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RANADI LANDFILL RESTORATION REPORT

INTRODUCTION

The restoration of Ranadi dumpsite is one of the three activities under the J-PRISM Honiara Operations to promote Partnership and Enhancement for Managing Disaster Waste (J-HOPE project). The project in Honiara is purposely for the post disaster waste management organized by Honiara City Council, Ministry of Environment, Climate change, Disaster Management and Meteorology and J-PRISM/JICA in collaboration with Port Vila Municipality (PVMC), Vanuatu. Mr. Amos Mathias, Port Vila Landfill expert was deployed in Honiara for the period of 6 days to assist and plan the restoration work along with Mr. Joe Kelesi, HCC Landfill supervisor.

The restoration work focused mainly on construction of new access road into the landfill. Also spreading and compaction of the waste and building embankment at the entrance. Incoming vehicle survey was also conducted from 16th to 24th April. The data is collected under two very important circumstances such as post flash flood and Easter weekend.

OBJECTIVE

The Restoration work should achieve the following important aspects of the landfill

- To recover the Ranadi dumpsite after flood disaster based on the Rehabilitation line out plan,
- To enhance vehicles to access disposal areas properly
- To have proper access road into the dump
- To have embankment
- To establish temporary disposal areas

1.1 FLOOD DISASTER SITUATION

Ranadi dumpsite is located on the eastern end of the Honiara City boundary. The site was primarily a swamp land but progressively accommodates the daily incoming waste from the Honiara City Refuse collection system. Hence, during the flood disaster, Ranadi dumpsite was really affected by the runoffs from its nearest creek and a very big amount of rainfall that leads to water log at the entrance and at the back along the main access road. Vehicles could not access the disposal sites so easily, therefore waste from vehicles are dump unnecessarily in and around the dumpsite.



Caption: *above Right*. Picture shows the main access road entrance during the flood disaster. *Above left*: Picture showing minor access road that was used during the flood disaster.



1. Medical waste dispose openly **2.** Sewage Open disposal site





3. Main Access road conjoined a minor access road. **4.** Water log within the dumping area.

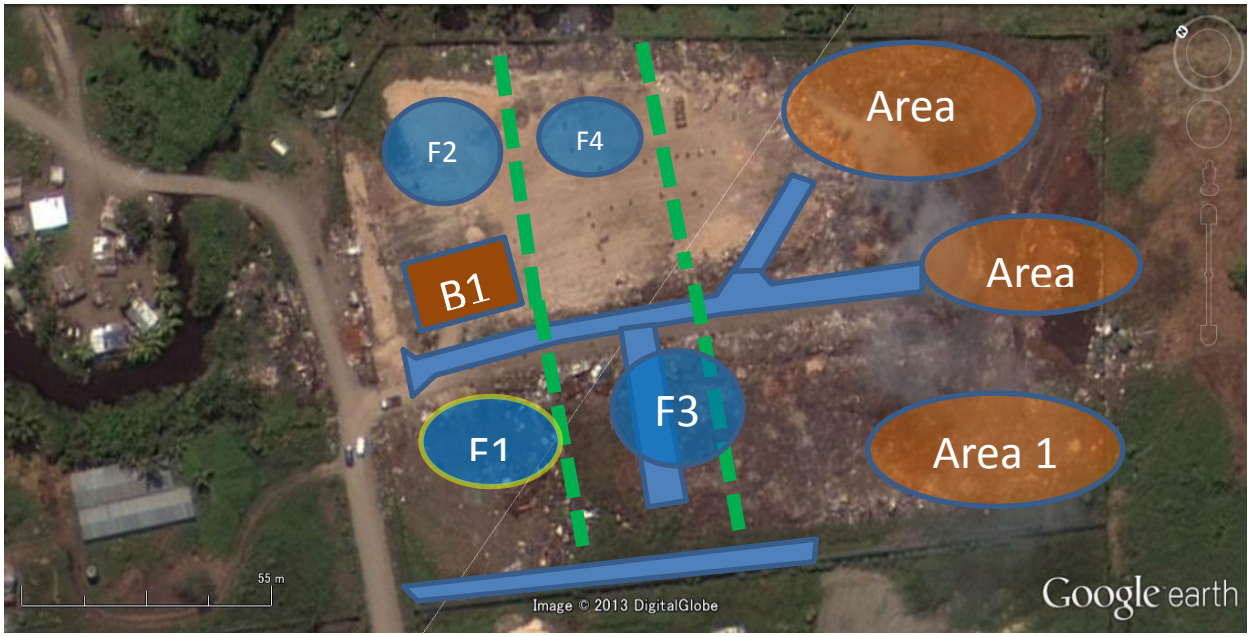
a) To develop a restoration plan

The restoration plan was based on the previous rehabilitation plan. Hence, the Restoration plan was to address the key areas of the site before enhancing further rehabilitation measures.

