



Malindza-Siteki Waste Survey Report

(Eswatini)

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1. Study area

1.1. Location:

The Malindza/Mpaka community is located within the Dvokodvweni constituency (Inkhundla) which traverses an area of 515.9 km². The Malindza chiefdom, under the chieftaincy of Chief Ndlondlo Tsabedze, is one of the largest in the country and is host to the country's newest international airport at Sikhuphe (King Mswati III International Airport). This area is located in the eastern part of the country where the agro-climatic conditions are typical of a Lowveld. The landscape in this area coupled with the recent developments support varying land uses such as human settlement, grazing, subsistence agriculture, amongst a few others (pers. obs.). These land uses are practiced under communal Swazi National Land which constitutes all of the land in this area.

The Siteki municipality, on the other hand, is a small town in the eastern-most part of the country and is situated on top of the Lubombo mountain range. The municipality falls under the Lugongolweni constituency. Being a largely rural town, the land use in the municipality comprises largely of homesteads which practice gardening and subsistence agriculture, a small commercial CBD predominantly comprising of retail shops. There is also a textile firm within the boundaries of the town and it employs a few hundred people from the surrounding areas.

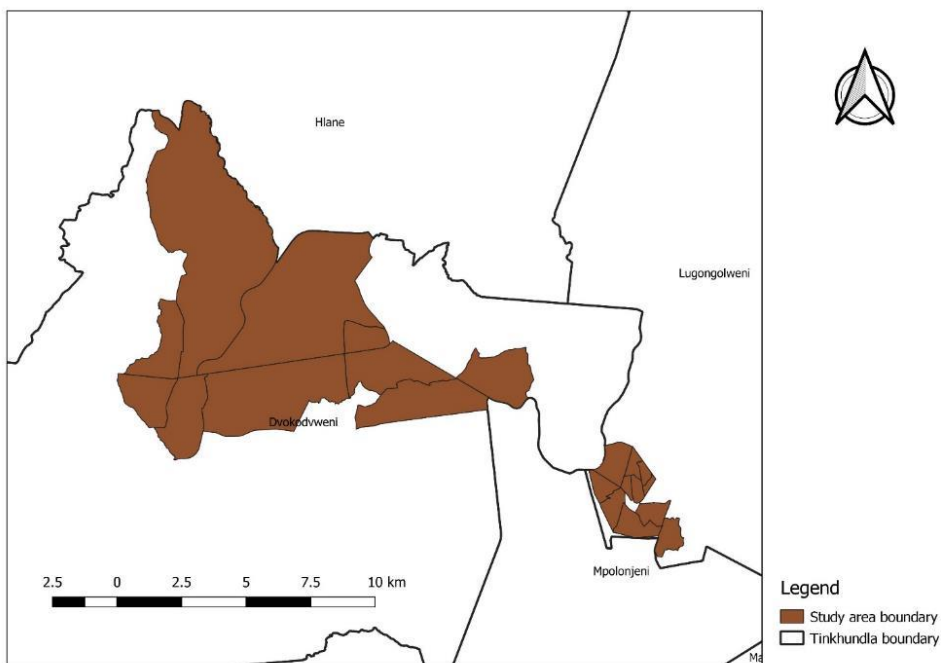


Figure 1: Location of Malindza and Siteki.

1.2. Demographics:

The Malindza Chiefdom is located within the Dvokodweni Inkhundla and is the centre of the developmental activities driven by the Sikhuphe International Airport and its precinct and other proposed developments such as the E52 billion Swazi City and the Thermal Power Station. The perceived opportunities coming with these and other proposed developments are attracting a large of immigrants into the area. This has resulted in a very rapid increase in human settlements/homesteads in the area. The 2017 Population and Housing Census estimated a total population of 20,846 within the Dvokodweni Inkhundla with an average annual growth rate of 1% since 2007. In addition, a number of commercial entities are increasingly being established particularly along the Manzini-Siteki (MR3) road. There is a similarly notable increase in human settlements and small enterprises within the Lonhlupeko area, which is a nodal area under the Langa Chiefdom. The increase in urbanized settlements and commercial activities in these areas is putting pressure on the available land resources including, but not limited to waste disposal facilities. Being located on Swazi Nation Land (SNL) makes proper spatial planning a challenge in these areas. As such, there are no waste collection infrastructure and systems. Nevertheless, the high population density which results in high waste generation has necessitated the Swaziland Environment Authority considering these areas as waste control areas.

The Siteki Town, on the other hand, is located on top of the Lubombo escarpment located along the tourist route to Maputo and has the characteristics of a growing rural town. The Siteki urban area covers approximately 788.64 hectares, comprising 8 townships. The urban area consists of 418 occupied residential properties, 711 vacant properties, 23 commercial properties, 25 institutions and 19 industrial or agricultural properties. With a population of **3369 residents** according to the 2017 census, there is evidence that the town is not optimally planned in terms of human settlements and the location of key infrastructure. This, however, can be attributed to its history which still has a strong bearing on the current layout of the town.

