PART 3 PILOT PROJECT

F. Social Consideration

F. QUESTIONNAIRE ON THE PUBLIC AWARENESS FOR MSW ISSUES

Location:

Municipality: _____

General Information:

Age:

□ 7 – 14 □ 15 - 21 □ 22 – 40
□ 41- 60 □ over 60

Level of education:

□ primary □ secondary □ science and technical
□ pre-university □ university

Occupation:

□ labourer □ professional □ housewife □ student

Gender:

□ Female □ Male

Family composition:

□ 1 pers □ 2 - 5 □ >5

Specific information:

1. The residents of Havana City produce the big amount of garbage which makes MSW treatment complicated every day. The dumping sites are filling up and reaching their maximum capacity. Moreover, transport problem to collect the garbage is getting to be serious, because of continuously growing quantities. Did you know about those problems?

□ yes □ no

2. Do you know any means to solve this problem?

□ yes □ no

Which?: _____

3. How would you evaluate the waste collection system regarding the following aspects?

Availability of containers

□ good □ regular □ bad □ absent

Frequency of the collection

□ timely □ slow □ absent

Time

□ very early □ good □ very late

4. How is the garbage collected?

□ closed truck □ open truck □ kart

5. Do you think this way is convenient?

□ yes □ no

6. How do you receive information on issues related to garbage?

□ radio □ television □ press

□ personally (schools, community, etc.) □ assemblies for financial accountability

7. In your opinion, who are responsible for the garbage problem?

□ Government □ DPSC □ the population □ all

8. Would you be prepared to help solve the garbage problems?

□ yes □ no □ if I get help

9. Do you know the value of garbage?

□ yes □ no

Which are its valuable components?

_____

10. The 3Rs are part of the solution to the garbage problem. Their meaning is: **Re-use, Recycling and Reduction:**

10.1 **Re-use** means to use any other things again instead of throwing them. Please mark with an X if you re-use any of these items:

□ cans
□ bottles
□ plastic bags
□ rags
□ paper and cartons
□ others: _____

10.2 **Recycling** means to use valuable materials present in the garbage as raw material to make other products. Please mark with an X if you separate any part of your garbage for recycling:

□ cans
□ bottles
□ plastic bags
□ rags
□ paper and cartons
□ others: _____

11. Would you separate your garbage before collection (cans, paper, glass, organic, etc.)?

□ yes, because it is a good idea to make use of raw materials that we would otherwise throw away
□ yes, because it's easy
□ yes, because _____
□ no, because I wouldn't know how
□ no, because it's a lot of fuss
□ no, because _____

12. Have you ever heard of compost?

□ yes □ no

13. Compost is a product made of organic material, or plant and animal rests such as those from the kitchen. It is used as a natural fertiliser, without causing harm to the soil and plants. Would you ever use compost?

□ yes □ no □ if I get help

14. If possible, would you make compost at your home?

□ yes □ no □ if I get help

What does it depend on? _____

15.1 Is there any landfill near your home?

□ yes □ no

15.2 If so, was it constructed before or after you came here?

□ before □ after □ don't know

15.3 If it was constructed alter you came here were you ever consulted by the authorities?

□ yes □ no

16.1 Generally spoken, do landfills cause problems to the neighbourhood?

□ yes □ no

16.2 Do landfills cause bad odour?

□ always □ sometimes □ almost never

16.3 Do landfills spread litter in their surroundings?

□ always □ sometimes □ almost never

16.4 Do landfills cause problems with harmful animals (rats, flies, cockroaches etc.)?

□ always □ sometimes □ almost never

16.5 Do landfills cause a fire?

□ often □ sometimes □ almost never

17. Are the landfills in good conditions?

□ yes □ no □ don't know

18. Are the landfills fenced?

□ yes □ no □ don't know

19. Is the garbage treated adequately in the landfills?

□ yes □ no □ don't know

20. Do landfills cause pollution and/or diseases?

□ atmospheric pollution
□ respiratory diseases
□ water pollution
□ gastro-intestinal diseases
□ noise
□ others. which? _____

21.1 In your opinion, who can help solve these problems?

□ government □ DPSC □ the population □ all

21.2 How?

_____

Thank you for your collaboration

G. Segregated Discharge:

G1 Stickers for Waste Bins

G1 STICKERS FOR WASTE BINS

(1) Stickers for Waste Bins at the Beginning of PLP

Kitchen Waste

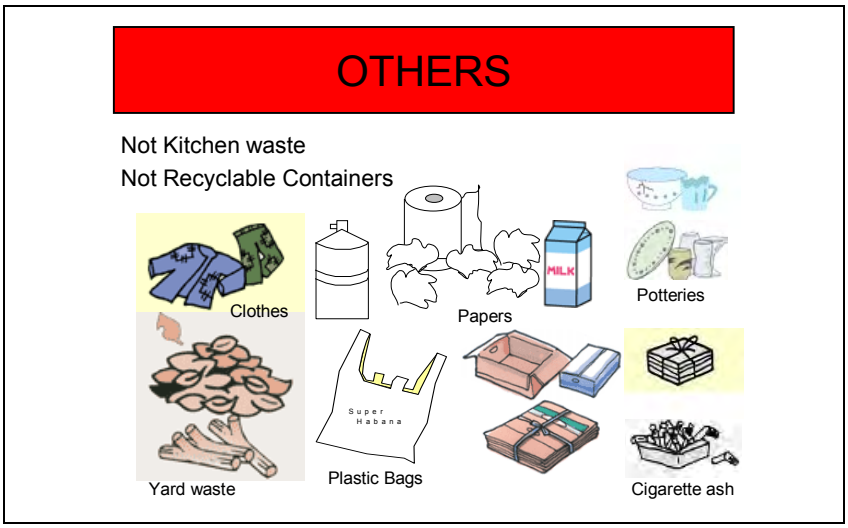
Resource

Others

(2) Revised Stickers for Waste Bins

Kitchen Waste

Resource



Others

G. Segregated Discharge:

G2 Instruction Paper for Residents

G2 INSTRUCTION PAPER FOR RESIDENTS

(1) Instruction distributed to Residents in Penas Altas in March 2005

NOTICE TO NEIGHBORS

A Pilot Project for segregated collection in Havana City is under way by DPSC and CITMA. Both organizations are trying to secure the proper sustainability and cost-effectiveness of the service in order to make it as stable as possible, its beneficiaries being the residents of Peñas Altas community.

In view of this innovation in the solid waste collection service, you are kindly requested to cooperate with segregated waste discharge. For this purpose we have arranged for three types of bins, namely: ***Organic Waste*** (only kitchen waste), ***Resource*** (recyclable materials) and ***Other*** (waste not classifying as Organic or Resource including printed and toilet paper, and wet cardboard and cloth as such conditions hamper the process of waste reuse).

You are expected to arrange for the proper separation of the waste at your homes: kitchen waste to be discharged directly (not in plastic bags) into the bucket; resource into a big cardboard box or plastic bag placed in the backyard, terrace or balcony to be discharged in the relevant bin as often as required during the week; and other, which includes non-reusable materials such as sweepings, yard waste and wood.

If discharge is done as required in every household, waste treatment at the Campo Florido landfill will be simpler and more economical, requiring less equipment, fuel, time and soil for covering other waste.

At the same time, *organic matter* will be turned into compost (organic fertilizer), thus preventing odors and insects, which are nuisance nearby residents often complain about, and *resource* (raw materials) will keep production flow going at the factories, which will result in the improvement of the people's living standards.

We hope that now you are more aware of the need to guarantee segregated discharge and that you are willing to become an activist and promoter of this task aimed at the protection of our environment.

LET'S RECYCLE

TO PROTECT OUR WORLD

CITMA HAVANA CITY – DPSC

(2) Instruction distributed to Residents in Penas Altas in May 2005

CITMA-HAVANA/DPSC

NOTICE

NEIGHBORS

DPSC in conjunction with CITMA is carrying out a Pilot Project on Segregated Collection of MSW in Havana City with the cooperation of the Japan International Cooperation Agency (JICA). Our aim is the sustainability and proper performance of such services without the need for significant governmental financial support to secure the stability of the same, the beneficiaries being the residents of **Peñas Altas**.

In view of this innovation in the collection service, your cooperation is essential for the proper separation of waste, which has so far lacked the required quality. With the aim of facilitating the operation, three waste bins will be provided. The new stickers used on them contain a clearer and more explicit information and facilitate identification of the bin in terms of category of waste: **Kitchen Waste (only food leftovers, vegetables and fruit), Recyclable Containers (glass, plastic, aluminum) and Other (all other unusable materials, i.e. neither kitchen waste nor recyclables),** plastic buckets being provided for collection thereof.

It is expected of you to arrange for the correct separation of the waste at home taking into account the categories described above, which is the basic element of the project. If plastic bags are used for lining the buckets to prevent the latter from getting soiled, it is necessary to empty the contents of the bags into the proper bin first before dropping it into the bin marked as Other.

If separation at source is carried out properly by everyone, waste treatment at **Campo Florido Landfill** will become easier and cost-effective, and less equipment, fuel, man/hours and cover soil will be required.

While organic waste will be turned into compost (**organic fertilizer**), odors and flies will be prevented and recyclables (**raw materials**) recovered will help keep production flow uninterrupted thus contributing to the economic development of the country.

We hope that now you are in a position to better understand the need to guarantee the quality of waste separation and are ready to become and activist and promoter of this task aimed at the protection of the environment.

THANK YOU VERY MUCH.

G. Segregated Discharge:

G3 Monitoring Record in Priority Stations

G3 MONITORING RECORD IN PRIORITY STATIONS

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 21(Mon) Month: May

Name of inspectors CP: Elida Study Team: Kamishita

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	20	100	0	0	A	15	100	0	0	A	17.5	100	0	0	
34	1 Kitchen waste	30	90	0	10	A	30	60	10	30	D	30	75	5	20	
	2 Recyclable Containers	30	0	80	20	B	20	0	90	10	E	25	0	85	15	
	2 Recyclable Containers	30	100	0	0	A	30	0	10	90	A	30	50	5	45	
	3 Others	100	0	0	100	A	120	10	10	80	B	110	5	5	90	
	3 Others	100	0	0	100	A	100	0	0	100	A	100	0	0	100	
27	1 Kitchen waste	10	80	0	20	B	15	60	0	40	D	12.5	70	0	30	
	2 Recyclable Containers	10	50	50	0	E	10	10	10	80	E	10	10	10	80	
	3 Others	10	0	0	100	A	15	0	0(some)	100	A	12.5	0	0	100	

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: As it can be shown some problems and difficulties with the segregation are being presented. The person that is located on the water tank says that everything is clear and he doesn't know why people mix the waste when they dump it into the containers.

