

PhATS Technical Note



Achieving
Total
Sanitation
July 2015

CITY OF TACLOBAN SEPTAGE MANAGEMENT PLANT: Construction Plans and Bill of Quantities



PERSPECTIVE
Scale NTS





ALFRED S. ROMUALDEZ
City Mayor
Tacloban City

Good Day!

This letter is in reference to the planned Septage Treatment Facility to be constructed in Barangay Sto. Nino, Tacloban North to be constructed by Unicef in partnership with **Samaritan Purse** on behalf of the **Tacloban City Government based on the MoU signed between Unicef and the City of Tacloban.**

We herewith request the Mayors authorization to begin construction of the facility as approved by your office. Attached herewith are the signed letter of approval by the city authorizing the the final drawings and Bill of Quantities for the envisioned Septage Treatment Facility.

With these we would like to ask the City Government of Tacloban to sign this letter as understanding that Unicef's Implementing Partner, Samaritan Purse, and Unicef and their designated representatives are authorized to access the site at any time necessary to construct the facility found in the attached documents on the parcel of the land designated by the City of Tacloban located in Brgy. Sto. Nino, North Tacloban.

As agreed, upon the completion, the city will assume full responsibility in the operation and maintenance of the facility. Upon completion, Unicef and and Samaritan Purse's liability and responsibility for the site will cease.

As agreed, the completed facility will also include demonstartion comfort rooms to showcase low – cost sanitation options. Unicef, Samaritan Purse and their representatives and guest will be allowed to access the site at anytime in the future in coordination with the City Government in order to present these demonstration facilities as well as the Septage Treatment Facility to new sanitation entrepreneurs and guests for educational purpose.

Unicef and its Implementing Partner Samaritan Purse are pleased to partner with the City Government Tacloban to help improving the lives of the people of Tacloban.

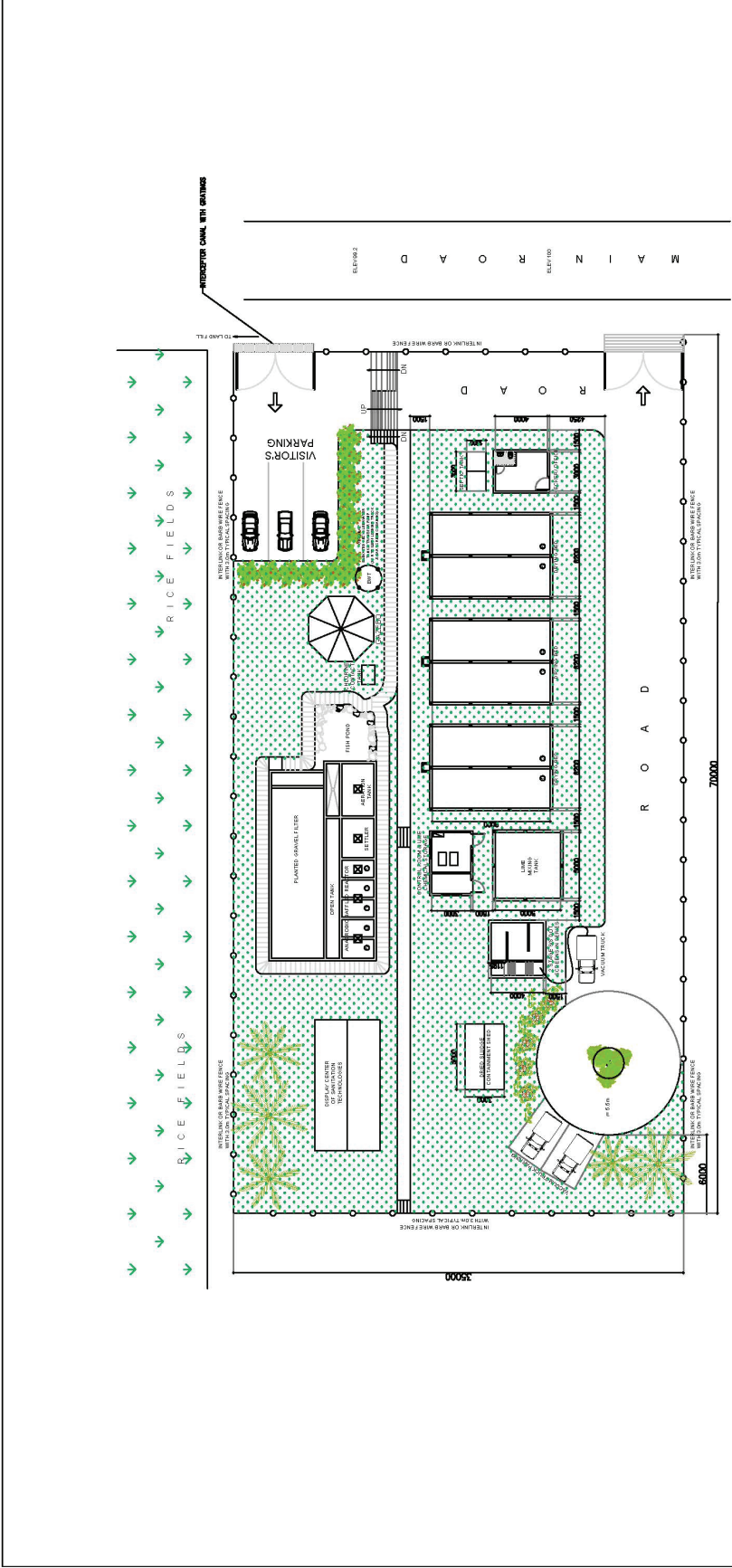
Thank you,

A handwritten signature in purple ink, appearing to read "Maulid Warfa".

Maulid Warfa
Chief of Field Office
Tacloban Field Office
UNICEF Philippines

A handwritten signature in blue ink, appearing to read "Alfred S. Romualdez".