2. Waste Generation and Collection System

2.1. Waste generation and collection:

The Siteki municipality does not own a weigh bridge, thereby making it difficult to ascertain the exact amount of waste collected within the town. However, an estimate was made based on the size of the truck being used (10.5m³) and assuming a density of 150kg/m³ (based on the Kwaluseni estimate of between 100 and 200kg/m³) and the frequency of disposal (currently once a week). This results in an estimated collected waste of 6.8 tons/month.

The results of the residential /domestic and business waste generation estimation from immediate source and at communal waste collection points are summarized in Table 4.2 below. The findings indicate that organic waste (including food), plastic, paper, metal and glass are the main types of waste generated in Siteki. Other notable waste streams include disposable nappies, electronic waste and rubble but these are relatively small quantities.

Table 1: Estimated waste generated from domestic and commercial sources in the Malindza/Siteki area.

Type of waste	Generated amounts (kg/month)				Total
	Business		Domestic		
	Siteki	Malindza-Lonhlupeko	Siteki	Mpaka Railway	
Food waste (organics)	5,068.44	5,335.20	10,978.66	1,576.85	22,959.15
Plastic	4,268.16	4,492.80	9,245.18	1,327.87	19,334.01
Paper/paperboard	2,800.98	2,948.40	6,067.15	871.42	12,687.95
Metal	666.90	702.00	1,444.56	207.48	3,020.94
Textile	266.76	280.80	577.82	82.99	1,208.37
Glass	133.38	140.40	288.91	41.50	604.19

Commented [MG1]: 21 m³ x 4 weeks = 84 m³ x 0.15 t/m³ = 12.6 t/month assuming the truck always full. Where the estimated 94.5 t/month come from?
In 2.3 it is mentioned that truck is 12 m³, which gives a figure of 7.2 t/month. Any clarification?

Commented [WD2R1]: I actually got 6.8 t/month (converted the weekly pickup to a daily rate before converting to a 30-day month) since assuming one week per month gives a 48-week year instead of 52. The correct truck size is 10.5m³ not the 21m³. I had put in the wrong data earlier, thanks for that.

Commented [MG3]: 45.5 t/month / (3369 x 30) = 0.45 kg/day. Is the reference to 3369 citizens confirmed?

Commented [WD4R3]: Yes, the population data is from the recent (2017) Census. But here we are still on the collected waste.

Other	133.38	140.40	288.91	41.50	604.19
Total	13,338	14,040	28,891.19	6,543.92	60,418.8

Most of the waste that is generated within the Siteki Municipality is general waste. However, institutions within the town that generate some hazardous waste and clinical waste include the Good Shepherd Hospital, Lubombo Referral Hospital, Nazarene Clinic, a local pharmacy and another small clinic in town. The Good Shepherd Hospital and Lubombo Referral Hospital own incinerators which are used to dispose of clinical waste. The other two clinics store their medical waste in sealed containers which are then taken to the larger hospitals for incineration for disposal. It was noted though by the study by ESMS (2016) that the pharmacy in the town generates expired drugs which are inappropriately disposed of as general waste in waste bins that are eventually emptied at the local dump site.

Considering the generated waste amount of 42.2 tonnes per month vis-à-vis the maximum collected waste of 6.8 tonnes indicates a collection efficiency of only 16% at Siteki. Hence, an estimated minimum of 36.9 tonnes of waste are left uncollected each month. The situation in the Malindza-Lonhlupeko area is such that only 29.2% (5.3 tonnes) of the waste generated (18.2 tonnes) is collected. However, it should be noted that this figure is only for the business areas and the Mpaka Railways village (i.e. the bigger communal area is excluded and not part of this initiative).

Table 2: Estimate waste generation and collection at the Malindza-Siteki area.

Type of waste	Generated amounts (kg/month)					
	Siteki			Malindza-Lonhlupeko		
	Generated	Collected	Difference	Generated	Collected	Difference
Food waste (organics)	16,047.10	2,565.00	-14,023.60	6,912.05	2,023.5	-4,888.55
Plastic	13,513.34	2,160.00	-11,809.34	5,820.67	1,704	-4,116.67
Paper/paperboard	8,868.13	1,417.50	-7,749.88	3,819.82	1,118.25	-2,701.57
Metal	2,111.46	337.50	-1,845.21	909.48	266.25	-643.23
Textile	844.58	135.00	-738.08	363.79	106.5	-257.29
Glass	422.29	67.50	-369.04	181.90	53.25	-128.65
Other	422.29	67.50	-369.04	181.90	53.25	-128.65
Total	42,229.19	6,750	-36,904.19	18,189.61	5,325	-12,864.61

The ESMS status quo report (ESMS, 2016), however, gives an estimate of 389.9 tonnes of waste being generated monthly at Siteki (see Table 2 below). This would give an average of waste generation of 0.035kg/capita/day, which is near impossible. Hence, the ESMS values could be underestimates considering the size of the truck used to collect waste and disposal frequency.

Commented [MG5]: Where 42 t/month comes from? See comment above

Commented [WD6R5]: See Table 1 and Table 2

Commented [MG7]: I have a figure of 12.6 t/month assuming the truck always full. Where the 7.7 figure comes from? It should be 58.9 - 12.6 = 46.3 t/month left

Commented [WD8R7]: I have looked through my data, again it might have been fatigue. The 6.75 is based on a smaller (10.5m³) truck (as opposed to the 21m³).