Study Team: One sticker of waste bin of station27 was removed and missing. The damaged sticker should be replaced or repaired shortly to prevent people from misdischarging. Two of four children who participated as assistance of PLP attended the monitoring. Inspectors visited several households to see the condition and situation of waste segregation in houses. The situation was quite good. I supposed the leader of the building which we visited was very active to assist segregation and support for other residents. Some resident said that the classification was easy to understand and she did not have any difficulty for segregation in house. She used to mix all waste, even the recyclables, before PLP implementation. Other housewife showed us the label attached to three different buckets or bags which described the classification of waste. The labels were attached to every bag and bucket to remind themselves waste classification. We could see not all residents use the buckets we supplied for waste storage in house.

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 21(Sat) Month: May

Name of inspectors CP: Elida Study Team: Kamishita

Photos

Kitchen Waste / Residuos de Cocina | Recyclable Containers / Envases Reciclables | Others / Otros

# of Station 33/34






# of Station 27



Monitoring Sheet for Segregated Collection (separate discharge)

Date: 23(Mon) Month: May

Name of inspectors CP: Elida Study Team: Kamishita

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	20	80	0	20	B	15	90	0(some)	10	A	17.5	85	0	15	B
34	1 Kitchen waste	50	80	0	20	B	30	90	0	10	A	40	85	0	15	B
	2 Recyclable Containers	100	0	70	30	C	100	10	10	80	E	100	10	10	80	E
	2 Recyclable Containers	60	10	70	20	C	70	0	20	80	E	65	0	20	80	E
	3 Others	100	0	0	100	A	100	0	0(some)	100	A	100	0	0	100	A
	3 Others	50	10	0	90	A	50	10	0	90	A	50	10	0	90	A
27	1 Kitchen waste	20	50	0	50	E	30	30	0	70	E	25	40	0	60	E
	2 Recyclable Containers	20	20	40	40	E	30	10	50	40	E	25	15	45	40	E
	3 Others	20	0	0	100	A	50	10	0	90	A	35	5	0	95	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: As it can be shown some problems and difficulties with the segregation are being presented. The person that is located on the water tank says that everything is clear and he doesn't know why people mix the waste when they dump it into the containers.

Study Team: One sticker of waste bin of station27 was removed and missing. The damaged sticker should be replaced or repaired shortly to prevent people from misdischarging of waste. Two of four children who participated as assistance of PLP attended the monitoring. They said they sometime directed even adults to discharge in proper way according to waste classification in PLP. They felt residents had undersood the classification. I wondered why the situation of discharge was bad in spite of understanding by residents. Inspectors visited several households to see the condition and situation of waste segregation in houses. The situation was quite good. I supposed the leader of the building which we visited was very active to assist segregation and support for other residents. It highly influence the result of discharge by residents. Some resident said that the classification was easy to understand and she did not have any difficulty for segregation in house. She used to mix all waste, even the recyclables, before PLP implementation. Other housewife showed us the label attached to three different buckets or bags which described the classification of waste. The labels were attached to every bag and bucket to remind themselves waste classification. We could see not all residents use the buckets we supplied for waste storage in house.

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 21(Sat) Month: May

Name of inspectors CP: Elida Study Team: Kamishita

Photos

Kitchen Waste / Residuos de Cocina | Recyclable Containers / Envases Reciclables | Others / Otros

# of Station 33/34






# of Station 27



Monitoring Sheet for Segregated Collection (separate discharge)

Date: 24(Tue) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	10	100	0	0	A	5	90	0	10	A	7.5	95	0	5	A
34	1 Kitchen waste	10	80	0	20	B	5	80	5	15	B	7.5	80	2.5	17.5	B
	2 Recyclable Containers	0	0	0	0	–	0	0	0	0	–	0	0	0	0	–
	2 Recyclable Containers	10	0	80	20	B	5	0	60	40	D	7.5	0	70	30	C
	3 Others	10	0	0	100	A	5	0	0	100	A	7.5	0	0	100	A
	3 Others	20	0	0	100	A	10	10	0	90	A	15	5	0	95	A
27	1 Kitchen waste	0	0	0	0	–	0	0	0	0	–	0	0	0	0	–
	2 Recyclable Containers	0	0	0	0	–	0	0	0	0	–	0	0	0	0	–
	3 Others	0	0	0	0	–	0	0	0	0	–	0	0	0	0	–
32	1 Kitchen waste	0	0	0	0	–	0	0	0	0	–	0	0	0	0	–
	2 Recyclable Containers	10	0	50	60	E	10	0	40	60	E	10	0	45	60	E
	3 Others	5	5	0	95	A	10	0	0	100	A	7.5	2.5	0	97.5	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: Yard waste was found with great ammount to one of the sides of the containers and the area of collection.
Because there is a lot of garbage scattered on the sorrounding areas of the buildings, so children were motivated to collect these wastes to claen the area as volunteer works

Study Team: By the side of container No. 33&34, there was gathered yard waste which is segregated properly (it should go to 'others'). The amount of it was approximately 150% of waste bin.
Still, we saw some plastic bags in 'kitchen' and 'recyclable' containors which seems to be used to store garbage in households.
The measures for improvement should be considered.
As for 'recyclable' of No.32, considerable amount of paper containors of juice and corrugated cardboards was mixed because of a misunderstanding of households in this area. On the spot, C/P requested the improvement to the leader of households in this area.
Acording to the households inspection, it seemed considerable number of households are keeping dogs and cats. It must affect the discharge of kitchen waste.
So far, community members are motivated for the project and it seems to be possible to improve it more. To find good leaders who can teach how to segregate must be indispensable.

Monitoring Sheet for Segregated Collection (separate discharge) Date: 24(Tue) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 25(Wed) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	5	100	0	0	A	10	100	0	0	A	7.5	100	0	0	A
34	1 Kitchen waste	20	90	0	10	A	20	70	10	20	C	20	80	5	15	B
	2 Recyclable Containers	5	95	0	5	E	5	100	0	0	E	5	97.5	0	2.5	E
	2 Recyclable Containers	10	0	70	30	C	10	0	40	60	E	10	0	55	45	E
	3 Others	50	3	0	97	A	60	0	10	90	A	55	1.5	5	93.5	A
	3 Others	90	5	0	95	A	100	10	0	90	A	95	7.5	0	92.5	A
27	1 Kitchen waste	5	0	0	100	E	10	0	5	95	E	7.5	0	2.5	97.5	E
	2 Recyclable Containers	10	0	5	95	E	10	20	20	60	E	10	10	12.5	77.5	E
	3 Others	10	0	5	95	A	10	0	5	95	A	10	0	5	95	A
32	1 Kitchen waste	5	100	0	0	A	10	100	0	0	A	7.5	100	0	0	A
	2 Recyclable Containers	5	0	95	5	A	5	0	80	20	B	5	0	87.5	12.5	A
	3 Others	5	0	0	100	A	10	0	0	100	A	7.5	0	0	100	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: The situation today is worse than previous days.
Proper meassuers are being taken into consideration on point 27
Visit each household with CDR and Activists, Delegate someone to check the bins and Ask Vladimir to collect this point on Thursday.

Study Team: Still, we found plastic bags in 'kitchen' containors and generally the segregation of these contents were pretty bad. More attention should be paied for plastic bags.
We found the segregation of No.27 containors were much worse than that of No.33&34. Through the inspection to the household in No.27 station area,
it seemed the households were not informed or educated how to segregate well.
All of us including the community leaders have agreed the improvement measures are necessary.
It was agreed that publicity activities at every doors will be implemented by community leaders. Besides, the leaders or
someone on behalf of the leaders will pay more attention to the containors at No.27 station.
To evaluate expected improvement on No.27 station, C/P requested to restart segregation by making the containors. This
issue will be discussed by concerned persons

Monitoring Sheet for Segregated Collection (separate discharge) Date: 25(Wed) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 26 (thu) Month: May

Name of inspectors CP: Barbara Study Team: Hososno

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E
33	1 Kitchen waste	40	100	0	0	A	30	80	0	20	B	35	90	0	10	A
34	1 Kitchen waste	5	100	0	0	A	10	100	0	0	A	7.5	100	0	0	A
	2 Recyclable Containers	10	0	50	50	E	20	0	40	60	E	15	0	45	55	E
	2 Recyclable Containers	5	100	0	0	E	10	90	0	10	E	7.5	95	0	5	E
	3 Others	90	15	0	85	C	100	5	5	90	A	95	10	2.5	87.5	A
	3 Others	100	1	1	98	A	70	10	0	90	A	85	5.5	0.5	94	A
27	1 Kitchen waste	10	90	5	5	A	10	70	5	25	C	10	80	5	15	A
	2 Recyclable Containers	10	95	3	2	E	10	40	20	40	E	10	67.5	11.5	21	E
	3 Others	30	5	5	90	A	30	15	5	80	B	30	10	5	85	A
32	1 Kitchen waste	5	100	0	0	A	10	90	0	10	A	7.5	95	0	5	A
	2 Recyclable Containers	10	0	100	0	A	5	0	80	20	B	7.5	0	90	10	A
	3 Others	10	0	0	100	A	20	0	0	100	A	15	0	0	100	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: In a general way a notable improvement is not seen.
On point 27 an improvement was acomplished even though the wastes in the bin were not collected to be able to appreciate
the awareness that was carried out with the neighbours the previous night and today.
It has been requested by some of the neihbours that we participate on the voluntary cleaning works on Sunday so we can
communicate with most of the residents.

Study Team: Segregation of 'recyclable' containors are getting worse. Some measures for improvement mentioned in previous inspections should be taken.
The residents are going to hold a meeting for the project on Sunday. They will discuss how to improve the situation. We are
going to attend the meeting and discuss with residents.
Some improvement on No.27 was ovserved. It seems to be because of the leaders' and the helpers' efforts.

