

System analysis for: Test Set-up

Amount of SaniSecure Toilets:

70

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	5
Set-up Pupu	10
Pumping Sludge	10
Cleaning and Packing	20
Drive to digester (full)	10
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	80

minutes per  
emptying trip

Scenario: Pupu Pump Failure:

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	5
Set-up Gulper	10
Pumping Sludge	40
Cleaning and Packing	20
Drive to digester (full)	10
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	110

minutes per  
emptying trip

Scenario: Tricycle Failure

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	X
Set-up Gulper	10
Pumping Sludge	40
Cleaning and Packing	20
Drive to digester (full)	X
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	X

minutes per  
emptying trip

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	9 trips
Litres of sludge / day	7200 L / day
Amount of people	1000 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	2000 L
% of system capacity	28%
Amount of sludge from public latrines	2000 L
% of system capacity	56%

#### Notes

We will not always have a 100% full container

The amount of water used for flushing is expected to be compensated by the times people go to public toilets and the lower volumes of fecal matter and urine produced by children

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	6 trips
Litres of sludge / day	4800 L / day
Amount of people	1050 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	2100 L
% of total capacity	44%

#### Notes

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	X trips
Litres of sludge / day	X L / day
Amount of people	1050 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	2100 L
% of total capacity	X

#### Notes

With no means of transport, no trips can be made

#### Time until System Failure

Maximum amount of people / toilet	30 L
Waste / toilet / day maximum	60 L
Buffer in toilet	1000 L

#### Notes

Days until failure: 17

Days to recover once functional: 11

With the help of the Gulper Group and their tricycle, we expect to be able to stretch this time to 12-16 days.

If system runs at 100%.

This system will have another tricycle on standby to mitigate potential failure.

System analysis for: Test Set-up

Amount of SaniSecure Toilets:

40

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	5
Set-up Pupu	10
Pumping Sludge	10
Cleaning and Packing	20
Drive to digester (full)	10
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	80

minutes per emptying trip

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	9 trips
Litres of sludge / day	7200 L / day
Amount of people	600 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	1200 L
% of total capacity	17%

#### Notes

We will not always have a 100% full container

The amount of water used for flushing is expected to be compensated by the times people go to public toilets and the lower volumes of fecal matter and urine produced by children

#### Scenario: Pupu Pump Failure:

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	5
Set-up Gulper	10
Pumping Sludge	40
Cleaning and Packing	20
Drive to digester (full)	10
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	110

minutes per emptying trip

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	6 trips
Litres of sludge / day	4800 L / day
Amount of people	600 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	1200 L
% of total capacity	25%

#### Notes

#### Scenario: Tricycle Failure

#### Emptying times

Step	Time (min)
Drive to toilet (empty)	X
Set-up Gulper	10
Pumping Sludge	40
Cleaning and Packing	20
Drive to digester (full)	X
Empty into the digester	5
Reset for next trip	10
Miscellaneous	10
Total	X

minutes per emptying trip

#### System Efficiency

Average amount of sludge pumped	800 L
Daylight per day (12 hrs) in minutes	720 min
Trips / day	X trips
Litres of sludge / day	X L / day
Amount of people	600 people
Amount of excrement / person / day	1,5 L
Amount of cleaning water / person / day	0,5 L
Total faecal waste / person / day	2 L
Amount of excrement total / day	1200 L
% of total capacity	X

#### Notes

With no means of transport, no trips can be made

#### Time until System Failure

Maximum amount of people / toilet	30 L
Waste / toilet / day maximum	60 L
Buffer in toilet	1000 L

#### Notes

Days until failure	17 days
Days to recover	3 days

With the help of the Gulper Group and their tricycle, we expect to be able to stretch this time to 14-21 days.

If system runs at 100%

Cost toilet									
Beams	€	25,00							
Plate material	€	68,00							
Laser cutting	€	20,00							
Car tire rubber	€	2,00							
Bolts and nuts	€	5,00							
Assembly	€	50,00							
Container	€	83,00							
Toilet stall	€	53,00				Toilet stall			
Transport	€	50,00				Excavation	€	-	For the inhabitant
						Bricks	€	-	For the inhabitant
						Cement	€	20,00	
Total	€	356,00				Iron sheets	€	10,00	
						Nails	€	4,00	
	x	80				Wire	€	1,50	
						Locks	€	2,50	
	€	28.480,00				Labour	€	15,00	
						Total	€	53,00	

CAPEX System		
80 SaniSecure Toilets	€	28.480,00
1 Tricycle + container	€	4.000,00
1 Pupu	€	10.000,00
1 Training Service Group	€	10.000,00
1 Cleaning Materials & PPE	€	2.000,00
total	€	54.480,00

OPEX System		
80 Depreciation Toilets	€	5.696,00
1 Depreciation Pupu	€	1.000,00
1 Depreciation tricycles	€	800,00
Cleaning Materials & PPE	€	2.000,00
Upkeep training	€	10.000,00
8 Wages Service Group	€	14.400,00
365 Petrol (40 km/day)	€	1.284,80

Total	€	35.180,80 per year
/		365
	€	96,39 per day

2000 from inhabitants	Price / L	€	-
2000 from public latrines	Price / L	€	0,05

Actual rate for public latrines	Price/L	€	0,015
Rate / day	Price/day	€	30,00
Loss / day	Price/day	€	66,39

Financing needed yearly		
from digester yield:	€	24.230,80