Commented [MG9]: Perhaps is referred to COLLECTED waste? In the negative, the difference between ESMS and report is really huge. What is the reason for?

Commented [WD10R9]: The value given is for waste GENERATED. As stated in the following sentence, I also believe that the ESMS estimate was a big underestimate. Please look through the report (which I also shared). Their waste characterization methodology was also not clear.

Commented [MG11]: It could be reasonable if the truck is not full (50%)

Commented [WD12R11]: Please note that the ESMS value refers to total waste generated (not collected). I was told the once a week disposal is after waiting for the truck to be full...i.e. they collect waste more than once in the town centre and then the domestic, after which they then dump the waste. I would understand if the value was for waste collected (and assuming 50% full).

Table 3: Waste streams and their sources at Siteki (source: ESMS, 2016).

Waste stream	Average Yearly Waste Volumes (kg)					
	Hotel / entertainment	Households	Textile Industry	Commercial	Office	Total (kg)
Plastic	1517.36	2,008.02	0	406.19	15.65	3,947.22
Bottle	3,665.12	577.22	0	0	0	4,242.34
Paper	2,675.45	1,806.33	2,350.08	102.72	62.57	6,997.15
Domestic - Kitchen	12410	5132.37	0	0	0	17,542.37
Domestic - others	0	2015.32	0	0	0	2,015.32
Cans	2070.59	131.4	0	0	0	2,201.99
Textile	0	0	5,625	0	0	5,625
Annual totals	22,338.52	11,670.66	7,975.08	508.91	78.22	42,571.39
Number of individuals	132	146	2	19	12	
TOTAL	2,948,685	1,703,916	15,950.2	9,669.29	938.64	4,679,159.09

2.2. Textile industry and textile waste disposal:

There is only one textile company which has been operating in the Siteki town for some time albeit under different ownership due to the volatility of the textile industry. Currently the textile company which has just started operating is a South African company, JS Clothing (PTY) Ltd located on the periphery of the town. The company is expected to employ almost 1000 people when it is fully operational by the end of 2018. It's main target market is local and the SADC region.

However, there is currently no data on how much they will be disposing of as waste. Furthermore, the municipality indicated that it does not have the authority to inspect industrial areas and hence did not have information on how the textile waste has been disposed of in the past. Nevertheless, a site visit to the Siteki dumpsite indicated that there is an appreciable amount of textile waste being disposed of and was being collected by waste pickers to supply the recyclers in Matsapha.

Commented [MG13]: Has SEA the authority?

Commented [WD14R13]: I am sure SEA does have the authority to check.

Commented [MG15]: It is said that the JS has just started its activity. Any explanation?

Commented [WD16R15]: As explained in the previous paragraph (and the Kwaluseni report), the textile industry is very volatile, there has been a lot of closures and re-openings in the recent past...the previous companies closed shop.



Figure 2. Waste pickers collecting textile waste from the Siteki dumpsite.

2.3. Waste collection system and infrastructure:

The estimated waste collected from the town is based on the waste collection truck of 10.5m^3 in size, disposing of waste once a week, a load factor of 1 and assuming a waste density of $150\text{kg}/\text{m}^3$. The table below shows the estimated amount of waste from the Siteki Municipality disposed of at the Siteki Dumpsite.

	Siteki Government rear-end load truck	Mpaka Railway Tractor	Malindza businesses Skip
Size of truck	10.5m^3	3.5m^3	5.5m^3
Total number of trips	Once per week	Twice per week	Once a month
Waste density	$150\text{kg}/\text{m}^3$	150	150
Collected waste (kg per month)	6,750.00	4,500	825

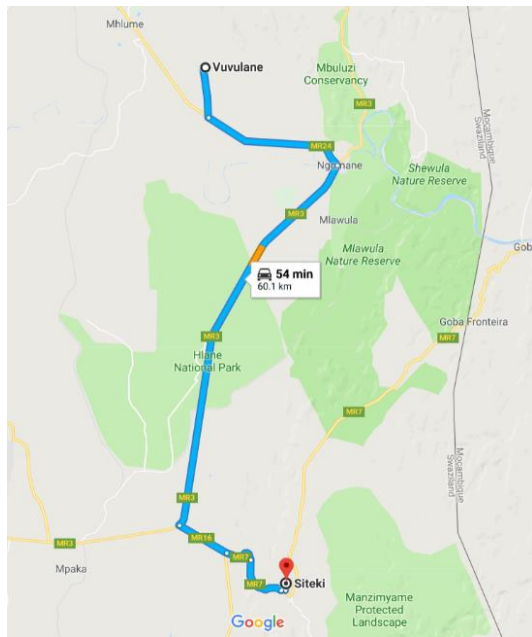
A total of 16 waste collection points were surveyed in the area, a large majority (~70%) of which used privately-procured bins and drums for waste collection. The rest of the respondents use refuse bags. Generally, waste is either stored in the refuse bags and plastic bins for transportation by a 10.5m^3 government garbage truck (rear-end loader) or disposed of directly into backyard pits. The plastic bags or bins are normally placed outside within the premises whilst plastic bags for packaging groceries are also used for storing waste within homesteads. The truck used by the Siteki Municipality is provided by the Ministry of Housing and Urban Development and is shared with another smaller town, Vuvulane, which is 61 km away.

