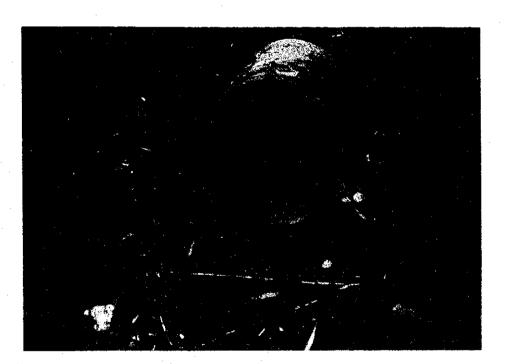
P. BILL OF QUANTITIES & COST ESTIMATES



APPENDIX P. BILL OF QUANTITIES & COST ESTIMATES

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1. Bill of Quantities & Cost Estimates	 P- 2

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LIST OF TABLE

 Table P.1
 BILL OF QUANTITIES & COST ESTIMATES
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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Demolition works				
	remove inlet gate	hr	24	30	720
	remove wire mesh in wet well	hr	8	100	800
	remove concrete pillars	hr	70	100	7,000
	remove access ladders	ea,	2	120	240
	remove concrete stairs	hr	· 70	30	2,100
c	sub-total				8,760
tio	Repair concrete surfaces				
sta	*on top of walls				
1. Raw water pumpong station		hr	25	30	750
ōđ	refinish with 50 mm air entrained				
E		m2	30	27	795
ā	sub-total		55		1,545
ate	New stop boards for foot bearing				6
ž	penstock	ea.	6	300	1,800
aw	sub-total				1,800
Ľ.	Install new aluminium stairs, and				· ·
**	railings				
	stairs (east side)	ea.	1	2,000	2,000
	new railings perimeter of wet well	m	50	100	5,000
	sub-total				7,000
				Total	19,105

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Table P.1 Bill of Quantities & Cost Estimate



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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Modify cross sectional area				
Ę	formwork	m2			
Station	concrete walls	m3	45	190	8,550
St	reinforcement	kg	10,000	2	20,000
อีน	new sluice gate	ea.	1	5,000	5,000
Screening	Rehabilitate sluice gates				
Scn	replace packing and grease spindle	ea.	4	750	3,000

	Y				
Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal cracks in walls &				
	construction joints				
	Epoxy injection vertical cracks	m	34	100	3,360
	Epoxy injection horizontal cracks	m		100	-
	Epoxy injection vertical				
	construction joints	m	10	100	960
	Epoxy injection horizontal				
	construction joints	m	66	100	6,640
	sub-total		110		10,960
	Repair expansion joints	ea,			
	New sealant on inside and				-
	outside of joints	m	-	20	
	Repair running surface for				
	travelling bridge				
	remove top 100mm concrete	hr	35	30	1,050
ē	disposal	m3	6	50	300
a E	100mm air entrained concrete,				
hai	with carborundum finish	m2	60	64	3,816
3. Aerated Grit Chamber	provide heat tracing cable	m	60	50	3,000
Έ ()	sub-total		161		8,166
ğ	Remove all handrails, ladders and				
ate	concrete walkway slabs				1
der	ladders	ea.	2	40	80
 	railings	m	100	10	1,000
	access walkways (concrete)	m2	40	45	1,800
	sub-total		142		2,880
	Install new aluminium stairs,				
	walkways, and railings				
	stairs (east and west side)	ea.	2	1,000	2,000
	walkways (each side of travelling				
	bridge) 1.2 m wide with railings	m	58	500	29,000
	open grating over inlet well	m2	-	250	-
	open grating over outlet well	m2	-	250	-
	new railings	m	-	100	-
	sub-total				31,000
	Rehabilitate Sluice Gates			1	1
	change packing & grease spindle	ea.	- 6	750	4,500
	P. Antis Sciences, and Sciences, Constraints, Antis Sciences, Antis Sciences, New York, New Y	1114-000-00-0	and free a cost to fee	and some of the first states and states	

Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
1 4011107	Seal cracks in walls & construction				
	ioints				
		m	203	100	20,290
		m	3	100	300
	Epoxy injection vertical construction	<u></u>			
	1 7 7 7 7 1	m	32	100	3,200
	Epoxy injection horizontal construction				
		m l	187	100	18,672
	sub-total		425		42,462
	Repair Expansion Joints	ea.			
	remove old sealant	m	234	15	3,511
	install new seal both sides (except				
	floor)	m	282	20	5,636
ି ଲ	channel gasket for wall joints	m	17	50	848
5	channel gasket for effluent launder				
a.	joints	m	18	60	1,056
pic	" " effluent chamber				
Ê	joints	m	13	60	792
ž	bottom gasket for floor joints	m	186	45	8,384
a l	sub-total		234		20,227
4.1 Primary Sedimentation Tank (Typical of 2)	Repair concrete surfaces				
ati	*on top of walls				
ert	top of tank walls	m2	99	·	
<u>Ē</u>	top of effluent launder walls	m2	34	ļ	
, pe	top of walls - effluent outlet structure	m 2	4		
	sub-total		137		
nar	remove top 50mm concrete	hr	34	30	1,029
rin -	disposal	m3	6.86	50	343
	refinish with 50 mm air entrained	_			
4	concrete	m2	137	27	3,637
	sub-total				5,009
	*on floors		······		
1	new screed on floor of effluent		105		
	launder	m2	185		
	new screed on floor of tank	m2	2,095		
	sub-total		2,280		13,681
	remove 50 mm of existing screed	hr m2	456	30	13,687
	disposal	m3	22.80	50	39,805
	new 100mm concrete floor slab	m2	2,095	19	40,000
	reinforcement, No.10-11.3mm dia.	kg	20,000	2 30	40,000
1	remove scrappers	hr	30		1,350
1	re-install and adjust scrapper height	hr	45	30	96,876
l	sub-total	L	L	L	90,070

Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
ucinty	Repair reinforcing steel inside walls				
	remove effluent weirs	hr	4	30	120
		m2	234	20	4,697
	disposal	m3	116.83	50	5,842
		m2	234	12	2,804
	3414 5400	m2	234	10	2,337
	new inside walls of clarifer, 150mm				
	concrete	m3	71	190	13,463
	reinforcement, No.10-11.3mm	kg	3,880	2	7,760
	modified formwork	m2	234		10,281
	epoxy resin coating at water line	m2	234	50	11,683
	reinstall & level effluent weirs	hr	8	30	240
	sub-total		<u>~</u>		59,225
4.1 Primary Sedimentation Tank (East)	Reconstruct columns supporting running surface of rotating scrapper (4 locations only)				
¥	labour to remove existing concrete,				
ີສາ	expose and treat reinforcement	hr	16	30	48
Ę	new steel No. 16 dia	kg	80	2	16
atio	new concrete	m3	4	190	76
ute Ute	sub-total				1,40
dime	Remove all handrails, ladders and concrete walkway slabs				
Se	ladders	ea.		40	-
∑ g	railings	m	-	10	-
Ĕ	access walkways (concrete)	m2	-	45	-
đ	sub-total				-
4.1	Install new aluminium stairs, walkways, and railings				
	stairs (Northwest side)	ea.	1	1,000	1,00
	walkways (perimeter of tank) 1.2 m wide with railings	m	82	500	40,85
	open grating over inlet well	m2	-	250	+
	open grating over outlet well	m2	-	250	25
	new railings	m	-	100	
	sub-tota				42,10
	Miscellaneous		1 .		
	Crane	month	1 1	25,000	
	Backfill	m3	1,325	60	79,51
	sub-tota		1		104,51
	Total cost ty		ne (1) sedim	entation tanl	

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Remove all handrails, ladders and				
	concrete walkway slabs				
	ladders	ea.	1	40	40
10	railings	m	13.6	10	136
el el	sub-total				176
liji	Replace slab supporting sluice gates				
Ö	at intake structure				
Σ	remove gate actuator and stem	hr	2	4	8
ша	remove slab	hr	16	30	480
Ъ Ц	replace packing and grease spindle	ea.	2	750	1,500
5	provide new reinfocement, 16mm	kg	29	2.5	72
ef	provide new concrete slab 200mm	m3	1.4	190	272
tu	sub-total				2,331
4.0 Inlet Structure for Primary Clarifiers	Install new galvanized walkways, and	·			
	railings				
llet	open grating over well	m2	4.4	250	1100
5	stairs and walkway from pumping	a a constante de la constante d			
4	station roof	ea.	1	1000	1000
	new railings	m	15.2	100	1520
	sub-total				3620
		en og en sanderid Forfallen og en senereter Forfallen og en senereter		Total	6,127