Alfred S. Romualdez
City Mayor
Tacloban City



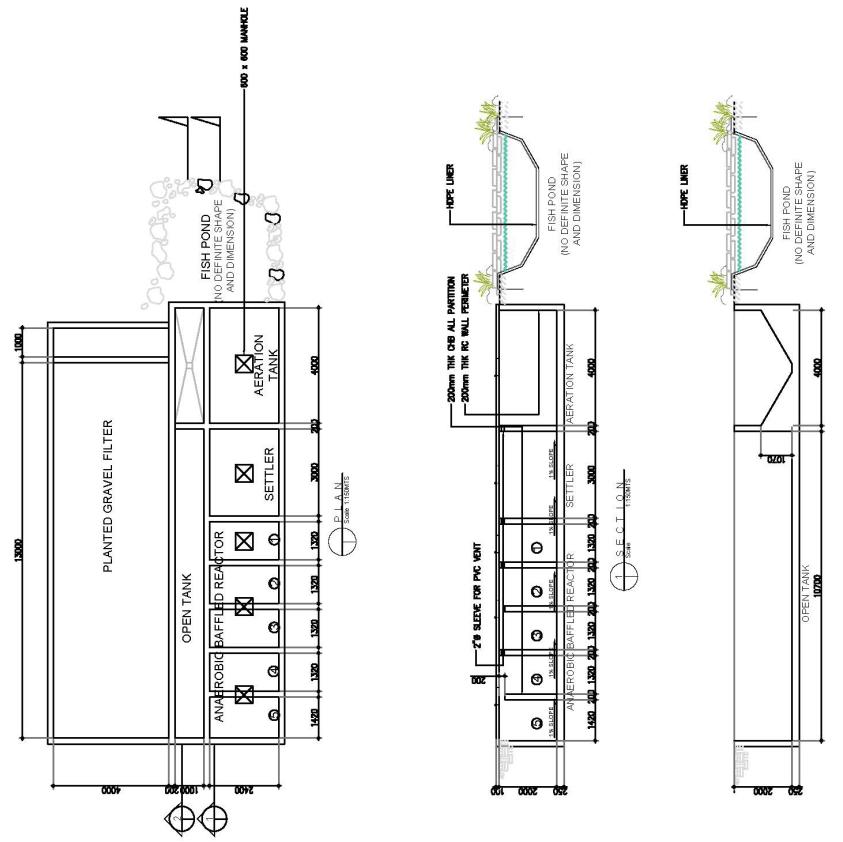


SITE DEVELOPMENT PLAN

 Scale NTS

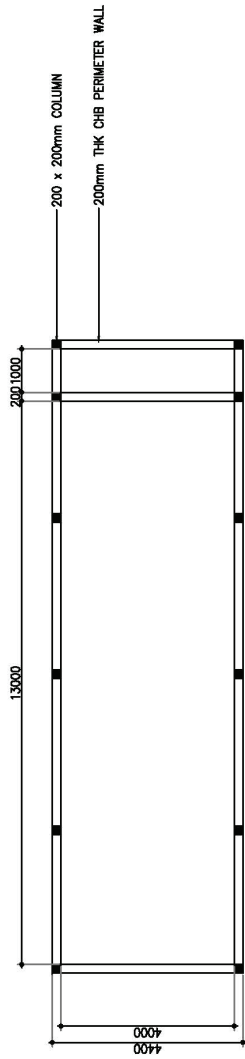
A-2

Office:	Reviewed By:	Recommended Approval:	Approved By:
Tacloban City	Arnel T. Brillo Engineering Assistant	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor
C.E.O	Office:	Location: Brgy. 101, New Kawawayan, Dumpsite, Tacloban City	
		Septage Management Plant	

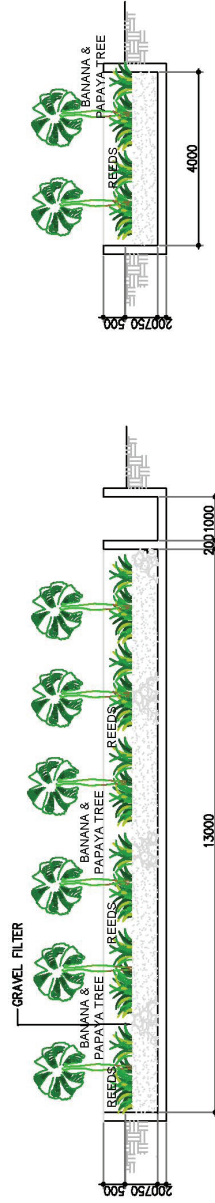


A-3

Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
Tacloban City	Arnel T. Brillo Engineering Assistant	Septage Management Plant Location: Brig. 101, New Kawayan, Dumpsite, Tacloban City	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor



PLAN



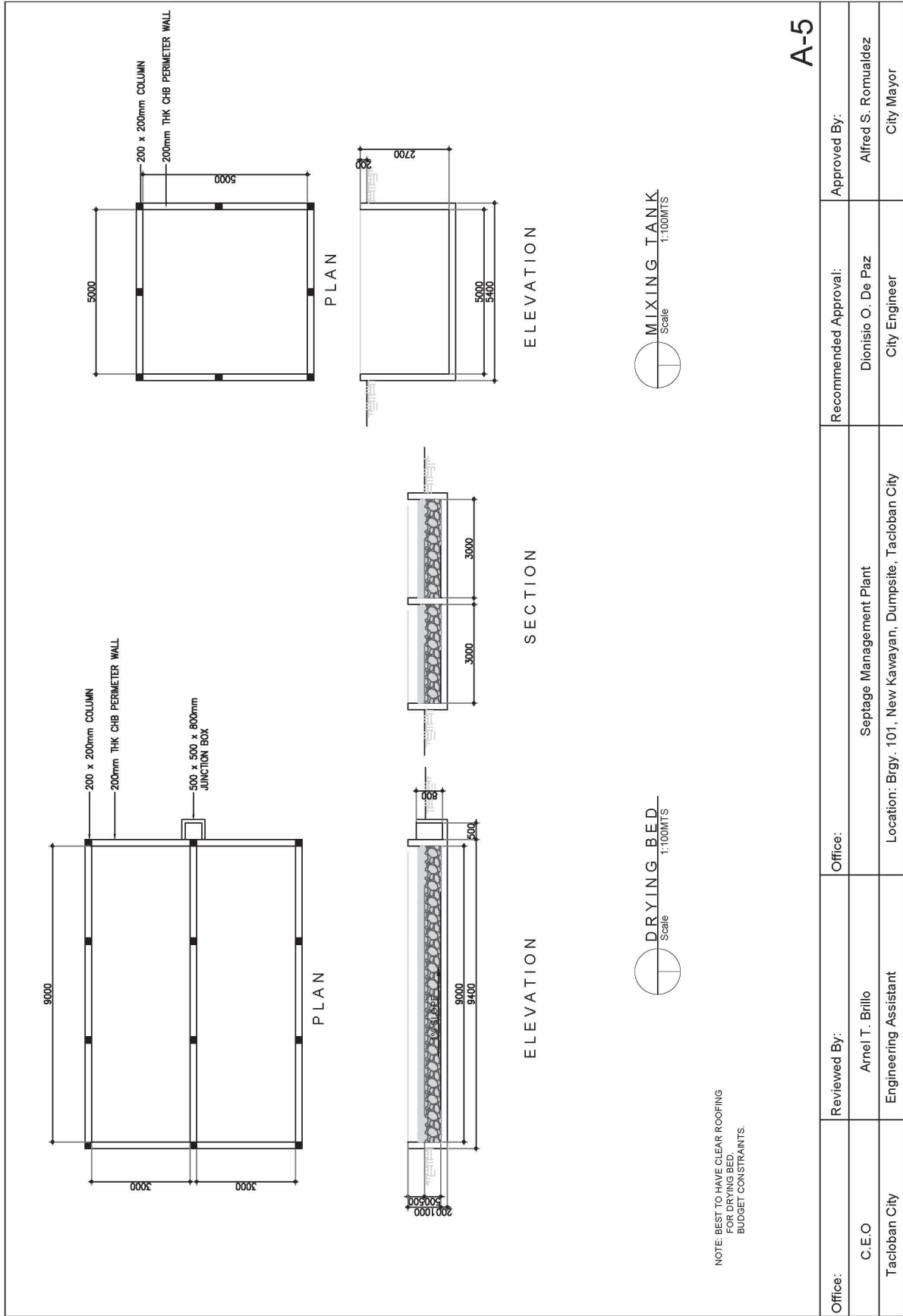
ELEVATION



GRAVEL FILTER DETAIL
Scale 1:100M/T/S

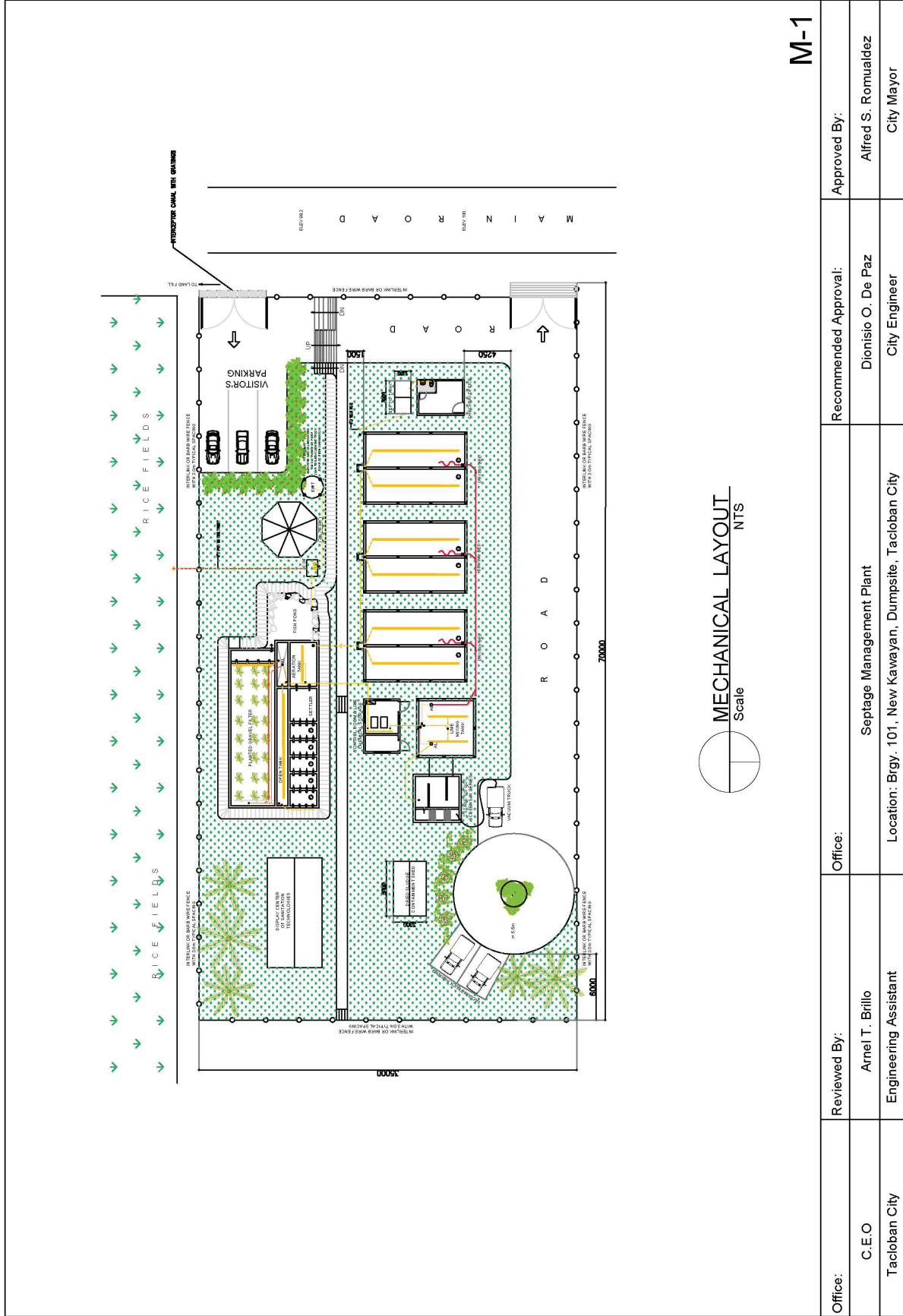
A-4

Office: Tacloban City	Reviewed By: Arnel T. Brillo Engineering Assistant	Office: Septage Management Plant Location: Brgy. 101, New Kawayan, Dumpsite, Tacloban City	Recommended Approval: Dionisio O. De Paz City Engineer	Approved By: Alfred S. Romualdez City Mayor