Commented [MG17]: It was motioned 21 m3 in 2.1. Which figure is the correct one?

Commented [WD18R17]: It's actually 10.5m^3 , not 21 nor 21m^3 my mistake. As corrected above



Figure 3: Examples of waste collection infrastructure within homesteads at Siteki.



The sizes of these bins are the normal 85litre (750 x950mm) size and were located within selected homesteads and near some business areas. These receive waste almost daily and accumulate until the gabbage rear-end loader picks them up on a pre-set day during the week. At Malindza, a 5.5m³ skip bin has been placed near the fruit and vegetable market where waste is disposed of and collected monthly. The Mpaka railway utilizes a tractor-drawn trailer with a capacity of 3.5m³ the waste of which is disposed 2 times a week.

Table 4: Waste disposal frequency in the Malindza/Siteki area.

Waste disposal frequency (per week)	Percentage of respondents	
	Homesteads	Businesses
1	33.1	15.5
2	19.8	24.1
3	11.5	1.7
4	4.1	0
5	1.7	0
6	0.8	0
7	28.9	58.6

The Siteki Municipality indicated that their collection is once a week for residents and daily for businesses. However, the truck only disposes of the waste once a week after reaching its full capacity. This is to a certain extent somehow corroborated by the findings above. Nevertheless, the findings from the survey indicate the waste collection system is not entirely reliable possibly due to the lack of a dedicated waste collection truck for the town.

What is notable from the Mpaka (Malindza) area is that there is lack of waste collection infrastructure. This is evidenced by the high number of open burning practices within the area. When asked on the waste collection service providers, almost all the respondents indicated that there is currently no formal waste collection system. Most of the businesses transport their waste to the local dumpsite located not far from and managed by the Mpaka Railway Station. The findings indicate the need for a dedicated waste collection system for the area. Currently, only the Mpaka Railway has outsourced waste collection to a private contractor through a formal contract. The contractor then collects the waste from the village houses to the local dumpsite and this is undertaken twice a week. The waste collection at the Mpaka railway village is operated by a 3-man shift comprising 1 driver and 2 waste collectors. The contractual costs could not be ascertained.

Most significantly, a majority of the respondents take responsibility of disposing of their waste, most often in illegal dumps within the Malindza and Siteki areas. The inefficiency of the collection system results in the widespread disposal of waste in backyards, where it is often burned and, to a lesser extent, buried.

- Commented [MG19]:** This sentence does not match with the information provided above and can change the estimates on collected amounts estimated above assuming once a week collection.. Any clarification?
- Commented [WD20R19]:** The disposal is once a week, even though the waste is collected daily. Due to the size of the truck vis-à-vis the amount of waste collected, they have to collect several times until the truck is full before final disposal at the dumpsite.
- Commented [WD21R19]:**



Figure 4: An example of a backyard pit where waste is burned.

A majority of the respondents in the area indicated that the currently recognized waste collection service provided by the Siteki Municipality is unreliable and inadequate. This was evidenced by the high incidence of backyard burning. Save for the Siteki Municipality, the current waste collection frequency is haphazard, and the waste is collected any day depending on the availability of the means of transport.

The current waste disposal practice at Mpaka and Siteki can be summarized as follows:

- There are no dedicated and properly trained (environmental health) personnel to manage waste in Siteki Town and Malindza area
- Both the Siteki town and Malindza area do not have most of the infrastructure that will allow for the current waste management system to meet the required environmental standards.
- The dumpsites (both Mpaka and Siteki) is not protected and not operated in a manner that meets the required environmental standards.
- Incoming waste is not recorded and weighed at the Siteki and Mpaka dumpsites.
- There are no weighbridges at the dumpsites.
- Waste segregation at source and the dumpsite is not practiced.
- Waste at the dumpsites is not spread and covered, hence it is easily blown away by wind and scavenged by dogs, wildlife and livestock.

- The dumpsites are not properly designed and located and as such land and water pollution and spontaneous (methane) combustion are highly possible. In addition, the Siteki dumpsite is a health hazard to the nearby homesteads.
- There is widespread illegal dumping in undeveloped plots, thickets, bushes and along footpaths.
- Problematic waste includes the part of waste that is not easily biodegradable such as nappies and plastic bags.



Figure 5: Locality map and photo of the Siteki dumpsite.



Figure 6: Locality map and photo of the Malindza/Mpaka dumpsite.

2.4. Waste fee policy:

The Siteki Municipality currently does not have a dedicated office responsible for environmental health or waste save for the Community Development Officer who is currently acting in that capacity. The annual budget allocation for Siteki Town Council is always inadequate to allow for the municipality to effectively manage the solid waste in the town. The Ministry of Housing and Urban Development has since seconded two (2) officers to the Municipality to assist with environmental health issues in the town. However, these are not professionally trained to deal with waste management issues.