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal cracks in walls & construction			1	
	joints				
	Epoxy injection vertical cracks	m	323	100	32,30
	Epoxy injection construction joints	m	-	100	
	sub-total		323		32,30
	Repair Expansion Joints				
		m	1,065	15	15,97
	install new seal both sides (except				
	floor)	ea.	1,233	20	24,66
	channel gasket for wall joints	m	102	50	5,09
	channel gasket for influent launder		,		
	joints	m	19	60	1,13
	" " influent chamber joints	m	9	60	56
	bottom gasket for floor joints	m	935	45	42,07
	new 100mm concrete floor slab	m2	6,360	19	120,84
	reinforcement, No.10-11.3mm	kg	60,000	2.5	150,00
	sub-total				360,34
	Repair concrete surfaces				000,04
	*on top of walls	· · · · · ·			· · · · · · · · · · · · · · · · · · ·
	top of tank walls	m2	1,638		
	top of walls - effluent outlet structure		442		
	sub-total				
		the second s	2,079		45.50
	remove top 50mm concrete	hr	520	30	15,59
Å Å	refinish with 50 mm air entrained		0 070		
Ë.	concrete	m2	2,079	27	55,10
5 Aeration Tank	sub-tota	l			70,70
rat	Repair reinforcing steel inside walls				
Ae	remove concrete over steel	m2	1,645	20	33,05
ດ	sand blast steel	m2	1,645	12	19,73
	treat steel with rust inhibitor	m2	1,645	10	16,44
	new wall inside of east & west walls,				
	150mm concrete	m3	247	190	46,86
	reinforcement, No.15 @ 100 cc	kg	11,657	2	23,31
	modified formwork	m2	1,645	44	72,35
	reinstall & level effluent weirs	hr	. 8	30	24
	sub-total				212,01
	Reconstruct columns & slabs supporting surface aerators				
	remove aerators	ea.	36	60	2,16
	remove existing slabs & walls (150mm)	lea.	36		
	provide supporting scaffolding	lm2	2,862	75	214,65
	remove and dispose	m3	72	50	3,60
	new slab 300 mm on new 400mm		12		
					1
	beams	<u></u>	0.000	125	357,75
	formwork	<u>m2</u>	2,862		
	concrete for slab	m3	41.	190	7,71
	concrete for beams	m3	115	the second se	21,88
	steel for beams and slab	kg	50,000		125,00
	i remove loose concrete on columns	ea.	144	20	2,89
		J			