Monitoring Sheet for Segregated Collection (separate discharge) Date: 26 Month: May

Name of inspectors CP: Barbara Study Team: Hosono

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 27(fri) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part: of Waste bin (%)	Ratio of waste(%): waste	ble	Others	Evaluation A~E	Observation by JICA Study Team: of Waste bin (%)	Ratio of waste(%): waste	ble	Others	Evaluation A~E	Results of Monitoring: of Waste bin (%)	Ratio of waste(%): waste	ble	Others	Evaluation A~E
33	1 Kitchen waste	5	95	0	5	A	5	80	5	15	B	5	87.5	2.5	10	A
34	1 Kitchen waste	50	80	5	15	B	50	95	0	5	A	50	87.5	2.5	10	A
	2 Recyclable Containers	5	80	5	15	E	5	50	5	45	E	5	65	5	30	E
	2 Recyclable Containers	30	0	80	20	B	25	5	60	35	D	27.5	2.5	70	27.5	C
	3 Others	100	5	5	90	A	100	20	5	75	C	100	12.5	5	82.5	B
	3 Others	100	10	0	90	A	100	15	5	80	B	100	12.5	2.5	85	B
27	1 Kitchen waste	20	70	15	15	B	15	90	5	5	A	17.5	80	10	10	B
	2 Recyclable Containers	20	0	30	70	E	10	20	30	50	E	15	10	30	60	E
	3 Others	50	0	20	80	C	40	0	15	85	B	45	0	17.5	82.5	B
32	1 Kitchen waste	20	95	0	5	A	5	95	0	5	A	12.5	95	0	5	A
	2 Recyclable Containers	20	0	95	5	A	10	0	0	100	A	15	0	47.5	52.5	E
	3 Others	20	0	0	100	A	5	75	0	25	E	12.5	37.5	0	62.5	D

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: Still some difficulties in some of the buildings like #27 and in apartment 27 cor. 4

New stickers are applied on top of the containers

It is reminded that the plastic bags and cardboard must go in the "others" bin.

Study Team: The segregation of 'kitchen' waste is getting better in general. The regulation of 'kitchen' waste segregation seems very clear for residents.

On the other hand the segregation of 'recyclable' is generally bad. We have to think why. There might be misunderstanding or confusion within residents. Of course patient education and training process must be necessary to improve because this activity requires a great deal of experience. Also, the changing of items for 'recyclable' may have affected to this bad segregation.

We have to spend much more time if we want to realize desirable segregation by visiting households , holding meetings and discussions, and so on.

We changed the place of stickers on bins from front & back to front & top to make them nmore visible.

I am anxious if kitchen waste began to decompose as kitchen waste is kept in enclosed bins and the inside of bins is very hot in daytime.

Monitoring Sheet for Segregated Collection (separate discharge) Date: 27 Month: May

Name of inspectors CP: Elida Study Team: Hosono

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 28(sat) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	10	90	5	5	A	40	95	5	0	A	40	92.5	5	2.5	A
34	1 Kitchen waste	40	95	5	0	A	5	90	5	5	A	7.5	92.5	5	2.5	A
	2 Recyclable Containers	20	65	5	30	E	30	5	70	25	C	40	35	37.5	27.5	E
	2 Recyclable Containers	50	0	80	20	B	10	50	0	50	E	15	25	40	35	E
	3 Others	100	5	5	90	A	110	10	5	85	B	105	7.5	5	87.5	B
	3 Others	100	10	0	90	A	100	10	5	85	B	100	10	2.5	87.5	B
27	1 Kitchen waste	20	70	5	25	D	15	85	5	10	B	17.5	77.5	5	17.5	C
	2 Recyclable Containers	15	0	50	50	E	15	10	50	40	E	15	5	50	45	E
	3 Others	50	5	5	90	A	60	5	5	90	A	55	5	5	90	A
32	1 Kitchen waste	10	100	0	5	A	5	95	0	5	A	7.5	97.5	0	5	A
	2 Recyclable Containers	10	0	90	10	A	10	0	80	20	B	10	0	85	15	B
	3 Others	20	0	0	100	A	20	0	0	100	A	20	0	0	100	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: An improvement is shown on the dumping of the waste

Study Team:

Much progress in 'kitchen' waste, although 'recyclable' waste needs more improvement.

The residents will have community cleaning activity tomorrow. The leaders are planning to teach how to segregate to the residents on the activity.

The collection of all the waste is scheduled today.

Monitoring Sheet for Segregated Collection (separate discharge) Date: 28 Month: May

Name of inspectors CP: Elida Study Team: Hososno

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 29 (sun) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	10	95	0	5	A	50	95	0	5	A	55	95	0	5	A
34	1 Kitchen waste	60	90	0	10	A	5	95	0	5	A	7.5	92.5	0	7.5	A
	2 Recyclable Containers	50	0	50	50	E	60	5	50	45	E	55	2.5	50	47.5	E
	2 Recyclable Containers	50	10	70	20	C	50	0	10	90	E	50	5	40	55	E
	3 Others	120	0	5	95	A	110	5	5	90	A	115	2.5	5	92.5	A
	3 Others	120	5	5	100	A	110	5	5	90	A	115	5	5	95	A
27	1 Kitchen waste	70	80	5	15	B	20	80	5	15	B	45	80	5	15	B
	2 Recyclable Containers	50	0	100	0	A	40	0	90	10	A	45	0	95	5	A
	3 Others	95	0	0	100	A	90	0	0	100	B	92.5	0	0	100	A
32	1 Kitchen waste	10	95	0	5	A	5	90	5	5	A	7.5	92.5	2.5	5	A
	2 Recyclable Containers	10	0	80	20	B	10	0	80	20	B	10	0	80	20	B
	3 Others	20	0	0	100	A	30	0	0	100	A	25	0	0	100	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart: The truck didint collect the wasteon Saturday this originated worms in the "kitchen" bin therefore some type of complaint by the residents.
On the plaza points the "others" bins overfolowed and made thar there was more contamination and higher % of mixture in other bins

Study Team:
The collection of waste scheduled on Saturday was not conducted. So, the residents cannnot segregate the waste discharged today because there are not enough space in bins.
The bins of kitchen' are getting dirty with plenty of warms and bad smell. Twice a week or more frequent cvollection must be necessary. We also have to think about Cuban hot and humid wether.
The community activity was held and the condition of segregation was excellent owning to this activity.
Almost 400% of bins amount yard waste was piled beside No.33&34 bins because of no collection

Monitoring Sheet for Segregated Collection (separate discharge) Date: 29 (sun) Month: May

Name of inspectors CP: Elida Study Team: Hososno

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 30(mon) Month: May

Name of inspectors CP: Carlos Study Team: hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recycla ble	Others	A~E
33	1 Kitchen waste	40	20	0	80	E	60	20	0	80	E	50	20	0	80	E
34	1 Kitchen waste	40	90	0	10	A	50	80	0	20	B	45	85	0	15	B
	2 Recyclable Containers	40	10	10	80	E	50	5	25	70	E	45	7.5	17.5	75	E
	2 Recyclable Containers	40	30	40	30	E	60	10	50	40	E	50	20	45	35	E
	3 Others	100	5	5	90	A	110	5	50	90	A	110	5	5	90	A
	3 Others	100	5	5	90	A	110	5	5	90	A	110	5	5	90	A
27	1 Kitchen waste	30	20	30	50	E	40	20	0	80	E	35	20	15	65	E
	2 Recyclable Containers	40	60	15	25	E	90	10	0	90	E	50	35	12.5	52.5	E
	3 Others	90	20	20	60	D	60	10	10	80	E	90	15	10	75	C
32	1 Kitchen waste	10	100	0	0	A	10	95	5	5	A	10	97.5	2.5	2.5	A
	2 Recyclable Containers	10	0	80	20	B	10	0	65	35	D	10	0	72.5	27.5	C
	3 Others	20	10	0	90	A	50	5	5	90	A	35	7.5	2.5	90	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

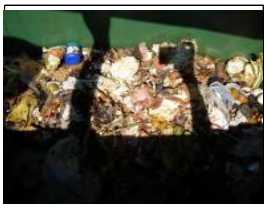
Counterpart: This monitoring was realized after a week that the collection truck did not pass.
The result of the monitoring was affected because of this cause.

Study Team:
As the collection is delaying, there is no space for 'others' bins. That's why the residents discharged improper wastes in kitchen' and 'recyclable' bins. As a result, condition of segregation was very bad today.
The residents complained about lack of collection.

Monitoring Sheet for Segregated Collection (separate discharge) Date: 30 Month: May

Name of inspectors CP: elida Study Team: hosono

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

Monitoring Sheet for Segregated Collection (separate discharge)

Date: 31(tue) Month: May

Name of inspectors CP: Elida Study Team: Hosono

Record of Condition of Discharge

# of Sta.	Classification of Waste Bins	Observation by Counter Part					Observation by JICA Study Team					Results of Monitoring				
			Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation		Ratio of waste(%)			Evaluation
		Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E	Ocupancy of Waste bin (%)	Kitchen waste	Recyclable	Others	A~E
33	1 Kitchen waste	60	10	0	90	E	50	40	0	60	D	55	25	0	75	E
34	1 Kitchen waste	50	90	0	10	A	50	90	0	10	A	50	90	0	10	A
	2 Recyclable Containers	80	0	20	80	D	70	5	10	85	E	75	2.5	15	82.5	E
	2 Recyclable Containers	80	5	10	90	E	0	0	10	90	E	40	2.5	10	90	E
	3 Others	5	0	0	100	E	0	0	0	0	–	0	0	0	0	–
	3 Others	5	5	0	95	E	0	0	0	0	–	0	0	0	0	–
27	1 Kitchen waste	0	0	0	0		0	0	0	0		0	0	0	0	–
	2 Recyclable Containers	0	0	0	0		0	0	0	0		0	0	0	0	–
	3 Others	0	0	0	0		0	0	0	0		0	0	0	0	–
32	1 Kitchen waste	10	95	0	5	A	10	95	0	5	A	10	95	0	5	A
	2 Recyclable Containers	20	0	90	10	A	10	0	70	30	C	15	0	80	20	B
	3 Others	50	0	10	90	A	40	0	0	100	A	45	0	5	95	A

* Evaluation: Extent of ratio of inproper mixing
A: less than 10% of mixing B: 11to 20% C: 21 to 30% D: 31 to 40 % E: more than 41%

Any remarks (opinion of attendant, remarkable problems, suggestion for improvement, etc.)

Counterpart:

Study Team: Waste collection is conducted.

Monitoring Sheet for Segregated Collection (separate discharge) Date: Month: May

Name of inspectors CP: Study Team:

Photos

	Kitchen Waste / Residuos de Cocina	Recyclable Containers / Envases Reciclables	Others / Otros
# of Station 33/34			
			
# of Station 27			
# of Station 32			

H. Community Composting:

H1 Instruction for Workers Assigned for Community Composting

H1 INSTRUCTION FOR WORKERS ASSIGNED FOR COMMUNITY COMPOSTING

(1) Instruction for Workers Assigned for Community Composting

Procedure of Community Composting at Site

1) Methodology

The method applied in the pilot project is the introduction of least procedure composting. Composting method in detail will also be adapted through this PLP. This is broadly divided into the following five steps.