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A-5

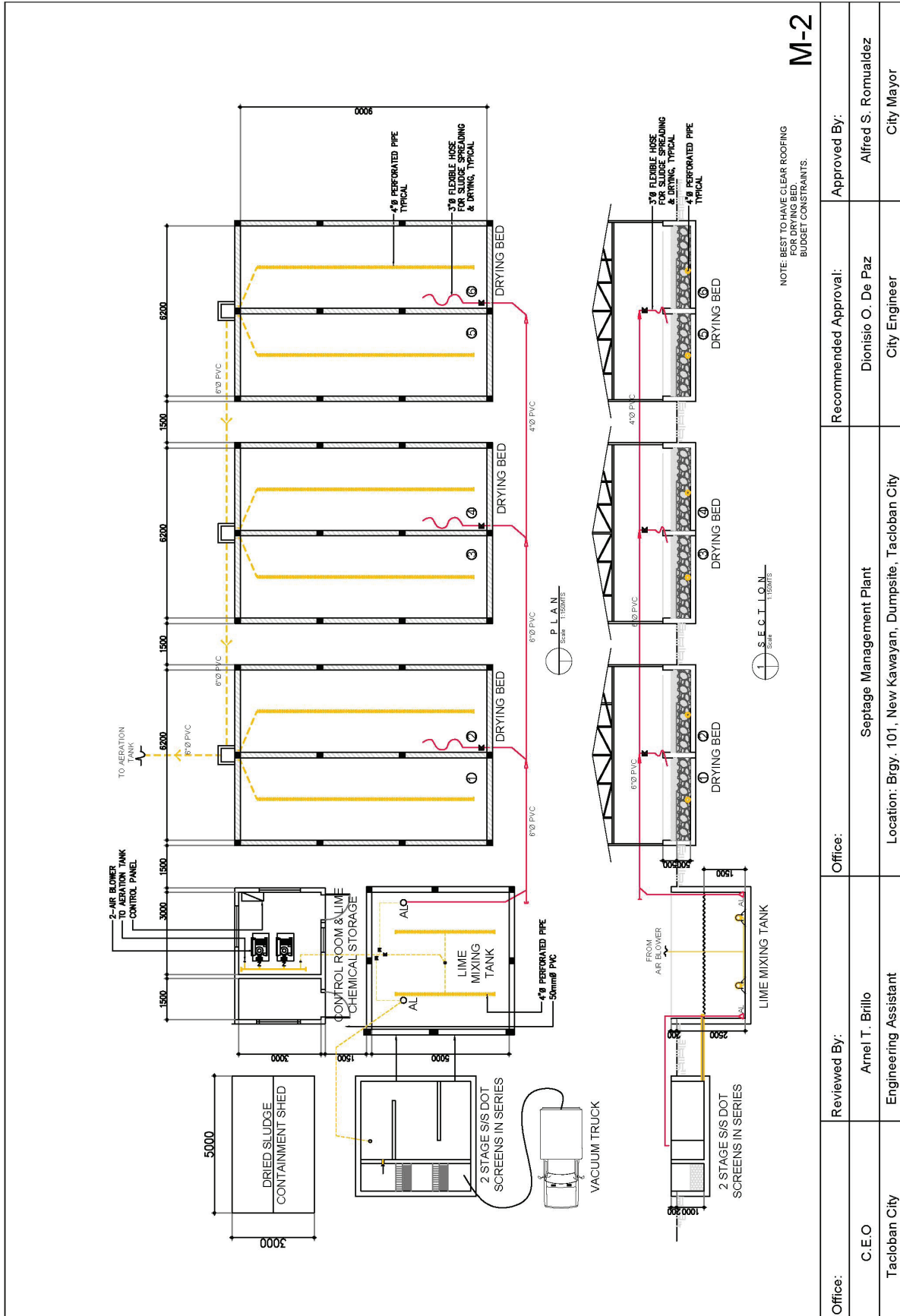
Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
Tacloban City	Arnel T. Brillo Engineering Assistant	Septage Management Plant Location: Brgy. 101, New Kawayan, Dumpsite, Tacloban City	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor



MECHANICAL LAYOUT
NTS
Scale

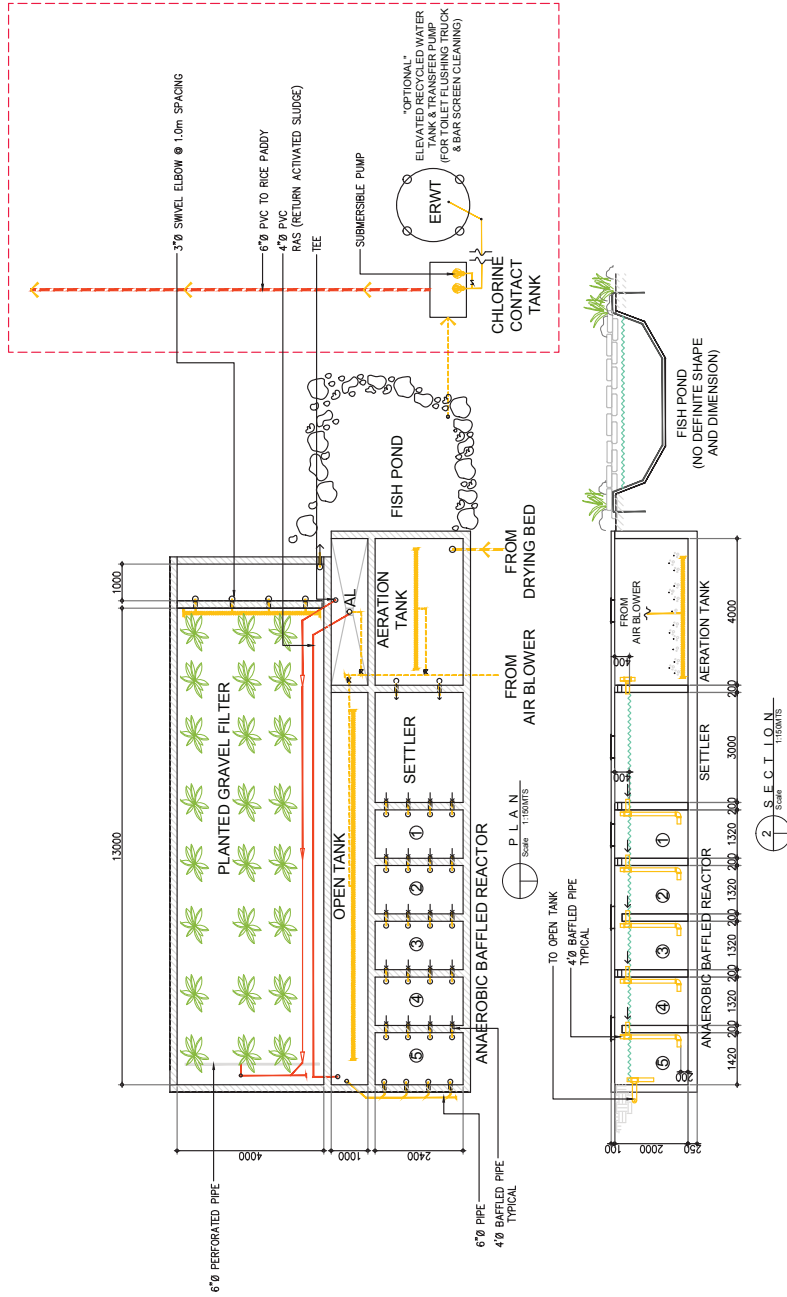
M-1

Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
Tacloban City	Arnel T. Brilló Engineering Assistant	Septage Management Plant	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor
		Location: Brig. 101, New Kawayan, Dumpsite, Tacloban City		



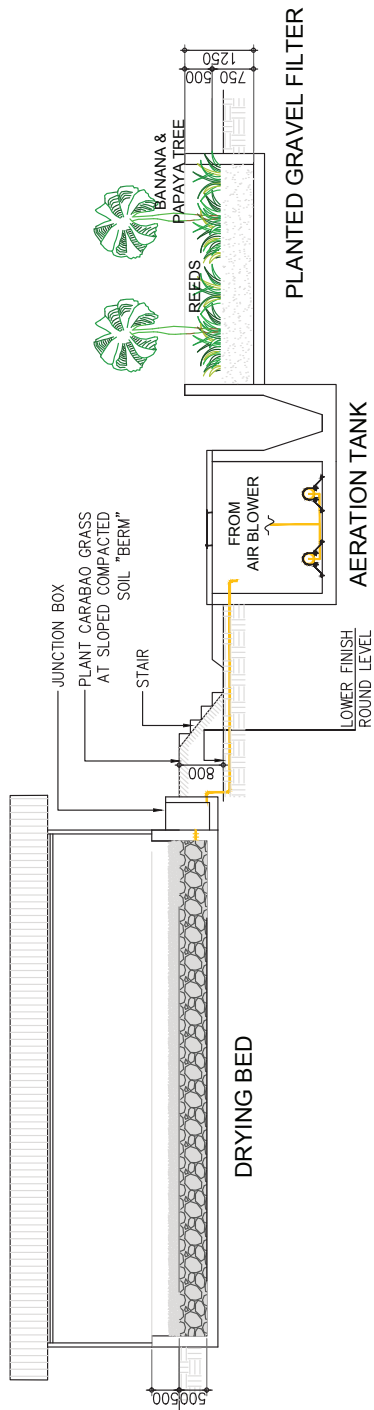
M-2

Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
Tacloban City	Arnel T. Brillio Engineering Assistant	Septage Management Plant	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor
C.E.O		Location: Brgy. 101, New Kawayan, Dumpsite, Tacloban City		

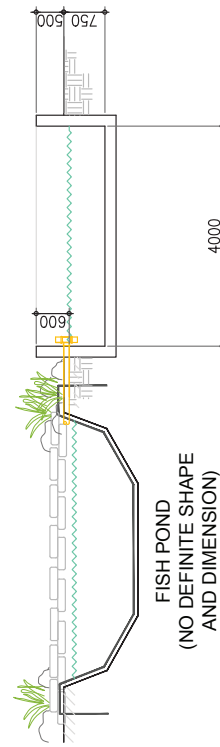


M-3

Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
Tacolban City	Arnel T. Brillo Engineering Assistant	Seplage Management Plant	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor
		Location: Brgy. 101, New Kawayan, Dumpsite, Tacloban City		