Facility Bill of Quantities & Cost Estimate

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View mail 160.74 190 30, steel m3 160.74 190 30, epoxy resin coating underside of slabs m2 541 50 27, epoxy resin coating columns m2 864 50 43, epoxy resin coating columns m2 864 50 43, new concrete, 150mm m3 171 190 32, reinforcement, No.16 @ 100 cc kg 11,375 2 22, modified formwork m2 1,137 44 50, Polyester resin "Estercrete" protective m2 1,137 50 56, sub-total m2 1,137 50 56, stairs ea, 20 40 20, access walkways (concrete) m2 594 45 26, stairs ea, 4 1,000 4, walkway 1,5 wide - across row of m 297 750 222, walkway 1,5 wide - across row of m<	Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
Concrete Im3 160.74 190 30, steel kg 24,000 2.5 60, epoxy resin coating underside of slabs m2 541 50 27, epoxy resin coating columns m2 644 50 43, epoxy resin coating columns m2 644 50 43, new concrete, 150mm m3 171 190 32, reinforcement, No. 15 @ 100 cc kg 11,375 2 22, modified formwork m2 1,137 44 50, Polyester resin "Estercrete" protective m2 1,137 50 56, walkway slabs iadders ea, 20 40 access walkways (concrete) m2 594 45 26, walkway slabs iadders ea, 4 1,000 4, 27, Instail new aluminium stairs, walkway 2 walkway 1,5 walkway 1,5 222, 40 access valkway 1,5 access row of aerators c/w railings m <td></td> <td>form new column, 600 mm square</td> <td>m2</td> <td>1,728</td> <td>44</td> <td>76,032</td>		form new column, 600 mm square	m2	1,728	44	76,032
steel kg 24,000 2.5 60, 27, 60, 60, 60, 60, 60, 60, 60, 60, 70, 60, 70, 60, 70, 60, 70, 60, 70, 60, 70, 70, 70, 70, 70, 70, 70, 70, 70, 7		· · · · · · · · · · · · · · · · · · ·			190	30,541
Version coating underside of slabs & beams m2 541 50 27, epoxy resin coating columns m2 864 50 43, epoxy resin coating columns 984, New exterior walls (East & West)				24,000	2.5	60,000
& beams m2 541 50 27, m2 epoxy resin coating columns sub-total 984, 50 43, 984, 984, New exterior walls (East & West) m3 171 190 32, reinforcement, No.15 @ 100 cc kg 11,375 2 22, modified formwork m2 1,137 50 56, 56, 56, 56, 56, 76, 76, 76, 76, 76, 76, 76, 76, 76, 7			1.5			
epoxy resin coating columns m2 864 50 43, 984, New exterior walls (East & West)			m2	541	50	27,072
Sub-total 984, New exterior walls (East & West) 984, new concrete, 150mm m3 171 190 32, reinforcement, No.15 @ 100 cc kg 11,375 2 22, modified formwork m2 1,137 44 50, Polyester resin "Estercrete" protective wall coating m2 1,137 50 56, walkway slabs m2 1,137 50 56, walkway slabs ea. 20 40 45 26, iadders ea. 20 40 27, 100 44 50, walkway slabs sub-total 614 27, 162, 162, 162, 164, 27, 11,000 44, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 14, 100, 10, 10,				864	50	43,20
New concrete, 150mmm317119032, (1,375reinforcement, No.15 @ 100 cckg11,375222, (22, modified formworkm21,1374450,Polyester resin "Estercrete" protective walt coatingm21,1375056,reinforcement, No.15 @ sub-totalm21,1375056,Polyester resin "Estercrete" protective walt coatingm21,1375056,sub-totalm21,1375056,Remove all ladders and concrete walkway slabsm25944526,laddersea.20404027,Install new aluminium stairs, walkway, and railingsm25944526,stairsea.41,0004,walkway 1.5 wide - along each row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm12050060,railings at inlet wellm25100291,Miscellaneous						984,41
new concrete, 150mmm317119032, 22, 22, modified formworkm317119032, 22, 22, modified formworkm211,375222, 22, 22, modified formworkm21,1374450, 50, 56, 162,Polyester resin "Estercrete" protective walk coatingm21,1375056, 56,Remove all ladders and concrete walkway slabsm21,1375056,Install new aluminium stairs, walkways, and railingsm25944526,Stairs walkway 1.5 wide - along each row of aerators c/w railingsea.41,0004,walkway 1.5 wide - across row of aerators c/w railingsm297750222,Miscellaneousm2510050,Provide new stop boardsea.530050,Rehabilitate sluice gatesm2075011,replace packing and grease spindle ea.aca369011,re-install surface aerators & hoist construction equipmentsmonth325,00074,		New exterior walls (East & West)				
modified formworkm21,1374450,Polyester resin "Estercrete" protective wall coatingm21,1375056,sub-total162,Remove all ladders and concrete walkway slabs162,walkway slabs2040laddersea.2040access walkways (concrete)m25944526,sub-total61427,Install new aluminium stairs, walkway 2 wide - along each row of aerators c/w railingsea.41,0004,walkway 1.5 wide - across row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm22050060,railings at inlet wellm25100291,Miscellaneousm2202505,Provide new stop boardsea.530075,Rehabilitate sluice gates		new concrete, 150mm	m3	171	190	32,41
modified formworkm21,1374450,Polyester resin "Estercrete" protective wall coatingm21,1375056,sub-total162,Remove all ladders and concrete walkway slabs162,walkway slabs2040laddersea.2040access walkways (concrete)m25944526,sub-total61427,Install new aluminium stairs, walkway 2 wide - along each row of aerators c/w railingsea.41,0004,walkway 1.5 wide - across row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm22050060,railings at inlet wellm25100291,Miscellaneousm2202505,Provide new stop boardsea.530075,Rehabilitate sluice gates		reinforcement, No.15 @ 100 cc				22,74
Verwalk coatingm21,1375056,Remove all ladders and concrete watkway slabs162,laddersea.20laddersea.20access walkways (concrete)m2594access walkways (concrete)m2594usb-total61427,Install new aluminium stairs, walkways, and railingsea.4stairs walkway 2 wide - along each row of aerators c/w railingsea.4m297750222,walkway 1.5 wide - across row of aerators c/w railingsm297railings at inlet wellm220060,open grating over inlet wellm2200250Provide new stop boardsea.5300Rehabilitate sluice gatesm20750replace packing and grease spindleea.3690crane to remove aeratorsea.3690crane to remove aerators & hoist construction equipmentsmonth325,000restrestrest3690		modified formwork	m2	1,137	44	50,04