- Preparatory work: Spreading information and awareness-raising

- First step: Receiving of kitchen waste as raw material

1.1. Measure and receive of kitchen waste collected by segregated collection

1.2 Removal of unsuitable material for composting in receiving

1.3 Measure the weight of unsuitable waste removed from raw material of compost

1.4 Turning of raw material for composting by shovels

1.5 Moisture adjustment, if necessary

- Second step: Fermentation

2.1 Make each pile which is consist of raw material for composting in seven days.

2.2 Every pile should be turned daily in order to supply air for fermentation for three weeks.

2.3 Leaf mold or dry soil shall be added to adjust the moisture condition of fermentation during this step. Close attention should be paid to moisture condition through this period.

1	Pile	1 pile contains 7 days materials
2	Turning	Every day
3	Period	3 week

- Third step: Maturing

The necessary procedures for maturing are similar to those of fermentation.

The materials being processed shall be moved to the next section and the wheel loader turned twice weekly.

1	Pile	1 pile contains 7days materials
2	Turning	Once a week (basically on Monday)
3	Period	6 week

- Final step: Sieving

The matured composting will be sieved to adjust the grain of the product. This work is also performed manually using a screen.

2) Monitoring

The fwing monitoring items should be recorded.

Items	Method	Frequency
Condition of segregation	Visual	Everyday in first week Once a week from 2nd week
Condition of fermentation	Visual, smelling	Everyday
Weight of waste brought to yard	Truck scale	Each time
Weight of litter/soil thrown into yard	Weight scale	As necessity
Weight of unsuitable wastes for composting that were picked up at composting yard	Weight scale	Every day
Internal temperature	Thermometer	Everyday, periodical
Weight of consumption	Weight scale	As necessity

Daily Report of Community Compost

Date : Weather: Prepared by: _____

No.	Items	Action/Notes
1.	Activities of first step: Receiving	
	Condition of segregation	1. Good 2. Fair 3. Bad
	Receiving time	h m ,
	Weight of transported waste	kg
	Weight of removed waste	kg
	Weight of raw material for composting	kg
2.	Activities of second step: Fermentation	
	Turning (time: h m)	1. Yes 2. No
	Supply of moisture	1. Yes (time: h m) 2. No
	Temperature of fermentation	____^{o}C (observed time: h m)
3.	Activities of third step: Maturing	
	Turning	1. Yes (time: h m) 2. No
	Temperature of maturing	____^{o}C (observed time: h m)
4.	Activities of final step: Sieving	
	Weight of Final Products (compost)	kg
	Quality of products	1. Good 2. Fair 3. Bad
	Other observation on product	
5.	Use of product	
	Name of consumer	
	Weight of use	kg
	Purpose of use	
6.	Operation of equipment	Hour
	Fuel consumption	Liters
	Number of workers	
7.	Other remarks of today's work	

H. Community Composting:

H2 Monitoring Record

H2 MONITORING RECORD

COMMYNITY COMPOSTING

Daily Record of Community Composting [Waste collected during 22 May to 28 May]

			1st week							2nd week						
	No of week	Unit/Answer														
	Month		5	5	5	5	5	5	5	5	5	5	6	6	6	6
	Day		22	23	24	25	26	27	28	29	30	31	1	2	3	4
	Weather															
	Name of recorder				Andres											
1	**Waste Receiving**															
1-1	Condition of segregation	1. Good 2. Fair 3. Bad			Fair											
1-2	Receiving time of collected waste	Time: h m			3:35		13:45									
1-3	Weight of transported waste	kg			1150		250									
1-4	Weight of waste picked up before composting	kg			495		40									
1-5	Weight of raw material for	kg			655		210									
2	**Fermentation (for 3 weeks after receiving of waste)**															
2-1	Turning #every day	1. Yes 2. No				Yes	Yes		Yes		Yes	No	No	No	Yes	Yes
	Time:	Time: h m				10:00	12:00		14:10		13:30				15:00	14:00
2-2	Supply of water/moisture	1. Yes 2. No				No	No		No		No	No	No	No	Yes	No
	if yes, what time?	Time: h m													15:15	
	if yes, how much?	liters													30	
2-3	Temperature of fermentation	°C				60° C	60° C		60° C		60	50	50	50	50	60
	Time:	Time: h m														
3	**Maturing (for 6 weeks after completion of fermentation)**															
3-1	Turning #every monday	1. Yes 2. No														
	Time:	Time: h m														
3-2	Temperature of maturing	°C														
	Time:	Time: h m														
4	**Sieving (after completion of maturing)**															
4-1	Weight of Final Products (compost)	kg														
4-2	Quality of products	1. Good 2. Fair 3. Bad														
5	**Use of product**															
5-1	Name of consumer															
5-2	Weight of use	kg														
5-3	Purpose of use															

Daily Record of Community Composting [Waste collected during 22 May to 28 May]

	No of week	Unit/Answer	3rd week							4th week						
	Month		6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Day		5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Weather															
	Name of recorder															
1	**Waste Receiving**															
1-1	Condition of segregation	1. Good 2. Fair 3. Bad														
1-2	Receiving time of collected waste	Time: h m														
1-3	Weight of transported waste	kg														
1-4	Weight of waste picked up before composting	kg														
1-5	Weight of raw material for	kg														
2	**Fermentation (for 3 weeks after receiving of waste)**															
2-1	Turning #every day	1. Yes 2. No		No	Yes			Yes			Yes			Yes		
	Time:	Time: h m		–	–			11:30			14:50			13:15		
2-2	Supply of water/moisture	1. Yes 2. No		–	–											
	if yes, what time?	Time: h m		–	–											
	if yes, how much?	liters		–	–											
2-3	Temperature of fermentation	°C		55	45	60	55	49	50	55	40	55	50	48	45	45
	Time:	Time: h m														
3	**Maturing (for 6 weeks after completion of fermentation)**															
3-1	Turning #every monday	1. Yes 2. No														
	Time:	Time: h m														
3-2	Temperature of maturing	°C														
	Time:	Time: h m														
4	**Sieving (after completion of maturing)**															
4-1	Weight of Final Products (compost)	kg														
4-2	Quality of products	1. Good 2. Fair 3. Bad														
5	**Use of product**															
5-1	Name of consumer															
5-2	Weight of use	kg														
5-3	Purpose of use															

Daily Record of Community Composting [Waste collected during 22 May to 28 May]

	No of week	Unit/Answer	5th week						
	Month		6	6	6	6	6	6	6
	Day		19	20	21	22	23	24	25
	Weather								
	Name of recorder								
1	**Waste Receiving**								
1-1	Condition of segregation	1. Good 2. Fair 3. Bad							
1-2	Receiving time of collected waste	Time: h m							
1-3	Weight of transported waste	kg							
1-4	Weight of waste picked up before composting	kg							
1-5	Weight of raw material for	kg							
2	**Fermentation (for 3 weeks after receiving of waste)**								
2-1	Turning #every day	1. Yes 2. No	Yes				Yes		
	Time:	Time: h m	10:00				14:15		
2-2	Supply of water/moisture	1. Yes 2. No	Yes				No		
	if yes, what time?	Time: h m	10:30						
	if yes, how much?	liters	30						
2-3	Temperature of fermentation	°C	40	54	55	55	46	50	50
	Time:	Time: h m							
3	**Maturing (for 6 weeks after completion of fermentation)**								
3-1	Turning #every monday	1. Yes 2. No							
	Time:	Time: h m							
3-2	Temperature of maturing	°C							
	Time:	Time: h m							
4	**Sieving (after completion of maturing)**								
4-1	Weight of Final Products (compost)	kg							
4-2	Quality of products	1. Good 2. Fair 3. Bad							
5	**Use of product**								
5-1	Name of consumer								
5-2	Weight of use	kg							
5-3	Purpose of use								

Daily Record of Community Composting [Waste collected during 29 May to 4 June]

	No of week	Unit/Answer	1st week							2nd week						
	Month		5	5	5	6	6	6	6	6	6	6	6	6	6	6
	Day		29	30	31	1	2	3	4	5	6	7	8	9	10	11
	Weather															
	Name of recorder															
1	**Waste Receiving**															
1-1	Condition of segregation	1. Good 2. Fair 3. Bad			2											
1-2	Receiving time of collected waste	Time: h m			14:00				14:30							
1-3	Weight of transported waste	kg			241				143							
1-4	Weight of waste picked up before composting	kg			80				25							
1-5	Weight of raw material for	kg			161				118							
2	**Fermentation (for 3 weeks after receiving of waste)**															
2-1	Turning #every day	1. Yes 2. No							Yes						Yes	
	Time:	Time: h m							14:00							
2-2	Supply of water/moisture	1. Yes 2. No							No							
	if yes, what time?	Time: h m														
	if yes, how much?	liters														
2-3	Temperature of fermentation	°C				65	65	65	60		45	40	50	55	40	55
	Time:	Time: h m														
3	**Maturing (for 6 weeks after completion of fermentation)**															
3-1	Turning #every monday	1. Yes 2. No														
	Time:	Time: h m														
3-2	Temperature of maturing	°C														
	Time:	Time: h m														
4	**Sieving (after completion of maturing)**															
4-1	Weight of Final Products (compost)	kg														
4-2	Quality of products	1. Good 2. Fair 3. Bad														
5	**Use of product**															
5-1	Name of consumer															
5-2	Weight of use	kg														
5-3	Purpose of use															

Daily Record of Community Composting [Waste collected during 29 May to 4 June]

	No of week	Unit/Answer	3rd week							4th week						
	Month		6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Day		12	13	14	15	16	17	18	19	20	21	22	23	24	25
	Weather															
	Name of recorder															
1	**Waste Receiving**															
1-1	Condition of segregation	1. Good 2. Fair 3. Bad														
1-2	Receiving time of collected waste	Time: h m														
1-3	Weight of transported waste	kg														
1-4	Weight of waste picked up before composting	kg														
1-5	Weight of raw material for	kg														
2	**Fermentation (for 3 weeks after receiving of waste)**															
2-1	Turning #every day	1. Yes 2. No		Yes			Yes						Yes			
	Time:	Time: h m											13:15			
2-2	Supply of water/moisture	1. Yes 2. No											Yes			
	if yes, what time?	Time: h m											13:40			
	if yes, how much?	liters											25			
2-3	Temperature of fermentation	°C		40	50	50	45	50	50		45	45	45	50	58	55
	Time:	Time: h m														
3	**Maturing (for 6 weeks after completion of fermentation)**															
3-1	Turning #every monday	1. Yes 2. No														
	Time:	Time: h m														
3-2	Temperature of maturing	°C														
	Time:	Time: h m														
4	**Sieving (after completion of maturing)**															
4-1	Weight of Final Products (compost)	kg														
4-2	Quality of products	1. Good 2. Fair 3. Bad														
5	**Use of product**															
5-1	Name of consumer															
5-2	Weight of use	kg														
5-3	Purpose of use															

Daily Record of Community Composting [Waste collected during 5 June to 11 June]