Nevertheless, the Siteki Municipality currently charges waste collection fee which is included in the municipal rates. Collection of waste for businesses within the Malindza-Lukhula corridor ranges from E10 to E100 per month, depending on the size of the business and the generated waste. However, the majority pay between E50 and E100 to private vehicles. At Malindza, there is currently no waste fee policy. Business/shop owners take care of their waste disposal costs which explains the widespread open dumping and burning of waste. Within the Mpaka railway village, the residents do not pay money relating waste collection. The Swaziland Railway reported that waste is collected 2 days in a week using a tractor whose trailer size is 3.5m³.

Collecting entity	Fee	
	Household	Business
Municipality (included in rates)	E150	E300
Malindza/Mpaka		E10-100

However, the municipality indicated that the current legislative framework does not allow the Siteki Municipality to collect waste from the industries such as the only textile company within the town. As such, waste from the company is only disposed of by the company and is out of reach.

This fee structure is reflected by the majority (76%) of respondents who indicated that they are willing to pay monthly fee of E10 for the waste collection under the current governance and operational conditions.

Fee (E)	Percentage of respondents willing to pay	
	Households	Businesses
5-10	47.5	29.1
11-20	18.8	21.8
21-30	2.5	1.8
31-50	7.5	23.6
51-100	10	12.0
>100	13.8	1.8

The findings corroborate the observations from ESMS (2016) wherein a majority of the residents (>85%) within the Siteki Municipality indicated that they are only willing to pay up to E50 per month for waste collection services.

Commented [MG22]: Is this duty is left to the factory? Is it mandatory? Is it possible to have more details?

Commented [WD23R22]: Yes, the factory disposes the waste itself, the details of which were not yet available due to the fact that is still new.

Commented [MG24]: What this table means? As the fee is 150 for households and 300 for business, no one is willing to pay. Will they pay for a better service?

Commented [WD25R24]: Exactly, the residents felt they are not willing to pay for the current fee (which is hidden or included within the property rates)

3. Recycling

3.1. Recyclable waste generation:

Despite a majority of the residents being aware of the importance of recycling, waste segregation was observed to be very low within the area and was largely restricted to the Siteki Municipality. Here, a majority of the recycling is done by waste pickers who collect recyclables, predominantly textile, on behalf of recyclers based in Matsapha. Hence, most of the recycling is unstructured, hap-hazard although it is a source of income for the poor residents of the small town. Hence, the quantities of material being recycled could not be ascertained. Nevertheless, the study by ESMS (2016) estimates that 5% of the total waste generated within the Siteki Municipality is being recycled.

Information on the buying prices could not be obtained from the waste pickers as most of them were skeptical and deemed such to be confidential business information. Since the buyers are the same Matsapha recyclers, it is expected that the buying prices are the same (refer to Kwaluseni Report), save for possible markup charges from the middle-men to cover their transportation costs.

3.2. Recycling industry and market prices:

With regards to recycling, there are no formalized recycling programmes within the Siteki and Malindza area. However, individual waste pickers found at the dumpsite indicated that they buyers within the Matsapha industrial area.

Interestingly though, approximately 16% of the respondents (almost all of them from Siteki) indicated that they are involved in some kind of recycling, albeit informally. Very few (26%) of the local residents indicated that they are aware of recycling initiatives in the area, a majority of whom were individual waste pickers who are possibly selling to the bigger recycling companies within the Matsapha municipality.



Commented [MG26]: ESMS study has provided quite different figures. Which figures can we rely on? ESMS or the study?

Commented [WD27R26]: Note the previous sentence. This study could not ascertain the amount of waste generated, but we could use the ESMS recycling estimate with caution.

Commented [MG28]: Recyclers in Matsapha provided figure on buying prices during our visit. They are not confidential as are available to everyone who want to sell to recyclers. Is it possible to have at least buying prices from recyclers?.

Commented [WD29R28]: These are provided in the Kwaluseni report. But note that not all of the recyclers are willing to share that info, probably because some are not licensed by the SEA.



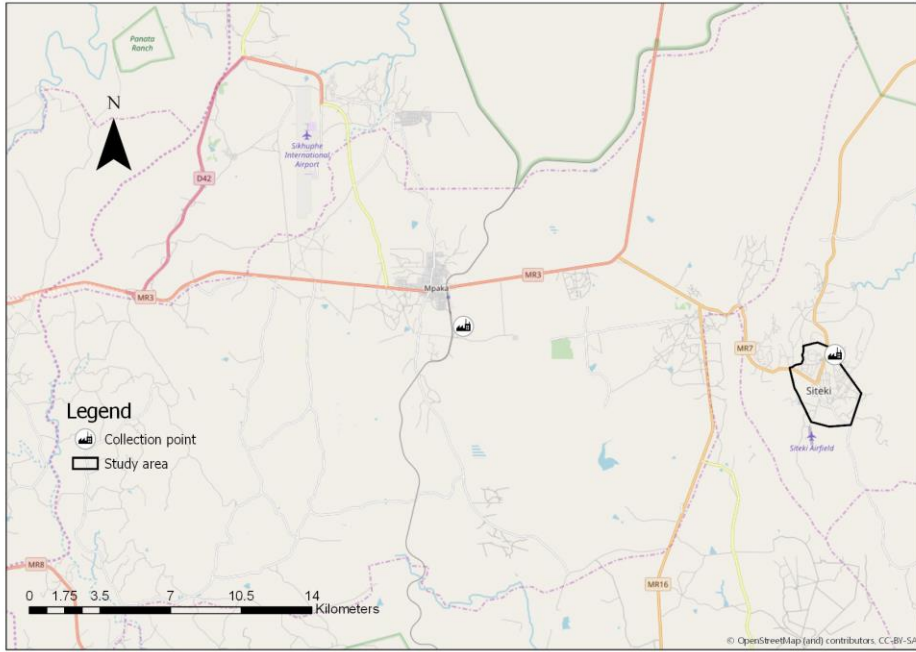
Based on the discussions with the waste pickers who pointed that the recyclers are based in Matsapha, it can be safely assumed that most, if not all, of the recyclers are on the Kwaluseni list.