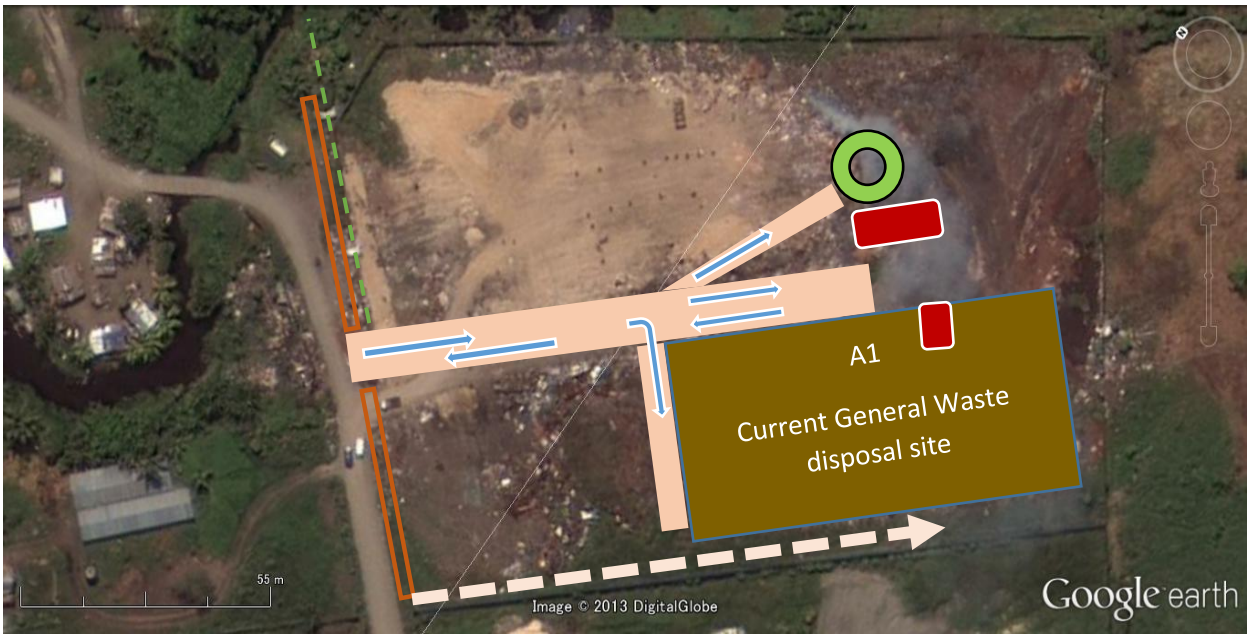
A restoration plan was developed purposely to ensure incoming waste are dumped correctly and vehicles flow in and out of the dumpsite.