sub-total 162, Remove all ladders and concrete 162, walkway slabs 120 ladders ea. 20 access walkways (concrete) m2 594 45 26, sub-total 614 27, Install new aluminium stairs, ea. 4 1,000 4, walkways, and railings ea. 4 1,000 4, walkway 2 wide - along each row of aerators c/w railings m 297 750 222, walkway 1.5 wide - across row of aerators c/w railings m 120 500 60, railings at inlet well m 25 100 291, Miscellaneous sub-total 291, 291, Provide new stop boards ea. 5 300 Rehabilitate sluice gates replace packing and grease spindle ea. 36 90 rations to remove aerators & hoist construction equipments month 3 25,000 74						
Remove all ladders and concrete walkway slabs ea. 20 40 Iadders ea. 20 40 access walkways (concrete) m2 594 45 26, sub-total 614 27, Install new aluminium stairs, walkways, and railings ea. 4 1,000 4, stairs ea. 4 1,000 4, walkway 2 wide - along each row of aerators c/w railings m 297 750 222, walkway 1.5 wide - across row of aerators c/w railings m 120 500 60, railings at inlet well m2 20 250 5, open grating over inlet well m2 20 250 5, Sub-total 291, 291, 291, 291, Miscellaneous - - 291, 291, Provide new stop boards ea. 5 300 - Rehabilitate sluice gates - - - - replace packing and grease spindle ea. 36 90 - crane to remove aerators				1,137	50	56,87
Walkway slabs ea. 20 40 ladders ea. 20 40 access walkways (concrete) m2 594 45 26, sub-total 614 27, Install new aluminium stairs, ea. 4 1,000 4, walkways, and railings ea. 4 1,000 4, walkway 2 wide - along each row of aerators c/w railings m 297 750 222, walkway 1.5 wide - across row of aerators c/w railings m 120 500 60, railings at inlet well m 25 100 0 90 291, Miscellaneous sub-total 291, 291, 291, 291, 291, 291, 291, Miscellaneous ea. 5 300 5, 300 10, 10, Provide new stop boards ea. 5, 300 10, 10, 10, replace packing and grease spindle ea. 36, 90, 10, 10, 10, crane to remove aerators ea. 36, 90,						162,08
Verladdersea.2040access walkways (concrete)m25944526,sub-total61427,Install new aluminium stairs, walkways, and railingsea.41,0004,walkways, and railingsea.41,0004,walkway 2 wide - along each row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm12050060,railings at inlet wellm2202505,sub-total291,202505,Sub-total291,291,291,Miscellaneousea.5300Provide new stop boardsea.5300Rehabilitate sluice gates 						
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walkway 2 wide - along each row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm12050060,railings at inlet wellm25100open grating over inlet wellm2202505,Sub-totalProvide new stop boardsea.5300Rehabilitate sluice gatesea.5300replace packing and grease spindleea.36903crane to remove aerators & hoist construction equipmentsmonth325,00074					45	26,73
walkway 2 wide - along each row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm12050060,railings at inlet wellm25100open grating over inlet wellm2202505,Sub-totalProvide new stop boardsea.5300Rehabilitate sluice gatesea.5300replace packing and grease spindleea.36903crane to remove aerators & hoist construction equipmentsmonth325,00074	tion			614		27,53
walkway 2 wide - along each row of aerators c/w railingsm297750222,walkway 1.5 wide - across row of aerators c/w railingsm12050060,railings at inlet wellm25100open grating over inlet wellm2202505,Sub-totalProvide new stop boardsea.5300Rehabilitate sluice gates1replace packing and grease spindleea.3690crane to remove aerators & hoist construction equipmentsmonth325,000	era					
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walkway 1.5 wide - across row of aerators c/w railingsm12050060, rowrailings at inlet wellm25100open grating over inlet wellm2202505,sub-total202505,Provide new stop boardsea.5300Rehabilitate sluice gatesreplace packing and grease spindleea.20750re-install surface aeratorsea.369074crane to remove aerators & hoist construction equipmentsmonth325,00074				007	750	000 76
aerators c/w railingsm12050060,railings at inlet wellm25100open grating over inlet wellm2202505,sub-total291,291,Miscellaneous291,Provide new stop boardsea.5300Rehabilitate sluice gates75011replace packing and grease spindleea.3690crane to remove aeratorsea.3690crane to remove aerators & hoistmonth325,000			m	297	750	222,10
railings at inlet wellm25100open grating over inlet wellm2202505,sub-total291,Miscellaneous291,Provide new stop boardsea.5300Rehabilitate sluice gatesreplace packing and grease spindleea.20750re-install surface aeratorsea.36903crane to remove aerators & hoist construction equipmentsmonth325,00074				100	500	60.00
open grating over inlet wellm2202505,sub-total291,Miscellaneous291,Provide new stop boardsea.5300Rehabilitate sluice gatesreplace packing and grease spindleea.20750re-install surface aeratorsea.36903crane to remove aerators & hoist construction equipmentsmonth325,00074			<u> </u>			60,00
sub-total291,Miscellaneous291,Provide new stop boardsea.Provide new stop boardsea.Rehabilitate sluice gates1replace packing and grease spindleea.re-install surface aeratorsea.3690crane to remove aerators & hoist3construction equipmentsmonth325,00074						5,00
Miscellaneousea.5300Provide new stop boardsea.5300Rehabilitate sluice gatesreplace packing and grease spindleea.20re-install surface aeratorsea.3690crane to remove aerators & hoist construction equipmentsmonth325,000			And the second se	20	200	
Provide new stop boardsea.5300Rehabilitate sluice gates			 			201,10
Rehabilitate sluice gatesreplace packing and grease spindleea.2075011re-install surface aeratorsea.369036crane to remove aerators & hoist construction equipmentsmonth325,00074			63	5	300	15
replace packing and grease spindleea.2075011re-install surface aeratorsea.369036crane to remove aerators & hoist construction equipmentsmonth325,00074			<u>.</u>	<u> </u>		
re-install surface aerators ea. 36 90 36 crane to remove aerators & hoist construction equipments month 3 25,000 74			ea	20	750	1500
crane to remove aerators & hoist construction equipments month 3 25,000 75						324
construction equipments month 3 25,000 7						
			month	3	25,000	7500
300-01a1 I I I I		sub-total				9474