1 CROSS SECTION
Scale 1:1500/1TS



2 CROSS SECTION
Scale 1:1500/1TS

M-4

Office:	Reviewed By:	Office:	Recommended Approval:	Approved By:
C.E.O Taclaban City	Arnel T. Brillo Engineering Assistant	Septage Management Plant Location: Brgy. 101, New Kawayan, Dumpsite, Tacloban City	Dionisio O. De Paz City Engineer	Alfred S. Romualdez City Mayor

BILL OF QUANTITIES					
Activity	Item Description	Quantity	Unit	Price/pc	Cost
EXCAVATION					
Breaker and Backhoe	mobilization	1	ea	₱10000	₱10000
FORMWORK					
	Plywood, 1/2"x4'x8'	150	sheets	₱700	₱105000
	CCL, 2x2x12	600	pieces	₱35	₱21000
	Nails				
	1 1/2"	100	kilo	₱40	₱4000
	2 1/2"	100	kilo	₱40	₱4000
	3"	100	kilo	₱40	₱4000
	4"	100	kilo	₱40	₱4000
STRUCTURES					
Screening with Grit Chamber					
SINGLE POUR	CONCRETE WALL POUR				
	pour	5	m3	₱5425	₱27125
	reinforcing steel bar, 10mm	60	ea	₱130	₱7800
	FOOTING				
	reinforcing steel bar, 10mm	16	ea	₱130	₱2080
	pour	2	m3	₱5425	₱10850
	CHB BAFFLE CONSTRUCTION				
	BAFFLE				
	CBH 4"	50	ea	₱15	₱750
	reinforcing steel bar, 10mm	6	ea	₱130	₱780
Plastering					
Portland cement	1	bags	₱275	₱275	
fine sand	0.5	m3	₱800	₱400	
Filling					
Portland cement	2	bags	₱275	₱550	
fine sand	0.5	m3	₱800	₱400	
GRAVEL BED					
4" gravel bed	2	m3	₱800	₱1600	
SECOND POUR	CONCRETE SLAB POUR				
	pour, 2.5	2.5	m3	₱5425	₱13562.5
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
ADDITIONAL MATERIAL					
Screens	2	ea	₱2000	₱4000	
Mixing Cells					
	air blower	2	ea	₱80,000	₱160000
SINGLE POUR	CONCRETE WALL POUR				
	pour	5.5	m3	₱5425	₱29837.5
	reinforcing steel bar, 10mm	75	ea	₱130	
	FOOTING				
	reinforcing steel bar, 10mm	20	ea	₱130	₱2600
pour	2.4	m3	₱5425	₱13020	
GRAVEL BED					
SECOND POUR	4" gravel bed	2.5	m3	₱800	₱2000
	CONCRETE SLAB POUR				
	pour, 2.5	2.5	m3	₱5425	₱13562.5
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
Drying Bed Units					
SINGLE POUR	CONCRETE WALL POUR				
	pour	15	m3	₱5425	₱81375
	reinforcing steel bar, 10mm	125	ea	₱130	₱16250
FOOTING					

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BILL OF QUANTITIES					
Activity	Item Description	Quantity	Unit	Price/pc	Cost
	reinforcing steel bar, 10mm	60	ea	₱130	₱7800
	pour, 14 m3	14	m3	₱5425	₱75950
	CONCRETE COLUMN POUR				
	pour	2.25	m3	₱5425	₱12206.25
	reinforcing steel bar, 10mm	144	ea	₱130	₱18720
	GRAVEL BED				
	4" gravel bed	16.2	m3	₱800	₱12960
SECOND POUR	SLAB				
	pour, 16.2	16.2	m3	₱5425	₱87885
	4X8 reinforcing mesh. 2.4x4.8m sheets	15	sheets	₱1276	₱19140
Treatment	gravel layer, 3/4	81	m3	₱800	₱64800
	sand layer, coarse washed	48.6	m3	₱800	₱38880
ABR					
	GRAVEL BED				
	4" gravel bed	6	m3	₱800	₱4800
SINGLE POUR	C.I.P CONSTRUCTION				
	pour	25	cubic	₱5425	₱135625
	reinforcing steel bar, 10mm	250	ea	₱130	₱32500
	CHB WALL CONSTRUCTION				
	CBH 4"	525	ea	₱15	₱7875
	reinforcing steel bar, 10mm	6	ea	₱130	₱780
	Plastering				
	Portland cement	19	bag	₱275	₱5225
	fine sand	1	m3	₱800	₱800
	Filling				
	Portland cement	26	bags	₱275	₱7150
	fine sand	2	m3	₱800	₱1600
	SLAB				
SECOND POUR	pour	8.4	m3	₱5425	₱45570
	4X8 reinforcing mesh. 2.4x4.8m sheets	5	sheets	₱250	₱1250
Wetlands					
	CONCRETE POUR WALLS				
SINGLE POUR	pour	4.5	m3	₱5425	₱24412.5
	reinforcing steel bar, 10mm	42	ea	₱130	₱5460
	FOOTING				
	reinforcing steel bar, 10mm	22	ea	₱130	₱2860
	pour	4	m3	₱5425	₱21700
	GRAVEL BED				
	4" gravel bed	14	m3	₱800	₱11200
SECOND POUR	SLAB				
	4X8 reinforcing mesh. 2.4x4.8m sheets	13	sheets	₱1276	₱16588
	pour	6	m3	₱5425	₱32550
	Gravel for gravel bed, 3/4	26	m3	₱800	₱20800
	Sand for Sand layer	15.6	m3	₱800	₱12480
Fish Pond					
TBD					
Chlorine Treatment					
	CHB WALL CONSTRUCTION				
	Wall Structure				
	CBH 4"	100	ea	₱15	₱1500
	reinforcing steel bar, 10mm	12	ea	₱130	₱1560
	Plastering				