2.1 RANADI RESTORATION WORK

Ranadi Rehabilitation Plan



Ranadi Restoration Plan



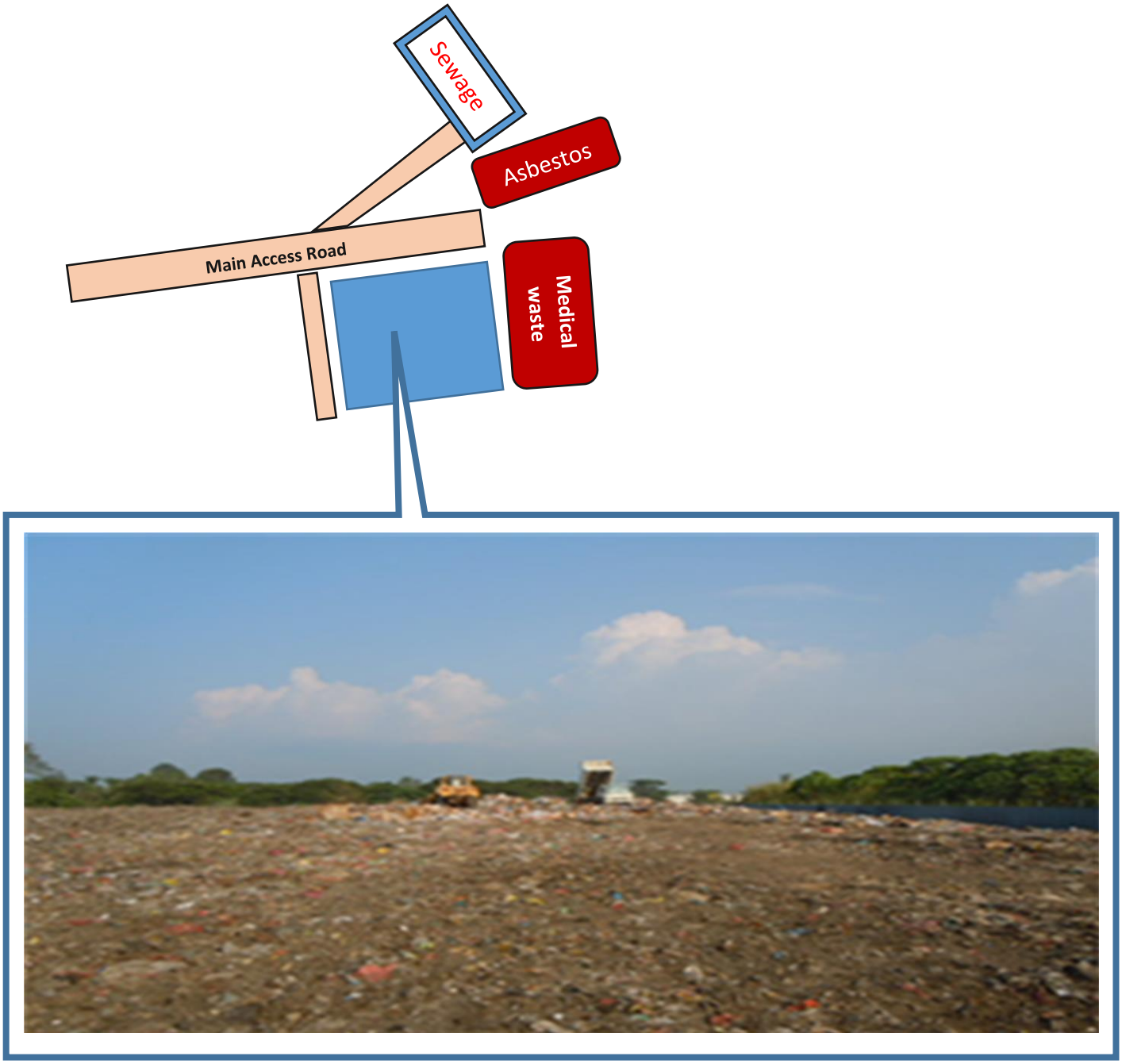
3.1 RESULT

3.2 Main access road



Above is the caption after the restoration of Ranadi landfill.