			1st week							2nd week						
	No of week	Unit/Answer														
	Month		6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Day		5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Weather															
	Name of recorder															
1	**Waste Receiving**															
1-1	Condition of segregation	1. Good 2. Fair 3. Bad														
1-2	Receiving time of collected waste	Time: h m														
1-3	Weight of transported waste	kg			92				550							
1-4	Weight of waste picked up before composting	kg			21				39							
1-5	Weight of raw material for	kg			71				511							
2	**Fermentation (for 3 weeks after receiving of waste)**															
2-1	Turning #every day	1. Yes 2. No						Yes			Yes			Yes		
	Time:	Time: h m														
2-2	Supply of water/moisture	1. Yes 2. No														
	if yes, what time?	Time: h m														
	if yes, how much?	liters														
2-3	Temperature of fermentation	__°C				55	55	55	60	55	50	60	55	50	55	45
	Time:	Time: h m														
3	**Maturing (for 6 weeks after completion of fermentation)**															
3-1	Turning #every monday	1. Yes 2. No														
	Time:	Time: h m														
3-2	Temperature of maturing	__°C														
	Time:	Time: h m														
4	**Sieving (after completion of maturing)**															
4-1	Weight of Final Products (compost)	kg														
4-2	Quality of products	1. Good 2. Fair 3. Bad														
5	**Use of product**															
5-1	Name of consumer															
5-2	Weight of use	kg														
5-3	Purpose of use															

Daily Record of Community Composting [Waste collected during 5 June to 11 June]

			3rd week						
	No of week	Unit/Answer							
	Month		6	6	6	6	6	6	6
	Day		19	20	21	22	23	24	25
	Weather								
	Name of recorder								
1	**Waste Receiving**								
1-1	Condition of segregation	1. Good 2. Fair 3. Bad							
1-2	Receiving time of collected waste	Time: h m							
1-3	Weight of transported waste	kg							
1-4	Weight of waste picked up before composting	kg							
1-5	Weight of raw material for	kg							
2	**Fermentation (for 3 weeks after receiving of waste)**								
2-1	Turning #every day	1. Yes 2. No			Yes				
	Time:	Time: h m			13:20				
2-2	Supply of water/moisture	1. Yes 2. No			Yes				
	if yes, what time?	Time: h m			13:50				
	if yes, how much?	liters			25				
2-3	Temperature of fermentation	__°C	55	48	43	43	45	58	55
	Time:	Time: h m							
3	**Maturing (for 6 weeks after completion of fermentation)**								
3-1	Turning #every monday	1. Yes 2. No							
	Time:	Time: h m							
3-2	Temperature of maturing	__°C							
	Time:	Time: h m							
4	**Sieving (after completion of maturing)**								
4-1	Weight of Final Products (compost)	kg							
4-2	Quality of products	1. Good 2. Fair 3. Bad							
5	**Use of product**								
5-1	Name of consumer								
5-2	Weight of use	kg							
5-3	Purpose of use								

I. Home Composting:

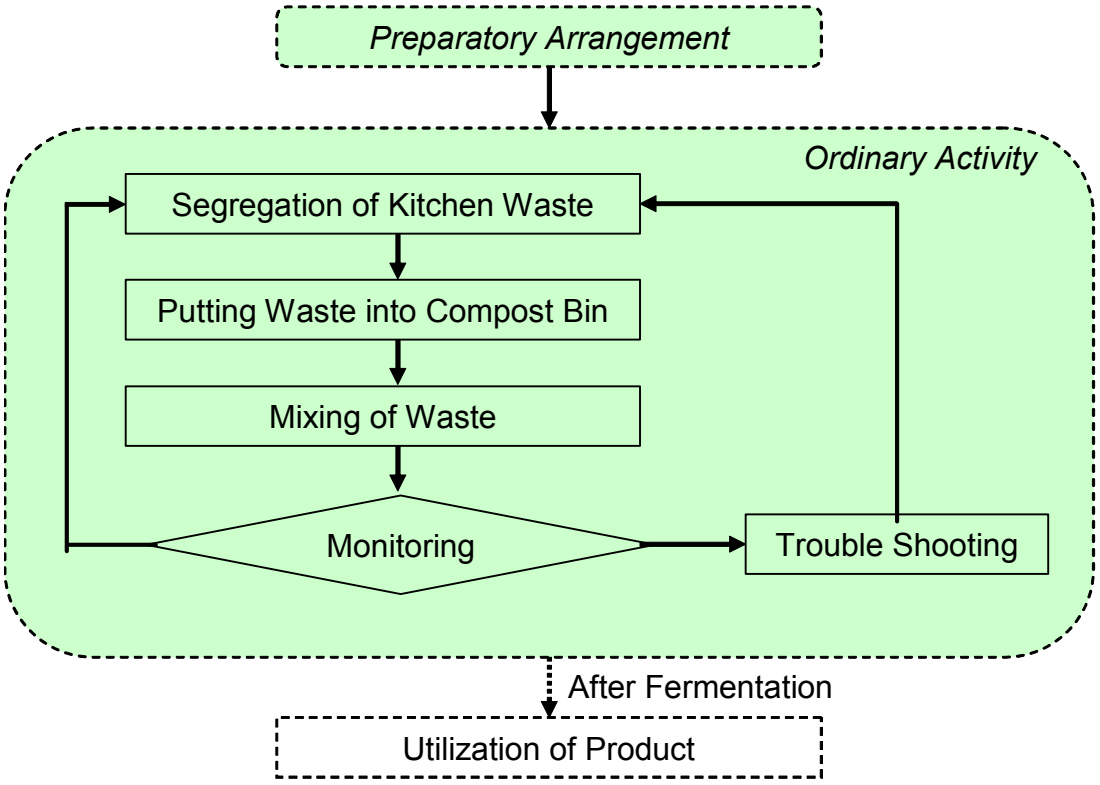
I1 Manual of Home Composting

I1 MANUAL OF HOME COMPOSTING

(1) Manual for Home Composting

Manual of Home Composting

The steps for practice of home composting are described in the following flow.



Basic ordinary activities for home composting are as follows.

1. Segregation of kitchen waste
2. Putting segregated material into compost bin with necessary cares.
3. Mixing waste occasionally
4. Monitoring

Item 1 to 4 are to be repeated everyday.

The product can be utilized after fermentation.

2. Preparatory Arrangement

—Selection of Best Place and Setting for Composting. —

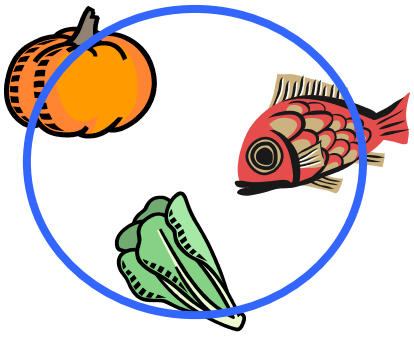
- Securing a place for compost bin. Under the shadow is better than under the sun, this will avoid the condition of the compost bin changing extremely.
- Excavation of the locations for bin to a depth of around 15 cm.
- Placing the bins after lining the ground with dry leaves.
- To control moisture and temperature, cover is placed on the top of bin usually.

3. Segregation

— Good Segregation is the First Step for Good Composting. —

◆Separation of Food Waste

- Separating of food waste such as leftovers of vegetables, fruits from household wastes.
- Especially, cigar/cigarettes, rotten foods, metals (e.g. dry cells) are unsuitable for fermentation.
- Too mush salts and oil/fats damages the quality of compost. These should be avoided to put into bin.



Suitable materials for composting

and rotten food,
inorganic material.

To be removed

◆Draining of Food Waste

- Appropriate moisture is necessary for fermentation. Draining of surplus water with food waste is necessary to keep suitable moisture for fermentation.
- Participants are recommended to drain surplus water of kitchen wastes by means of kitchen net before putting them into compost bin.

◆Cutting Bulky Food Waste

- Bulky food wastes such as cornhusk, eggshell should be cut up because these wastes are difficult to be decomposed and fermented.

4. Composting

— Manage Good Condition for Fermentation. —

◆Putting Food Waste

- Putting the segregated food wastes into Compost Bin.
- They will be nourishment for microorganisms.

◆Putting Mold, Withered Leaf or Grass

- Put leaf mold and withered leaf or grass into Compost Bin as moisture coordinator.
- Food waste usually include enough moisture for fermentation. Avoid only fully dried up condition please.

◆Mixing

- Mixing of whole the contents to supply air and to keep an uniformity.

◆Fermentation

- A microbe reaction will be activated and heat will be generated.
- When the form of food wastes is lost and its color becomes black, it is completion of composting. It comes after two or three months after putting waste into compost bin.

5. Utilization

— Complete the Recycling System. —

◆House Gardening

- You can enjoy growing beautiful flowers and plants.

◆House Farming

- You can self support healthy vegetables and fruits by organic farming.

6. Trouble Shooting

— Take care of Your Composting. —

You might face some troubles and difficulties in the course of composting. The following gives some solution for improvement annoying condition. Besides you may find out better solutions by your practice of composting.

Most probable troubles are offensive odor, breeding of worm/insect, and putrefaction. To avoid these troubles, proper care is necessary.

- In case of strong offensive odor, breeding of worm/ insects
  - ✓ Mixing with additional leaf mold or dried soil
  - ✓ Supply of air by mixing.
  - ✓ Please understand some extend of odor is caused by composting
- Putrefaction
  - ✓ Methods shown above
  - ✓ Removal of putrefied part when the situation is serious
- Ways to prevent these trouble
  - ✓ Supply of air by mixing
  - ✓ Moisture control by draining as well as adding leaf mold to kitchen waste

7. Remarks

- Best way for Composting will be found by trial and error.
  - ✓ Materials and mixing rate of food waste & moisture coordinator,
  - ✓ Frequency of mixing,
  - ✓ Term of fermentation, and so on.
- Please discuss with neighborhood or experienced farmers.

Concluded

I. Home Composting:

I2 Monitoring Record

I2 MONITORING RECORD

(1) Sheet for Daily Monitoring of Home Composting

Monitoring Sheet for Home Composting

Date: / /2005 Name of house owner _____

Total days: _____

Volume of Kitchen Waste : _____ Liter(s)

Condition of Composting (#Please mark right to describe the condition)

Odor:	Bad	A little	None	
Color:	Not Changed	Brown	Black	Other ( )
Worm/insect	No Exist	A few	Many	

Action:

- Mixing of whole content of bin Yes No
- Additional leaf mold/dried soil Yes No

if yes

Volume of Leaf/soil: _____ Liter(s)

Any remarks

_____

_____

_____

J. Awareness-raising

J. AWARENESS-RAISING

QUESTIONNAIRE FOR THE PLP IMPLEMENTATION

Location: Peñas Altas/Campo Florido
Questions:

(1) With regard to Solid Waste Management in General

1) How do you evaluate the actual collection of waste?