BILL OF QUANTITIES

Activity	Item Description	Quantity	Unit	Price/pc	Cost
	Portland cement	2	bags	₱275	₱550
	fine sand	1	m3	₱800	₱800
	Filling				
	Portland cement	3	bags	₱25	₱75
	fine sand	1	m3	₱800	₱800
	GRAVEL BED				
	4" gravel bed	0.5	m3	₱800	₱400
	MONOLITHIC FOOTING/SLAB POUR				
	reinforcing steel bar, 10mm	10	ea	₱130	₱1300
	pour	1.5	m3	₱5425	₱8137.5
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
	Stack Feeder Chlorinator	2	ea	₱1250	₱2500
	Covering for Stack Feeder	1	ea	₱650	₱650
Biosolids Stock Pile					
	MONOLITHIC FOOTING/SLAB POUR				
	reinforcing steel bar, 10mm	10	ea	₱130	₱1300
	pour	3	m3	₱5425	₱16275
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
	gravel bed	1.5	m3	₱800	₱1200
Control Room					
	Portland cement	53	bag	₱250	₱13250
	coarse sand	6	cubic	₱800	₱4800
	CHB 4"	600	ea	₱15	₱9000
	reinforcing steel bar, 10mm	30	ea	₱150	₱4500
	reinforcing steel bar, 5mm	10	ea	₱150	₱1500
	plywood, 1/2"	7	ea	₱660	₱4620
	CCL 2x2x8	30	ea	₱32	₱960
	CGI	10	ea	₱300	₱3000
	umbrella nails	4	kg	₱60	₱240
	hinge	6	ea	₱100	₱600
	metal door handle	2	ea	₱300	₱600
	barrel bolt	2	ea	₱4400	₱8800
	G.I. Plain sheet	2	ea	₱500	₱1000
	casement windows	4	ea		
	doors	2	ea	₱800	₱1600
	MONOLITHIC FOOTING/SLAB POUR				
	reinforcing steel bar, 10mm	10	ea	₱130	₱1300
	pour	4	m3	₱5425	₱21700
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
	GRAVEL BED				
	4" gravel bed	1.5	m3	₱800	₱1200
Guard Station					
w/ CR	Superstructure				
	Portland cement	53	bag	₱250	₱13250
	coarse sand	6	cubic	₱800	₱4800
	CHB 4"	600	ea	₱15	₱9000
	reinforcing steel bar, 10mm	30	ea	₱130	₱3900
	reinforcing steel bar, 5mm	10	ea	₱130	₱1300
	plywood, 1/2"	7	ea	₱660	₱4620
	CCL 2x2x8	30	ea	₱32	₱960
	CGI	10	ea	₱300	₱3000
	umbrella nails	4	kg	₱60	₱240

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BILL OF QUANTITIES					
Activity	Item Description	Quantity	Unit	Price/pc	Cost
	hinge	6	ea	₱30	₱180
	metal door handle	2	ea	₱100	₱200
	barrel bolt	2	ea	₱100	₱200
	G.I. Plain sheet	2	ea	₱300	₱600
	toilet bowl	1	ea	₱600	₱600
	casement windows	4	ea	₱11000	₱44000
	doors	2	ea	₱500	₱1000
	GRAVEL BED				
	4" gravel bed	1.5	m3	₱800	₱1200
	MONOLITHIC FOOTING/SLAB POUR				
	reinforcing steel bar, 10mm	10	ea	₱130	₱1300
	pour	4	m3	₱5425	₱21700
	4X8 reinforcing mesh. 2.4x4.8m sheets	2	sheets	₱1276	₱2552
	Substructure (for CR)				
	Portland cement	8	bag	₱250	₱2000
	coarse sand	1	cubic	₱800	₱800
	CHB 4"	80	ea	₱20	₱1600
	Reinforcing steel bar 10mm	10	ea	₱130	₱1300
	plywood, 1/2"	1	ea	₱660	₱660
	CCL 2x2x8	4	ea	₱25	₱100
	nails, 4"	1	kg	₱40	₱40
	nails, 3"	1	kg	₱40	₱40
	nails, 2"	1	kg	₱40	₱40
	nails, 1 1/2"	1	kg	₱40	₱40
	4" x 10' pvc	1	ea	₱500	₱500
	2" x 10' pvc	2	ea	₱300	₱600
	4" x 4" tee	1	ea	₱200	₱200
	4" x 4" 90' elbow	3	ea	₱100	₱300
	4" x 2" tee	1	ea	₱130	₱130
	2" x 2" elbow	1	ea	₱40	₱40
	4" clean out	2	ea	₱65	₱130
	solvent cement	1	can	₱60	₱60
	floor drain	2	ea	₱100	₱200
PIPING					
Screening with Grit Chamber /Control Room/ Mixing Cell	PVC				
	2" Pipe	6	lengths	₱800	₱4800
	2" Coupling	5	ea	₱100	₱500
	2" 45 degree elbows	3	ea	₱100	₱300
	2" 90 degree elbow	2	ea	₱100	₱200
	2" 4 way pvc tee	1	ea	₱200	₱200
	2x2 tee	1	ea	₱200	₱200
	2" gate valves	3	ea	₱500	₱1500
	Pipe cone fittings	1	ea	₱200	₱200
	4" pipe	4	lengths	₱800	₱3200
	4" coupling	3	ea	₱100	₱300
	2x4 Tee	2	ea	₱200	₱400
	End caps	4	ea	₱100	₱400
	Black Iron				
	2" Check valve	2	ea	₱3300	₱6600
	2x2 tee	4	ea	₱528	₱2112
	2" pipe, 3m lengths	3	ea	₱8000	₱24000