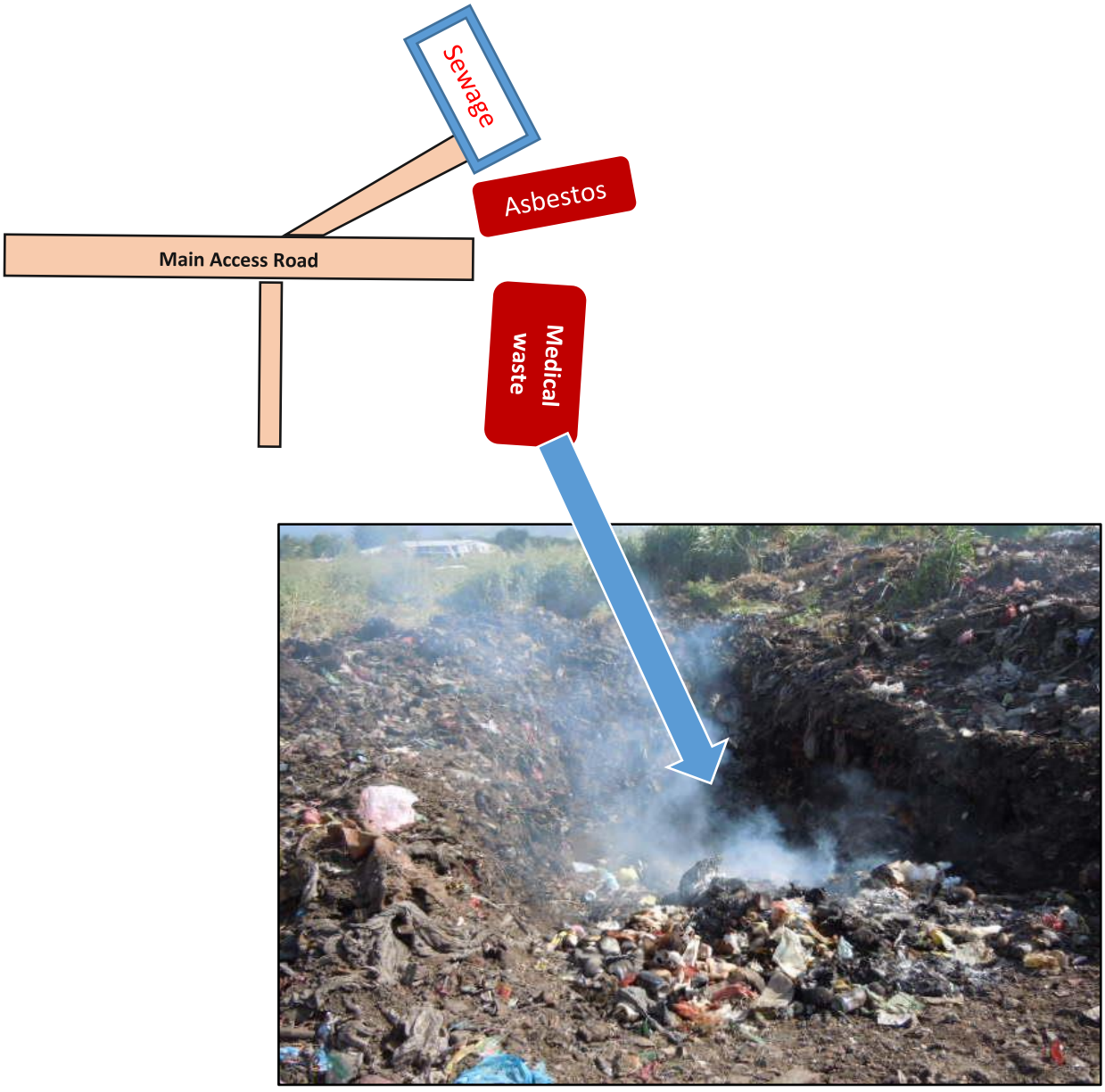
3.3 General waste disposal area 1



3.4 Sewage pit



3.5 Medical waste pit /Asbestos





The above caption shows the embankment work during the restoration of Ranadi Landfill in April 2014. There are two embankments erected at the entrance of the Landfill, indicating temporary fencing of the boundary.

a) To improve access to and from the disposal area

One permanent access road was constructed that cover a distance of about 100 meters. Another two conjoined roads was constructed as to access the General waste disposal area while another is to access the sewage disposal pit. There are 350 cubic meters of Coronus gravel been used for the road work. Also, the line out for an exit road has also been done but will be constructed on a later schedule.

b) To improve the site drainage

Drainage was constructed purposely to address water log, runoffs or overland flow and also to channel leachate from the dump. Proper culvert will be installed to help the drainage system work properly.

c) To improve/establish disposal cells

After the restoration work of the Ranadi dumpsite was done it is visible now that cells have been established especially for the general waste disposal. Embankment was established for the purpose of properly disposal and compression of waste.

d) To designate temporary stockpile area for disaster wastes within the site

Currently stock a site of the landfill was allocate for stockpile of incoming disaster waste. Now the amount of truckloads of disaster waste has now flowing into the landfill while there is none coming in during the restoration work. Hence, at the back of the dumpsite is proposed as temporary for stockpile. Such materials can degrade easily and be used for firewood and composting.