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acility	Description of Work	Unit	Qty	Unit Cost	Total Cost
aonny	Seal cracks in walls & construction				
	loints				
		m	36	100	3,600
		m	83	100	8,262
	Epoxy injection vertical construction				
		m	-	100	-
	Epoxy injection horizontal construction				
	joints	m		100	
	sub-total		119		11,862
	Repair Expansion Joints	ea.			
	remove old sealant	m	221	15	3,320
	install new seal both sides (except		~~ '		0,020
		m	289	20	5,790
	floor) channel gasket for wall joints	m	203	50	1,000
	channel gasket for effluent launder	111	20		1,000
	-	m	12	60	722
	joints " effluent chamber	m	12		141
	endent undinder		10		70
ŝ	joints	m	12	60 45	72
6.4 Secondary Sedimentation Tank (Typical of 4))	bottom gasket for floor joints	m	177	40	
aj	sub-total		221		19,53
<u>ii</u>	Repair concrete surfaces				
ž	*on top of walls				
к Х	top of tank walls	m2			
an	top of effluent launder walls	m2	17	· · · · · · · · · · · · · · · · · · ·	
-	top of walls - effluent outlet structure				
tio	sub-total		17		
臣	remove top 50mm concrete	hr	4	30	12
nei	refinish with 50 mm air entrained				
÷	concrete	m2	17	27	44
Š	sub-total				574
Σ	*on floors				
ĝ	new screed on floor of effluent				
20	launder	m2	67		-
Se.	new screed on floor of tank	m2	2,119		-
4	sub-total	m2	2,186		-
<u>ن</u>	remove 50 mm of existing screed	hr	437	30	13,11
	new 100mm concrete floor slab	m2	2,119	19	40,26
	reinforcement, No.10-11.3mm	kg	20,000	2	40,00
	remove scrappers	hr	30	30	90
	re-install and adjust scrapper height	hr	45	30	1,35
	sub-tota				95,62
	Repair reinforcing steel inside walls	1			
	remove effluent weirs	hr	4	30	12
	remove concrete over steel	m2	245	20	4,92
	sand blast steel	m2	245	12	2,94
	treat steel with rust inhibitor	m2	245	10	2,45
	new inside walls of clarifer, 150mm	1	1	1	·····
	concrete	m3	73	190	13,92
	reinforcement, No.10-11.3mm	kg	2,500		5,00
	modified formwork	m2	245		10,78
	epoxy resin coating at water line	m2	245		12,25
	reinstall & level effluent weirs	hr	8	· · · · · · · · · · · · · · · · · · ·	24
	sub-tota				52,64

Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
Contig	Remove all handrails, ladders and steel walkways				
	ladders	ea.	1	40	40
L L	railings	m	-	10	-
μĔ	access walkways (concrete)	m2	-	45	~
tion	sub-total		1		40
imenta	Install new aluminium stairs, walkways, and railings				
eq	stairs	ea.	1	500	500
lary S	walkways (effluent launder) with railings two sides	m	82	500	40,850
P R	clean and paint existing railings	m	60	25	1,500
Typical Secondary Sedimentation Tank (Cont ^d	sub-total				42,850
	Total cost typ	oical for on	e (1) sedime	entation tank	223,129
Typi	То	tal for four	(4) sedimen	tation tanks	892,514

Remove all handrails, ladders and				
concrete walkway slabs				
ladders	ea.	4	40	160
railings	m	0	10	-
sub-total				160
Seal cracks in walls & construction				
oints				
Epoxy injection construction joints	m	257.05	100	25,705
Epoxy injection cracks	m	23.5	100	2,350
sub-total				28,055
Repair concrete surfaces				
*on top of walls				-
top of tank walls	m2	-	30	
top of effluent launder walls	m2	17	2.5	42
sub-total	m2	17		
remove top 50mm concrete	hr	3.37		
refinish with 50 mm air entrained				
epoxy mortar	m2	0.8	190	160
sub-totai				202
Install new galvanized walkways, and				
railings open grating over well	m2	200	250	50000
new railings	m	130	100	13000
sub-total				63000
Rehabilitate Sluice gates		•		
	ea.	4	750	3000
sub-total				3000
			Total	94,417

Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal construction joints				
	horizontal joints in efffluent launder	m	40	100	4000
	Remove all handrails, ladders and				
	concrete walkway slabs				
-	ladders	ea.	1	40	40
jo	railings	m	100	10	1,000
tat	access walkway to effluent				
ŝ	penstocks(concrete)	m2	40	45	1,800
i,	sub-total	ea.			2,840
du	Install new aluminium stairs,				
- 5	walkways, and railings		· · · · · · · · · · · · · · · · · · ·		
e De	stairs (north side)	ea.	1	1,000	1,000
p	open grating over wet well	<u>m2</u>	30	250	7,500
S	open grating walkway to effluent				
eq	penstocks	<u> </u>	20	500	
, Z	new railings	m	50	100	5,000
G	sub-total		<u> </u>	· · · · · · · · · · · · · · · · · · ·	13,500
8. Recycled sludge pumping station	New penstock stop planks				
	in wet well to isolate foot bearings	<u>ea.</u>	4	300	1,200
	in effluent launder	ea.	4	300	1,200
	sub-total			A see the self-statement of the self-self-self-self-self-self-self-self-	2,400
				Tota	22,740