4. Proposal for collection points

Collection points for the Malindza-Siteki corridor could easily be placed in a strategic place along the road as most of the business areas are also found there. However, most of the residential areas are accessible by road albeit the differing road conditions thereby necessitating a collection point to be located at or near the dumpsite. This should be done in addition to skip bins that should be located within each of the business clusters. A map showing possible collection points is shown below (Figure 7).

Commented [MG30]: Have the collection points discussed with SEA and Municipality?

Commented [WD31R30]: Yes, these were discussed were actually suggested by the Malindza headman and Bucapho, including the business owners themselves.



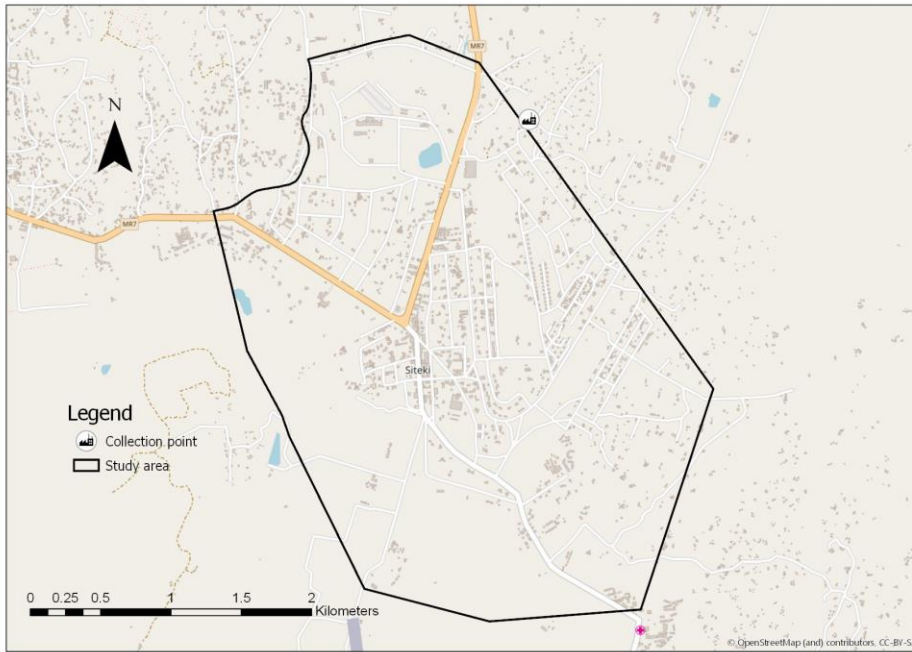


Figure 7: Proposed collection points along the Malindza-Siteki route (above) and Siteki Town (below).

For the Siteki municipality, the current waste collection points are the individual homesteads. The only improvement could be the collection frequency and ensuring that all homesteads are covered by the municipality's waste collection services. A waste collection point cum transfer station could be established at the current Siteki dumpsite after its closure and rehabilitation. The unrecyclables would then be transported to a proper landfill at Mpaka/Malindza. Another Collection

Commented [MG32]: The improvement should be the extension of the service to all households

Commented [WD33R32]: According to the survey and the Council, all the homesteads are covered. The issue is reliability on the collection frequency, i.e. some weeks are missed by the council.