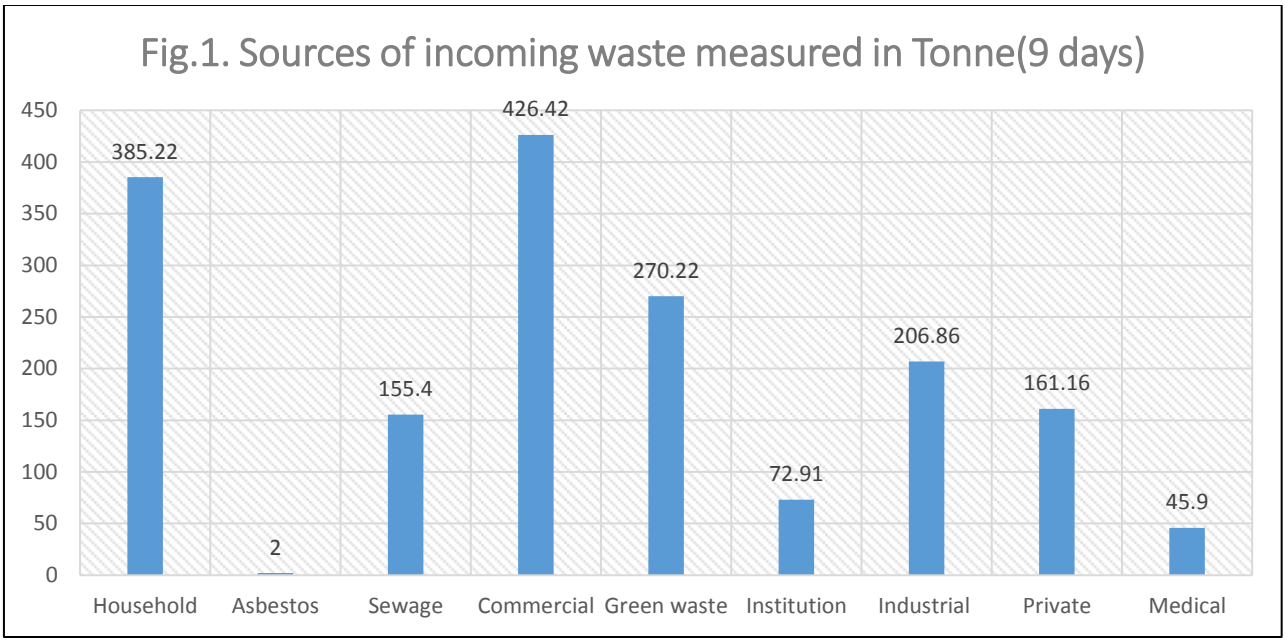
e) To monitor and keep record of data (types of waste, number of truckload, etc.) of the incoming disaster waste for the future evaluation at site.

Incoming waste data collection was also conducted at the Ranadi dumpsite. It is visible from each truck loads that organic or green waste dominates other waste. Recyclable materials are very common in almost all truck loads though at low quantity. Plastics are so obvious but occupying very small space. Recyclable materials and green waste do occupies more spaces. However, disaster waste flow into the landfill is coming in very slowly, but now it's coming in regularly

Table.1. Daily Amount of waste generated by sources

Date	Household	Asbestos	Sewage(L)	Commercial	Green waste	Institution	Industrial	Private	Medical
Wed 16	29.98		32500	57.72	20	9.62	7	12.4	4.08
Thurs. 17	61.3		14800	77.72	31	0.22	21.2	4	6.96
Fri. 18	31		11100	18.6	23.5	6.63	0.3	14.3	4.8
Sat. 19	45		29600	45.34	66	8	26	19	4
Sun. 20	9.5			18.3	35		20.6	3.72	3.6
Mon. 21	45.82		11100	29.5	11.12	8	8.5	2.64	2.5
Tues.22	47.3	2	7400	39.72	21.5	5	26.26	11.58	3
wed 23	27.48		29600	35.18	19.72	17	26	11.56	4.88
Thurs 24	30.18	2	25900	34.58	11.33	0.72	22.5	35.2	3.6
TOTAL	**327.56**	**2**	**129500**	**356.66**	**239.17**	**55.19**	**158.36**	**114.4**	**37.42**

The above table depict the amount of waste generated daily from the source. Sewage is measured in litters while others are measured in tones.