☐ good ☐ average ☐ bad

2) How is the disposition of the containers?

☐ sufficient ☐ insufficient ☐ absent

3) How is the conservation state of the containers?

☐ good ☐ damaged ☐ broken

4) How do you evaluate the frequency of the collection?

☐ good ☐ average ☐ bad

(2) With regard to segregated collection

1) Do you know what segregated collection means?

☐yes ☐no

2) Do you know the benefits of segregated collection?

☐yes ☐no

3) Do you believe segregating wastes in homes is complicated?

☐yes ☐no ☐ don't know

4) If segregated collection would take place in your neighborhood, would you participate?

☐yes ☐no ☐ don't know

(3) With regard to sanitary landfills

1) Do you know that in Campo Florido a landfill exists?

☐ yes ☐ no

2) Does this landfill cause any disturbance to your family?

☐ yes ☐ no

In an affirmative way, How? _____

3) Do you know what a sanitary landfill is?

☐ yes ☐ no

4) Do you know the advantages of a sanitary landfill are?

☐ yes ☐ no

5) Would you oppose the construction of a sanitary landfill near to you?

☐ yes ☐ no

(4) With regard to compost

1) Do you know what is composting?

☐ yes ☐ no

2) Do you know the benefits of composting?

☐ yes ☐ no

3) In your opinion, who should make the compost?

☐ the people ☐ the government

4) Would you be interested on doing compost in your house?

☐ yes ☐ no ☐ don't know

(5). With regard to recycling

1) Do you know what recycling is?

☐ yes ☐ no

2) Do you know the benefits of recycling?

☐ yes ☐ no

3) Would you be willing to cooperate with recycling?

☐ yes ☐ no ☐ don't know

(6). With regard to Environmental Awareness Raising Activities

1) Do you know what Environmental Awareness Raising is?

☐ yes ☐ no

2) Are you missing any part of awareness or environmental education?

☐ yes ☐ no

3) Would you be willing to participate in Environmental Awareness Raising activities?

☐ yes ☐ no ☐ don't know

Thank you for your collaboration

K. Environment-Friendly Landfill Operation:

K1 Data of Soil Covering Work

K1 DATA OF SOIL COVERING WORK

Table 1 Calculation of Fuel Consumption by Comparison of Fuel Consumption at Existing Calle 100

1.Data of Fuel Consumption in Campo Florido, Pilot Project site

		month	March					April					May					Average for 3 month per week	Average for 3 month per day		Note
		day	7-12	14-19	21-26	28-02	Average	4-9	11-16	18-23	25-30	Average	2-7	9-14	16-21	23-28	Average	Average	7days/sem ana		
		week	1st	2nd	3rd	4th	(2nd - 4th)	1ra	2da	3ra	4ta		1ra	2da	3ra	4ta		per week	per day		
1.Fuel Consumption for appellation record	Bulldozer	Liter	840	800	630	770	733	720	660	830	530	685	380	955	980	510	706	647	92		
	wheel loader	Liter	820	720	600	480	600	440	410	510	320	420	380	610	750	340	520	463	66		
	Dump Truck	Liter		180	400	460	347	450	450	420	370	423	470	460	400	540	468	383	55		
	Total	Liter	1,660	1,700	1,630	1,710	1,680	1,610	1,520	1,760	1,220	1,528	1,230	2,025	2,130	1,390	1,694	1494	213		
	Fuel Cost	CUC	581	595	571	599	588	564	532	616	427	535	431	709	746	487	593	523	75	Fuel Unit Cost	0.35 *CUC/liter*
	Carried waste Volume	m3	-	650	535	969	718	794	1,209	1,128	1,006	1,034	530	811	696	838	719	764	109		
	charring condition	ton.	-	126	128	294	183	180	409	274	297	290	124	231	213	221	197	208	30		
2. Consumption in Operation time	Bulldozer	Liter	140	133	105	128	122	120	110	138	88	114	63	159	163	85	118	108	15	operation working time 1.5hr	1.5 hr
	wheel loader	Liter	410	360	300	240	300	220	205	255	160	210	190	305	375	170	260	232	33	operation working time 0.5hr	0.5 hr
	Dump Truck	Liter	-	7	16	18	14	18	18	17	15	17	19	18	16	22	19	15	2	operation working trip distance 4km	4 km
	Total	Liter		501	421	387	436	358	333	410	263	341	272	483	554	277	396	355	51		
3.Operation time Unit Cost per ton of waste	Unit Cost	Liter/ton	-	3.97	3.29	1.31	2.39	1.99	0.81	1.50	0.89	1.18	2.19	2.09	2.60	1.25	2.01	1.70	1.70		
		CUC/ton	-	1.39	1.15	0.46	0.83	0.70	0.29	0.52	0.31	0.41	0.77	0.73	0.91	0.44	0.70	0.60	0.60	Fuel Unit Cost	0.35 *CUC/liter*
	(ratio calle100 = 1.0)						6.8					3.8					6.6	5.4	5.4		

Note ; Bulldozer : Fiat BD20, 220hp,470 liter
Wheel Loader : Fiat, FR'12B, 220hp, 3.5
Tractor Shovel : Komatsu D65S 280 liter, 2.0 m3 capacity Shovel
Truck : Capacity 10ton,KAMAZ 740,210HP

2.Estimation of heavy equipment from fuel consumption including operation hours for other purpose

		month	March					April					May					per week	per day		Note
Unit consumption		day	7-12	14-19	21-26	28-02	Average	4-9	11-16	18-23	25-30	Average	2-7	9-14	16-21	23-28	Average	Average	7days/sem ana		
		week	1st	2nd	3rd	4th	(2nd - 4th)	1ra	2da	3ra	4ta		1ra	2da	3ra	4ta		per week	per day		
Operation Hour	Bulldozer	hr/week		40.0	31.5	38.5	36.7	36.0	33.0	41.5	26.5	33.7	19.0	47.8	49.0	25.5	40.8	35.3			20 liter/hr
Bulldozer		hr/day		6.7	5.3	6.4	6.1	6.0	5.5	6.9	4.4	5.6	3.2	8.0	8.2	4.3	6.8	5.88			
Operation Hour	wheel loader	hr/week		36.0	30.0	24.0	30.0	22.0	20.5	25.5	16.0	21.0	19.0	30.5	37.5	17.0	28.3	25.3			20 liter/hr
Shovel Loader		hr/day		6.0	5.0	4.0	5.0	3.7	3.4	4.3	2.7	3.4	3.2	5.1	6.3	2.8	4.7	4.21			
Moving distance	Dump Truck	km/week																			15 liter/hr

3. Estimation of fuel consumption for cell construction and cover soiling

		month	March					April					May					per week	per day		Note
Unit consumption		day	7-12	14-19	21-26	28-02	Average	4-9	11-16	18-23	25-30	Average	2-7	9-14	16-21	23-28	Average	Average	7days/sem ana		
		week	1st	2nd	3rd	4th	(2nd - 4th)	1ra	2da	3ra	4ta		1ra	2da	3ra	4ta		per week	per day		
Bulldozer	Moving distance	hr/week		7.7	6.3	11.4	8.5	9.4	14.2	13.3	11.9	13.1	6.2	9.6	8.2	9.9	9.2	9.8			1.5 hr/day
	Fuel consumption	liter/week		153.2	126.1	228.2	169.2	187.2	284.8	265.9	237.1	262.6	124.8	191.2	163.9	197.5	184.2	196.4			20 liter/hr
Shovel Loader	Moving distance	hr/week		2.6	2.1	3.8	2.8	3.1	4.7	4.4	4.0	4.4	2.1	3.2	2.7	3.3	3.1	3.3			0.5 hr/day
	Fuel consumption	liter/week		51.1	42.0	76.1	56.4	62.4	94.9	88.6	79.0	87.5	41.6	63.7	54.6	65.8	61.4	65.5			20 liter/hr
Dump Truck	Moving distance	km/week		20.4	16.8	30.4	22.6	25.0	38.0	35.5	31.6	35.0	16.6	25.5	21.9	26.3	24.6	26.2			4 km/day
	Fuel consumption	liter/week		10.2	8.4	15.2	11.3	12.5	19.0	17.7	15.8	17.5	8.3	12.7	10.9	13.2	12.3	13.1			18 km/week
Consumption Fuel	Moving distance	Liter/week		214.4	176.6	319.5	236.8	262.1	398.7	372.3	331.9	341.3	174.7	267.6	229.5	276.6	257.9	274.9			
	Fuel consumption	Liter/day		35.7	29.4	53.3	39.5	43.7	66.5	62	55.3	56.9	29.1	44.6	38.2	46.1	43.0	45.8			
	Fuel cost	CUC		12.5	10.29	18.66	13.83	15.3	23.28	21.7	19.36	19.92	10.19	15.61	13.37	16.14	15.05	16.0			0.35 *CUC/liter*
	Unit Cost per ton of waste	Liter/ton		1.7	1.38	1.09	1.3	1.46	0.98	1.36	1.12	1.18	1.41	1.16	1.08	1.25	1.31	1.3			
	CUC/liter	CUC/ton		0.60	0.48	0.38	0.46	0.51	0.34	0.48	0.39	0.41	0.49	0.41	0.38	0.44	0.46	0.45			0.35 *CUC/liter*
Ratio of case of existing C (rate bycalle100 = 1.0)							3.76					3.83					4.33	4.00	0.0		

4.Fuel consumption of heavy equipment for landfill operation at existing Calle 100 Landfill

		month	March					April					May					per week	per day		Note
		day	7-12	14-19	21-26	28-02	Average	4-9	11-16	18-23	25-30	Average	2-7	9-14	16-21	23-28	Average	Average	7days/sem ana		
		week	1st	2nd	3rd	4th	(2nd - 4th)	1ra	2da	3ra	4ta		1ra	2da	3ra	4ta		per week	per day		
Fuel consumption by record	Bludozer1	Liter	2,160	2,180	1,980	2,190	6,350	1,230	1,810	1,990	1,650	6680	1,260	2,050	1,840	1,520	6670	1,642	235		
	Bludozer2	Liter	1,720	1,750	1,250	1,750	4,750	1,470	1,840	1,590	1,360	6260	1,680	1,430	2,240	820	6170	1,432	205		
	Total	Liter	3,880	3,930	3,230	3,940	11,100	2,700	3,650	3,580	3,010	12940	2,940	3,480	4,080	2,340	12840	3,073	439		
	Fuel Cost	CUC	1,358	1,376	1,131	1,379	3,885	945	1,278	1,253	1,054	4529	1,029	1,218	1,428	819	4494	1,076	154	Fuel Unit Cost	0.35 *CUC/liter*
Hauled waste volume	Operating waste Volume	m3	43,694	43,694	43,694	43,694	131,082	43,694	43,694	43,694	43,694	174,776	43,694	43,694	43,694	43,694	174,776	40,053	5,722		
(in loading)	in loading vehicle	ton.	10,573	10,573	10,573	10,573	31,719	10,573	10,573	10,573	10,573	42,292	10,573	10,573	10,573	10,573	42,292	9,692	1,385		
Full operation	Unit Cost for bulldozer	Liter/ton	0.37	0.37	0.31	0.37	0.35	0.26	0.35	0.34	0.28	0.31	0.28	0.33	0.39	0.22	0.30	0.32	0.32		
Unit fuel consumption		CUC/ton	0.13	0.13	0.11	0.13	0.12	0.09	0.12	0.12	0.10	0.11	0.10	0.12	0.14	0.08	0.11	0.11	0.11		