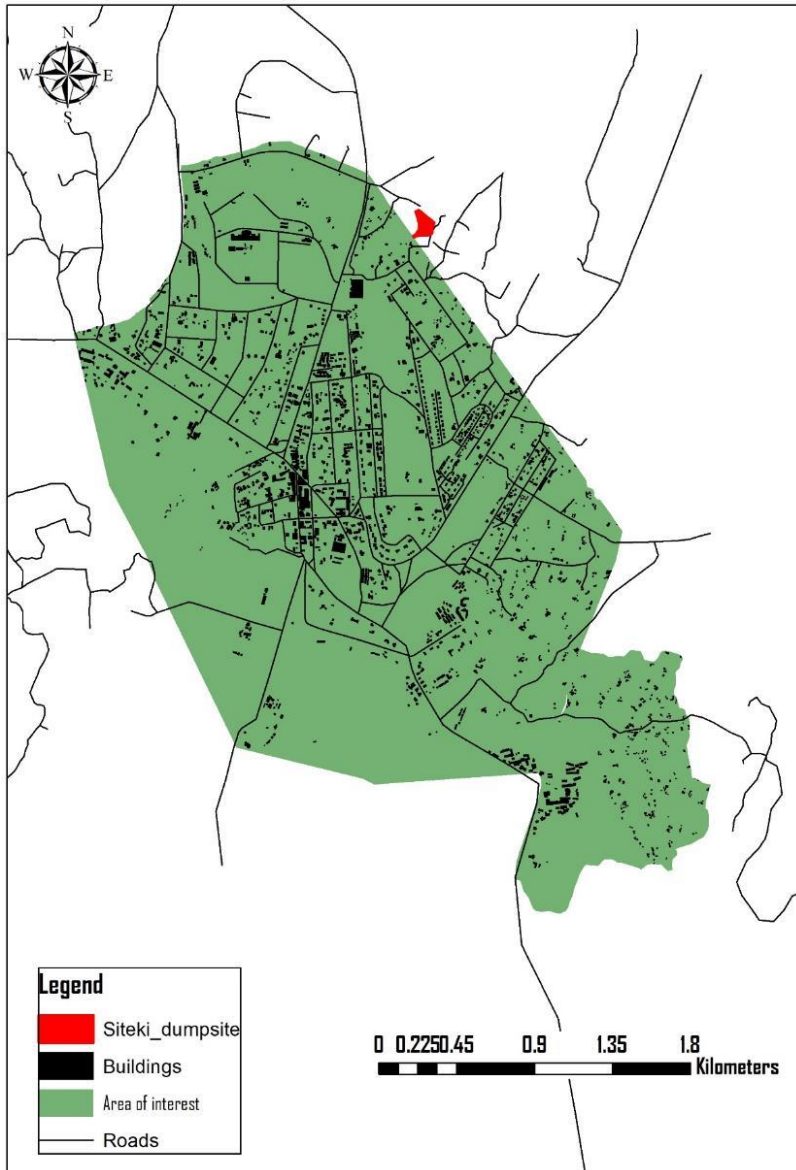


Figure 8: Buildings within the Siteki urban area.

5. Best Environmental Practice Assessment

In this section, the most important findings of the Status Quo analysis that will support the development of the Integrated Solid Waste Management Plan are presented.

5.1. Awareness and Education

In as far as they are concerned, the communities both within Siteki urban area and at the periphery, are well aware about appropriate waste management practices as well as the supporting legislation and other regulatory mechanisms. However, the survey also reveals that the communities have received very little support in terms of deliberate efforts to train, educate and build local capacity for solid waste management.

There is therefore an opportunity to develop tailored education and awareness-raising campaigns that will address the specific needs of the communities.

5.2. Composition of Waste Streams

There is a possibility that some other forms of waste are removed between source and collection points (bins), considering the high level of illegal dumps in undeveloped plots, bushes and thickets within the town boundaries. The low coverage of waste removal services by the Siteki Town Council is likely to result in some other forms of waste such as disposable nappies (which are difficult to degrade) and rubble being dumped illegally outside of their points of generation. The implications of this observation are that:

- Only a fraction of the solid waste generated ends up in the collection points (some is removed for reuse and others dumped illegally)
- More than 50% of the organic fraction of the waste is removed between source and recovery, thereby understating the actual volumes of such waste that are being generated.

5.3. Solid Waste Quantities

Current waste collection levels at Siteki are at about 18.3%. There is also an absence of proper documentation of the waste volumes that are collected from source and taken to the local dumpsite both in Siteki and Malindza. Even if the Siteki Town Council and Malindza Chiefdom were to initiate the keeping of an inventory for the different waste streams and their volumes, it would be difficult to do so effectively without addressing first the problems of illegal dumping and poor system of waste collection to the dumpsite. Although an attempt was made, it is currently unknown and difficult to estimate how much agricultural waste is generated and how much organic waste is recovered or composted.

The Siteki dumpsite is completely open thereby allowing livestock and pets (particularly dogs) to scavenge freely. Furthermore, the waste is burned periodically.

The Mpaka dumpsite, although partially fenced, is accessible to a lot of scavenging dogs. It was also observed that a failed attempt was made to dig a depression into which waste was to be disposed of and buried. Unfortunately, that was improperly done and is now accumulating water.

5.4. Waste Segregation

A significant amount of recyclable waste currently finds its way into the dumpsites both at Siteki and Malindza, including cans, bottles, plastic and garden waste/yard trimmings such as leaves, which are compostable.

5.5. Institutional Capacity

The Siteki Town Council currently has limitations in its ability to manage the current solid waste management system. Some of the limitations are as follows:

- STC does not have a dedicated department of Public Health, Safety and Environment with proper staffing.
- The institutional set-up for STC does not allow for effective management of waste.

- The overall budgetary requirement for managing the town is way higher than the yearly budget allocations that are made available to STC, thereby limiting the town's ability to effectively function.
- Financing of solid waste management currently remains a challenge in Siteki both as a direct service provider and in informal partnerships.
- STC does not have any waste pick-up trucks and other waste management equipment but only depends on one truck that is borrowed from the MHUD.

The Malindza area does not have a proper institutional structure for waste management save for the area's Chiefdom Development Committee which is also expected to focus on environmental issues. Exacerbating the situation is the fact that The Mpaka/Malindza dumpsite is under the custodianship of the Malindza Chiefdom, which does not have the capacity to manage the site. Additionally, the Mpaka railway village's waste management capacity is also low and in discussions with the Safety, Health and Environment Officer of the Swaziland Railways, it was indicated that they will need to be capacitated.