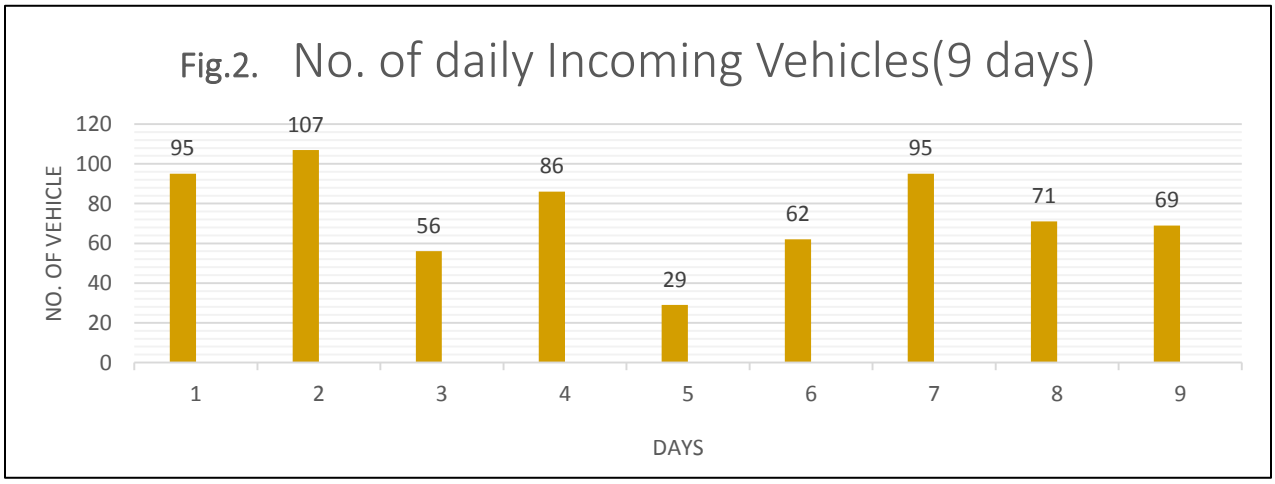


The graph shows the volume of waste generated at each source.

- Household waste represents general waste from residential areas that under Honiara city council refuse collection including contractors.
- Asbestos waste is very low in volume and incoming vehicles.
- Sewage volume is increasing daily with an average of 14,388 litters equivalent to 14.34 Tons per day
- Commercial waste includes business houses, hotels and restaurants
- Green waste comprises debris, grass, and woods
- Institutions includes schools such as SINU, KG6 and others that produces both general and kitchen waste
- Industrial waste is mainly from manufacturing companies, hazardous waste and constructions
- Private source includes all waste from private residences not under HCC refuse collection, Government ministry offices, NGOs and other private companies.
- Medical waste are from National referral Hospital and clinics, it also includes mix waste



Caption showing access roads constructed in the landfill. The main access road with two inner access roads to the general waste area and the sewage area.



The above graph shows the total number of vehicles coming into the landfill on a daily basis. On 17th April has the highest number of incoming vehicles. While on the 5th day have the lowest incoming vehicles duly because of Sunday where most religion observed. The graph shows a decrease starting on the 3rd day progressively into 5th day but gradually increasing on the 6th day. This is because of the Easter weekend that marked the most important celebration of Christians in the Honiara that result in less vehicles coming into the Ranadi Landfill. However, on the 7th day most vehicles are coming in after the long Easter weekend but gradually decreasing. In this regard the average incoming vehicle per day is 74. Therefore, the average general waste is 20 tons per day would cover approximately an area of 40 square meters. Currently the disposal area for general waste is approximately 50 square meters that indicates that machinery should be available daily.