v						
Activity	Item Description	Quantity	Unit	Price/pc	Cost	
	2" coupling	2	ea	₱264	₱528	
	2" 90 elbow	2	ea	₱352	₱704	
Conveyance from Mixing Cell to Drying Beds	PVC					
	6" pipe length	8	ea	₱1100	₱8800	
	6" Coupling	7	ea	₱100	₱700	
	6" pipe cone	1	ea	₱200	₱200	
	6" y elbow	2	ea	₱300	₱600	
	6" end cap	1	ea	₱100	₱100	
	6" 45 degree elbow	2	ea	₱150	₱300	
	4" PVC pipe	3	ea	₱800	₱2400	
	4" Coupling	2	ea	₱100	₱200	
	6x4 reducer	1	ea	₱250	₱250	
	4" 45 degree elbow	2	ea	₱100	₱200	
	3" pipe	2	length	₱800	₱1600	
	3" coupling	1	ea	₱100	₱100	
	6x3 reducer	2	ea	₱250	₱500	
	4x3 reducer	1	ea	₱250	₱250	
	3" gate vales	3	ea	₱800	₱2400	
	HDPE					
	hose, 10m length	3	ea	₱500	₱1500	
Drying Beds	PVC					
	4" pipe, 3m	24	ea	₱800	₱19200	
	4" 45 degree elbow	12	ea	₱100	₱1200	
	4" end caps	6	ea	₱100	₱600	
	4" clean out	6	ea	₱250	₱1500	
Conveyance from Beds to ABR	PVC					
	6" pipe lengths	8	ea	₱1100	₱8800	
	6" Couplings	7	ea	₱100	₱700	
	6" 90 degree elbows	3	ea	₱100	₱300	
ABR	PVC					
	4x4 Outlet tees	26	ea	₱250	₱6500	
	4" pipe lengths, 3m	16	ea	₱800	₱12800	
	4" end cap	1	ea	₱100	₱100	
	4" y elbows	4	ea	₱250	₱1000	
	4" 45 degee elbow	1	ea	₱100	₱100	
	4" end caps	4	ea	₱100	₱400	
	4" couplings	5	ea	₱100	₱500	
	2" gate valves	3	ea	₱600	₱1800	
	2x4 tee	2	ea	₱200	₱400	
	2x2 tee	3	ea	₱200	₱600	
	2" 90 degree elbow	3	ea	₱100	₱300	
	2" end cap	1	ea	₱100	₱100	
	2" pipe lengths	5	ea	₱500	₱2500	
		2" couplings	4	ea	₱100	₱400
	(RAS)	4" PVC pipe	3	ea	₱800	₱2400
45 degree elbow		1	ea	₱100	₱100	
90 degree elvow		1	ea	₱100	₱100	
4" outlet tee		1	ea	₱200	₱200	
4" end cap		1	ea	₱100	₱100	
	Black Iron					
	2" pipe lengths	3	ea	₱3300	₱9900	

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Activity	Item Description	Quantity	Unit	Price/pc	Cost
	2" 45 degree elbows	2	ea	₱300	₱600
	2" 90 degree elbow	1	ea	₱350	₱350
Wetlands	PVC				
	6" outlet tee	3	ea	₱200	₱600
	6" 45 degree elbow	2	ea	₱200	₱400
	6" pipe lengths, 3m	11	ea	₱1100	₱12100
	6" y elbow	1	ea	₱250	₱250
	6x6 tee	1	ea	₱200	₱200
	6" end caps	5	ea	₱100	₱500
	6" 90 degree elbow	1	ea	₱100	₱100
	3x6 tees	8	ea	₱200	₱1600
	3" swivel elbow	8	ea	₱300	₱2400
Pond	TBD				
Chlorine Treatment (to CT and exit)	PVC				
	6" pipe	8	lengths	₱1100	₱8800
	6" couplings	7	ea	₱100	₱700
Additional Materials	solvent cement	10	cans	₱100	₱1000
Landscaping	plantlife	1	system	₱100000	₱100000
Electrical	wiring, connecting system, materials	1	system	₱40,000	₱40000
Coverings for DB and BSSP	7 corrugated polycarbonate roofing systems with CCL supports	170	pieces	₱1050	₱178500
Walkways					
75 linear meters of sidewalk (1m wide, .12m thick)	MONOLITHIC FOOTING/SLAB POUR				
	reinforcing steel bar, 10mm	90	ea	₱130	₱11700
	pour	18.75	m3	₱5425	₱101718.75
	GRAVEL BED				
	gravel layer, 7.5m3	7.5	M3	₱800	₱6000
Fencing w/ Gates	contractor	1	job	₱175,000	₱175000
Water System					
	5,000 l water tank	1	tank	₱110000	₱110000
	Portland cement	30	bags	₱250	₱7500
	CHB 4"	350	ea	₱15	₱5250
	coarse sand	3	m3	₱800	₱2400
	fine coarse sand	1	m3	₱800	₱800
	reinforcing steel bar				
	10mm	5	ea	₱130	₱650
	12mm	29	ea	₱140	₱4060
	CCL, 2x2x8	16	ea	₱35	₱560
	nails				
	4"	1	kg	₱40	₱40
	2"	1	kg	₱40	₱40
	Minor piping structures	1	set	₱750	₱750
TOTAL CURRENT COST					₱2,435,656.5

FOR MORE INFORMATION:

VISIT OUR WEBSITES: WWW.UNICEF.ORG
WWW.PHWASHRESOURCES.COM

OR CONTACT:

SIMONE KLAWITTER, PHD
 WASH TEAM LEAD YOLANDA RESPONSE
SKLAWITTER@UNICEF.ORG

KRISTINE WAGER
 KNOWLEDGE MANAGEMENT SPECIALIST
 SAMARITAN'S PURSE INTERNATIONAL RELIEF
KWAGER@SAMARITAN.ORG