On a positive note, the Siteki Town Council in 2017 finalized a 3-year Integrated Waste Management Plan which was also approved by the Swaziland Environment Authority. This Plan covers most of the aspects of waste management including best practices including:

- Awareness, Education and Information
- Segregation
- Collection and disposal
- Recycling
- Collection of biodegradable waste

The Swaziland Civil Aviation Authority (SWACAA) has initiated a process for the formulation of an Integrated Waste Management Plan for the King Mswati III (Sikhuphe) International Airport at Malindza. The scope of work encompasses litter picking, refuse collection, waste minimization and beneficiation by using environmentally friendly approach to waste management; i.e. waste separation from the source. The service provider will also be expected to undertake snake control and grounds maintenance at the KM III temporary housing village. The invitation to tender, as advertised, indicates that the detailed work areas envisaged as part of the integrated waste management for KM III International Airport will include:

1. Landside: Separation of waste from source by providing additional labeled bins for the daily operation in the public spaces, offices & landscape works. Waste receptacles will be provided at the parking area that will be emptied daily.
2. Offices: Waste to be collected e.g. food, glass, plastic bottles, cans and paper. Color - coded bins must be supplied for this operation. When full they will be taken to the sorting area for further separation. Non-recyclable material will be disposed of at a licensed landfill facility.
3. Yard waste: Waste from landscaping works e.g. green waste must be collected by the service provider. Compost bins must be provided at the sorting area.
4. Parking lot and driveways: collection of waste in waste receptacles to be done two times a week
5. Cargo: Waste to be collected e.g. pallets, cardboard, plastic wrapping & metal racks.
6. Waste Receptacles: provision of refuse bins with a capacity of 200 litres to be provided and installed in strategic areas as directed by SWACAA and emptied 2 times a week. All identified areas shall be provided with receptacles for Bottles, Cans, Plastic, Paper and General waste.
7. Litter picking: Litter to be picked once a week along the Airport access roads. Litter pickers and Litter Wardens shall be employed to ensure that the area is kept clean at all times. Litter Wardens will be responsible for the enforcement of the Litter Regulations of 2012.
8. Aircraft: Waste from Aircraft to be collected e.g. paper, plastic bottles, card, food and sanitary waste. Separation of the waste will be done at the sorting area; the operation will be coordinated with the ground handling company.

Commented [MG34]: There are negotiations going on about the rehabilitation of the Railway dumpsite. Why is not mentioned in the report?

Commented [WD35R34]: It is covered in the separate BEP Assessment Report...it can also be included here. However, those negotiations are not yet solid.

The envisaged integrated waste management has all the hallmarks of best environmental practice which could be emulated in the wider Malindza area as the area develops.

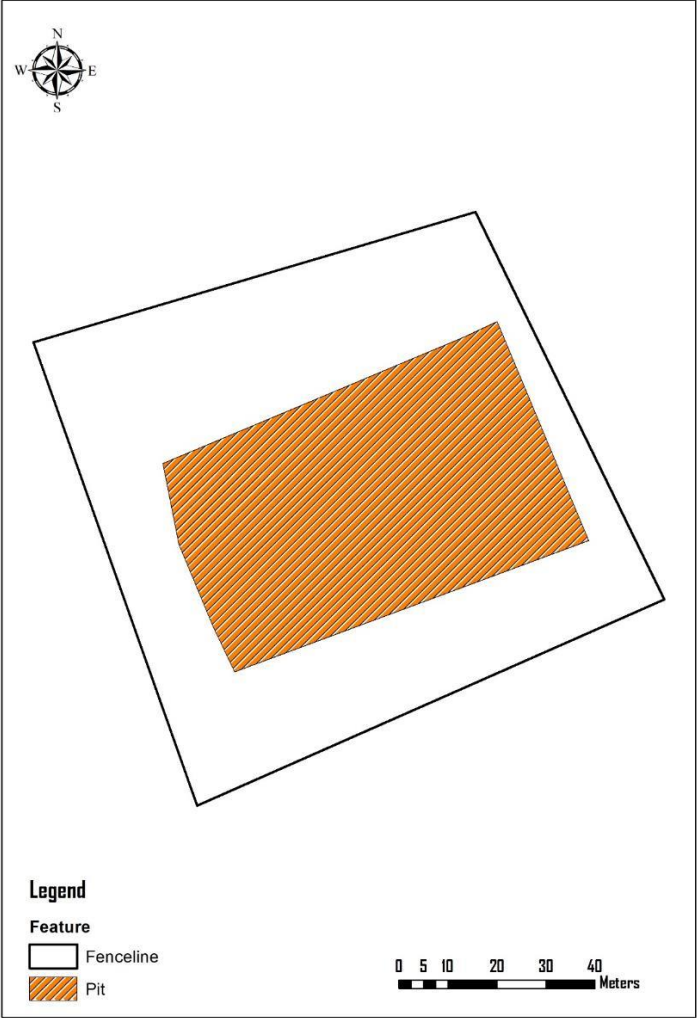


Figure 9: Current layout of the Malindza/Mpaka dumpsite