ISSUES TO BE ADDRESSED AFTER RESTORATION

Issues	Remarks	Urgent
Access Road	An exit road is yet to be constructed while the main access require continues attention for gravelling and maintenance.	Urgent
HCC waste Vehicle	Market waste to be disposed properly especially at night	Urgent
Site management office	Daily management is very crucial in order daily operations are carried out effectively. Such building will cater for collection of first hand informations on the incoming waste.	Urgent
Tipper truck	Require to allocate 1 truck to be on the site by schedule for road maintenance.	Urgent
Site Traffic controller	Require another person to assist Andrew	Urgent
Medical waste	Waste separation is needed before disposal at dumpsite. It is noted that they disposed mixed waste with medical waste. This must be addressed by the Ministry of Health.	Urgent
Disposal Directive signs	Directives or written instructions makes it very simple for vehicles to disposed garbage at the right place.	Urgent
Drainage system	Culvert is required for the flow of water and leachate.	Urgent
Issues	**Remarks**	**ATTENTION**
After/before hour disposal	There is no traffic controller after 4:30 pm and before 8:30am that result to uncontrolled disposal at the site.	Attention
Develop disposal Awareness material	Very important to enhance directives to disposal sites to all incoming vehicle.	Attention
Commercial waste Vehicles	Tipping fee to be applied to enhance revenue and also responsible disposal	Attention
Soil cover	Soil cover is very important to enhance good compaction of waste and reduce odor to the surroundings. Soil needs to be on the site for use.	Attention
Sewage Vehicles	Tipping fee to be applied to enhance revenue and also responsible disposal	Attention
Waste Pickers	Useful workforce but require good coordination	Attention
Asbestos contractors	Tipping fee to be applied to enhance revenue and also responsible disposal.	Attention
Public access	The site needs to be privatized to HCC for proper management of the dumpsite.	Attention
Private vehicle	Tipping fee to be applied to enhance revenue and also responsible disposal	Attention

RECOMMENDATION

After the restoration work on Ranadi Landfill, there are current issues that are yet to be addressed and therefore the following recommendations are very important for consideration.

1. SEWAGE requires a permanent facility in order to sustainably manage the constant incoming volume of sewage. The Pit size of 18 Cubic Meter can be filled up within a month as already experience with the first temporary pit during the restoration. The volume of sewage filling the pit is overflowing into the water ways (creek). Therefore, a sewage pond is very important for proper discharging into the environment.
2. MEDICAL WASTE is hazardous that really requires attention especially at the final disposal. Temporary pit for burning was the only management method been practiced over the past years. Hence, it requires site incineration plant purposely for hazardous.
3. MACHINERY is foremost an important aspect of any Landfill management operation. Ranadi Landfill requires one EXCAVATOR and one BULDOZER. These machines are needed for spreading of the waste, compaction of the waste, road maintenance, embankment, cell, drainage system, pit, and soil covering. Those are the very important activities for proper management of the Landfill as to be able to accommodate the incoming volume of waste.
4. Develop an operation manual for Ranadi Landfill Rehabilitation disposal site. This manual contains the operational systems adopted by Ranadi landfill.
5. Schedule a yearly work plan for Ranadi Landfill. There are existing issues at the landfill that needs to be scheduled.
6. Main entrance gate is a useful tool for providing information and directives to all incoming vehicles.
7. Waste pickers within Ranadi landfill are also an important stakeholder. there are values in waste pickers therefore, they could be part of the operational system for Ranadi Landfill
8. Recyclers are very important partner stakeholders that help to reduce the amount of bulky waste at Ranadi Landfill. Therefore providing good link with them is necessary.

PROGRESSIVE WORK PLAN AFTER RANADI LANDFILL RESTORATION

N0.	ITEM	MATERIAL	QTY	EQUIPMENT	Description	RESPONSIBLE	TOTOAL COST
1	Drainage system	Culvert	7	Backhoe	1@$1744.00	Works/HCC	**$10,464.00**
		Concrete	2 cu	Mixture	1Cu@$793.00x2	Works(carpenters) /HCC	**$1586.00**
2	Soil Cover	Soil	-	tipper truck	Soil stockpile at site	Works /HCC	Ready
				Loader	1tyre@$11,623x4 1tube@$535.00x4	**SUPPORT?**	**$ 48,632.00**
3	Boom Gate Installation	Concrete		Mixture		Works/HCC	**Provided**
4	Line out of dumpsite boundary				Identifying land marks & issuing notices to settlers	Works /HCC	**Done**
5	Flyers(Awareness)	Flyer	130	-	Provide basic landfill management approaches to users	**SUPPORT?**	**$2600.00**
5	Directive/control signs		10		Signs for Disposal areas	**SUPPORT?**	**$3500.00**
6	Office building proposal				Review application	HCC/ECD/MHS	Done
7	1 traffic controller				Identified	HCC/EHD	Done

Above table is the proposed work plan for Ranadi Landfill after restoration.