Table 2 Bulk Density of Hauled Waste at Campo Florido after Loading

Date	Vehicle Number	Length m	Width m	Height m	Volume after unloading m^3	Weight kg	Collection Area	Bulk density ton/m^3
18-May	HUR373	5.0	3.3	1.4	23.1	8000	Guanabo Area(Beach area)	0.35
23-May	HUR373	5.5	2.6	1.7	24.31	7200	Guanabo Area(Beach area)	0.30
24-May	HUR373	4.5	2.5	1.7	19.125	7500	Guanabo Area(Beach Area)	0.39
26-May	HUR373	5.0	2.6	1.7	22.1	7800	Guanabo Area(Beach Area)	0.35
	Average							0.35

K. Environment-Friendly Landfill Operation:

K2 Drawing

K2 DRAWINGS

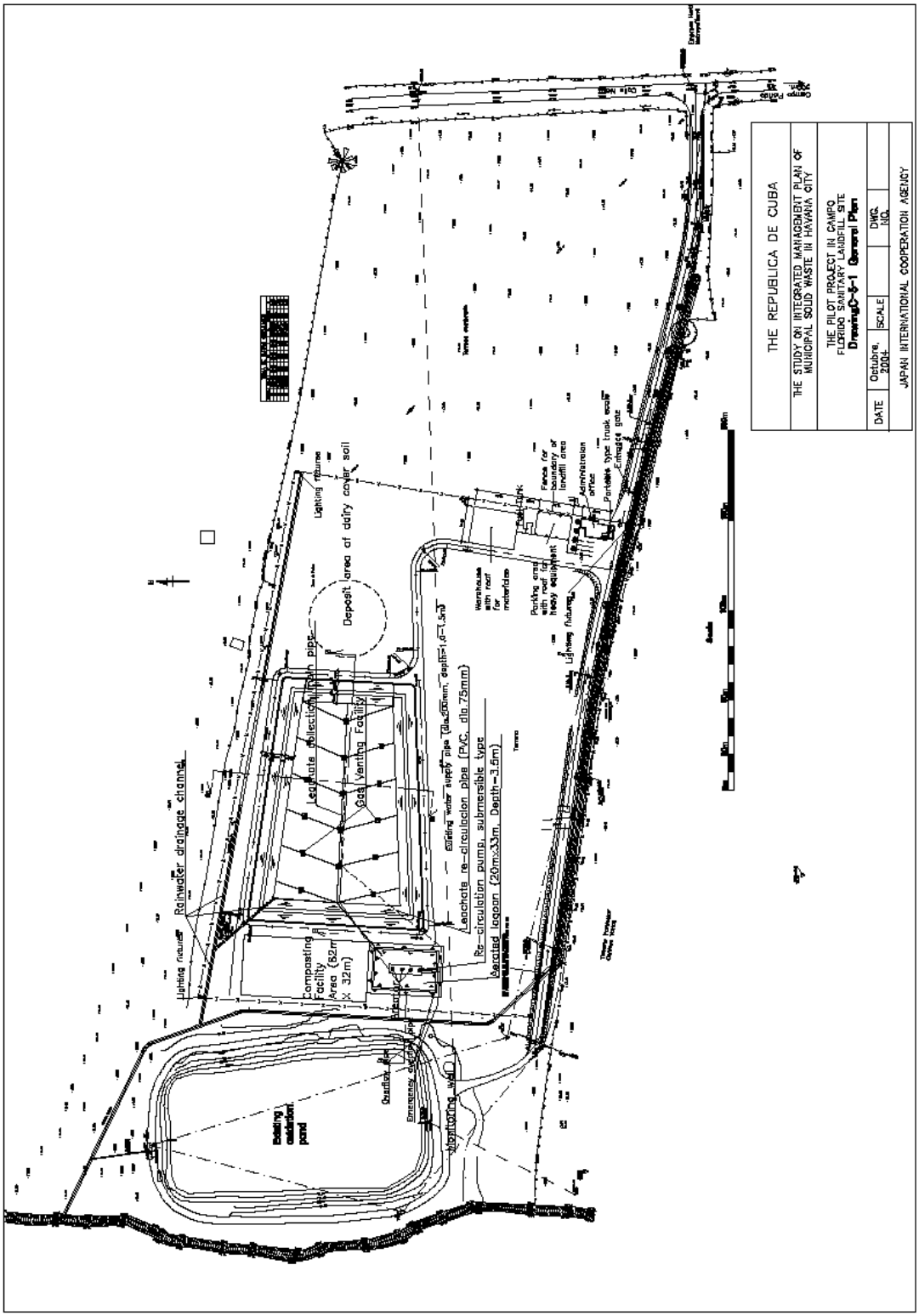


Figure 1 General Plan of Pilot Project in Campo Florido Landfill Site

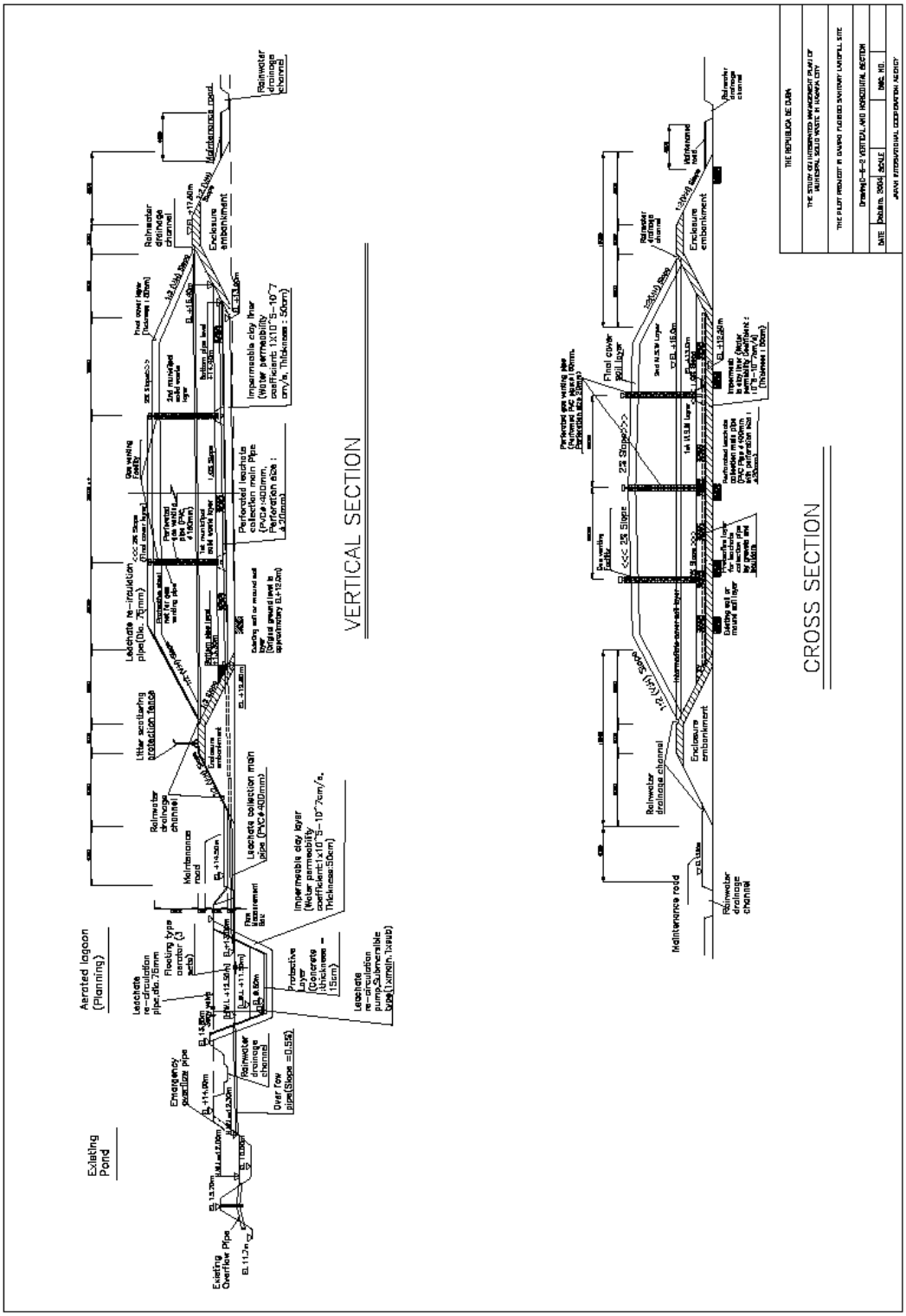


Figure 2 Section of Pilot Project in Campo Florido Landfill Site

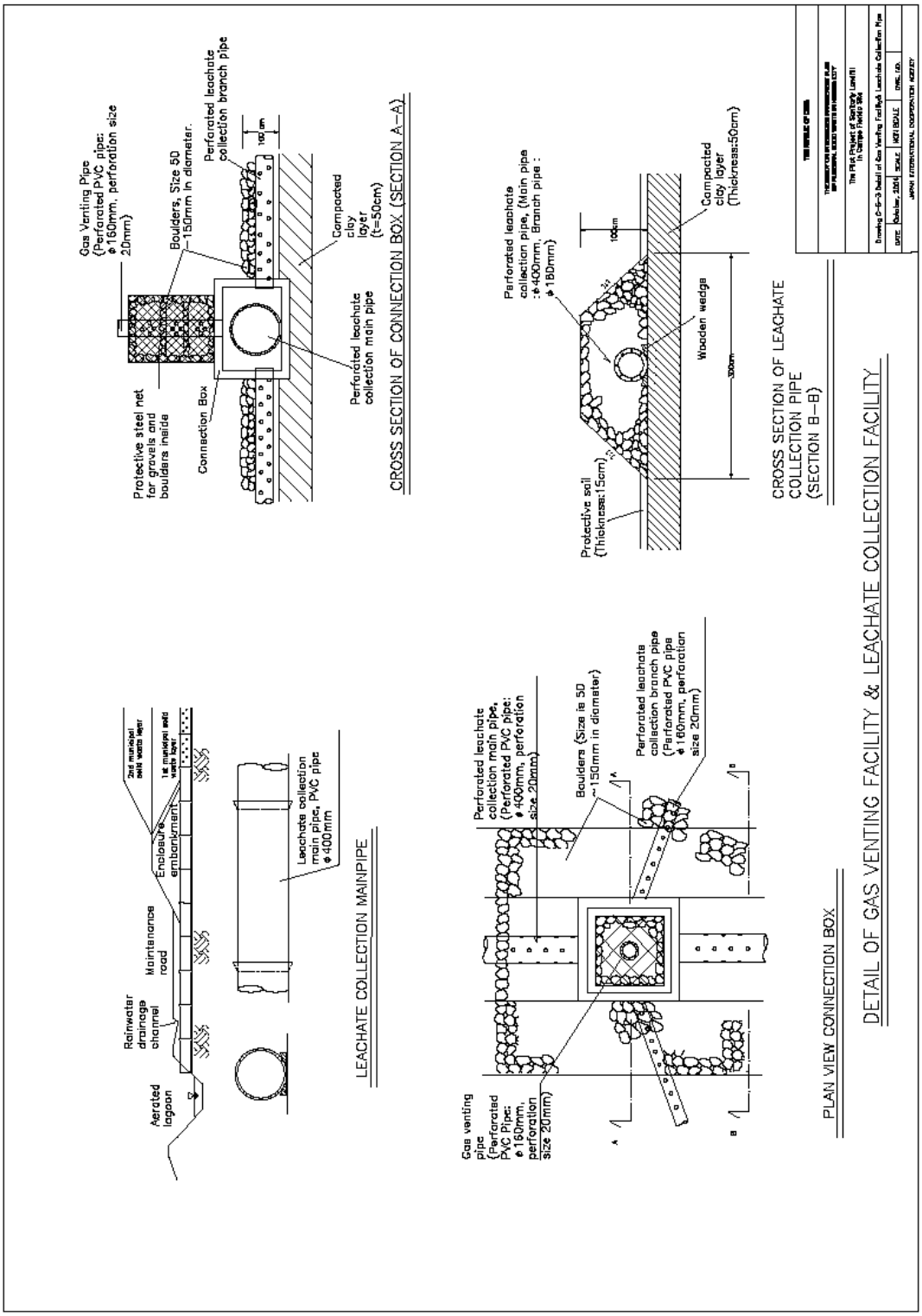


Figure 3 Details of Leachate Collection System in Campo Florido Landfill Site

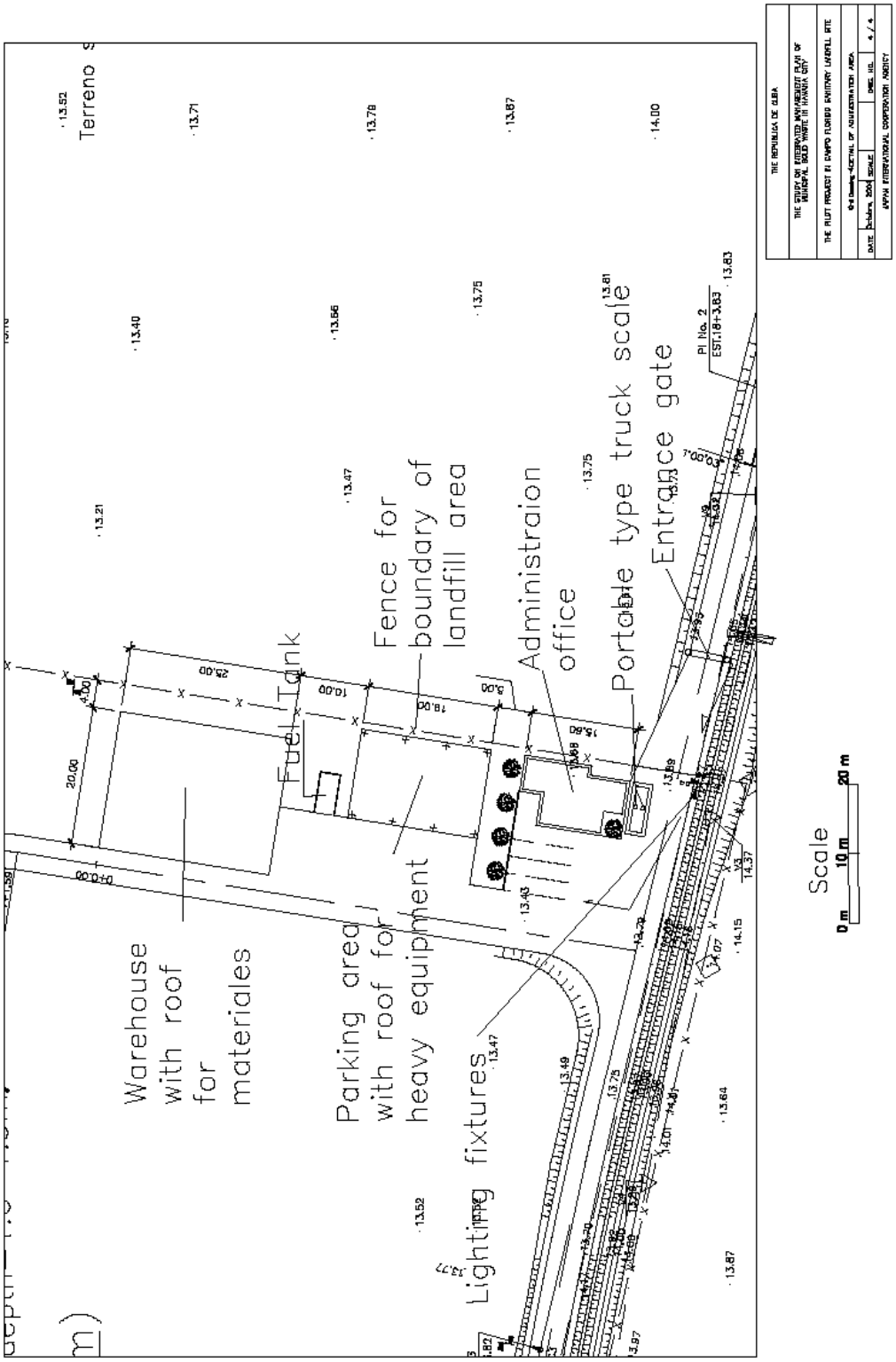


Figure 4 Site Plan of Administration Area in Campo Florido Landfill Site

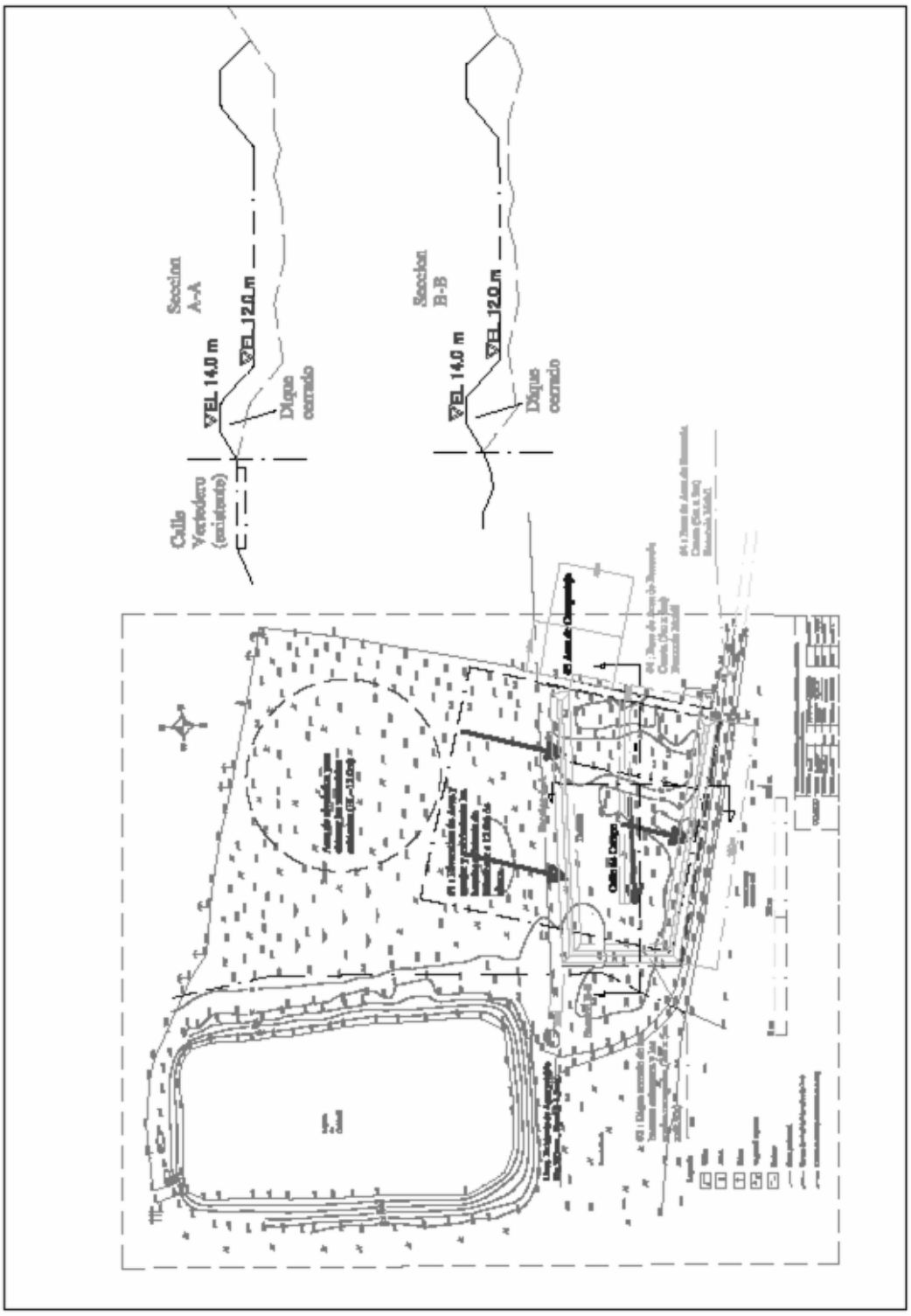


Figure 5 Soil Covering Operation Plan of pilot project in Campo Florido Landfill