			stimate	U.V. Oa at	Tatal Coot
Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal leaks in wet well				
	provide waterproof membrane			100	000
	inside wet well	m2	60	100	6000
	Remove all handrails, ladders and				
	concrete walkway slabs				
	ladders	ea.	1	40	40
	railings	m	100	10	1,000
	access walkway to				
5	esedimentation tanks (concrete)	m2	10	45	450
9 Primary sludge pumping station	sub-total	ea.			1,490
5	Install new aluminium stairs,				
ling	walkways, and railings				
du	stairs to sedimentation tanks				
л Д	from wet well platform	ea.	2	500	1,000
e	open grating over wet well	m2	10	250	2,500
đđ	open grating walkway to				
slu	sedimentation tanks	m	3	500	1,500
2	new access stair to wet well				
บส	platform	ea.	1	500	500
Ę.	new railings	m	35	100	3,500
б	sub-total				9,000
	Miscellaneous works				<u> </u>
	support valve stems and actuators				1
	at wet well platform	ea.	1	1,000	1,000
	retaining wall for stairs down to				r 00
	motor room	ea.	11	5,000	5,000
	sub-total		<u> </u>	 	6,000
				Tota	22,49

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
aomy	Seal cracks in walls & construction				
	ioints				
		m	210	100	21,000
		m	77	100	7,68
	Epoxy injection vertical construction				
	joints	m		100	••
	Epoxy injection horizontal construction				
	joints	m	95	100	9,48
	sub-total		382		38,16
	Repair Expansion Joints	ea.			<u> </u>
	channel gasket for wall joints	m	-	50	·
	channel gasket for effluent launder				
	joints	m	-	60	-
	" " effluent chamber				
	joints	m	-	60	-
	bottom gasket for floor joints	m	580	45	26,08
	sub-total		580		26,08
	Repair concrete surfaces				
	*on top of walls				
โ	top of tank walls	m2	14		<u></u>
ō	top of effluent launder walls	m2	24		
<u>is</u>	sub-total	m2	38		
_ S	remove top 50mm concrete	hr	9	30	28
10 Sludge Thickener (Typical of 2))	refinish with 50 mm air entrained			· ·	
Це	concrete	m2	38	27	1,00
÷.	sub-total	1112			1,28
hi	*on floors				
 ⊕	new screed on floor of effluent				
- Br	launder	m2	67		
Sla	new screed on floor of tank	m2	59		
ő	sub-total	A	125		
-	remove 50 mm of existing screed	hr	25	30	75
	new 100mm concrete floor slab	m2	59	19	1,11
	reinforcement, No.10-11.3mm		600	2	1,20
		kg	30	30	
	remove scrappers	hr	45	30	1,3
	re-install and adjust scrapper height	hr	40		5,31
	sub-total	[] 	 		5,3
	Repair reinforcing steel inside walls			20	
	remove effluent weirs	hr Inc	8	30	24
	remove concrete over steel	m2	165	20	3,3
	sand blast steel	m2	165	12	1,97
	treat steel with rust inhibitor	m2	165	10	1,64
	new inside walls of clarifer, 150mm		·		
	concrete	m3	14	190	2,6
	reinforcement, No.10-11.3mm	kg	1,700	2	3,4
	modified formwork	m2	165	a second s	7,2
	epoxy resin coating at water line	m2	165	50	8,24
	reinstall & level effluent weirs	hr	12	30	36
	sub-tota	II			29,1

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost		
i donicy	Remove all handrails, ladders and steel						
-	walkways						
রি	ladders	ea.	1	40	40		
o	railings	m	-	10			
a a	access walkways (concrete)	m2	-	45			
, Mpi d	sub-total		1		40		
E	Install new aluminum ladder,						
Jer	walkways, and railings						
kei	ladder	ea.	1	500	500		
hic	walkways (effluent launder) with			500			
 ()	railings two sides	lm		500	4 050		
δp	clean and paint existing railings	m	50	25	1,250		
10 Sludge Thickener (Typical of 2))	sub-total				1,750		
	Total cost typical for one (1) thickener tank 101,762						
	Total for two (2) thickeners 203,523						

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal leaks in wet well				
tation	provide waterproof membrane inside wet well	m2	60	100	6000
ng st	Remove all handrails, ladders and concrete walkway slabs				
idu	ladders	ea.	1	40	40
Inc	sub-total				40
dge 1	Install new aluminium ladder and platforms				
2	open grating over wet well	ea.	10	250	2,500
ğ	new ladder to roof	ea.	1	500	500
, ne	new ladder into wet well	ea.	1	500	500
11 Thickened sludge pumping station	new railings	m	15	100	1,500
	sub-total				5,000
	sub-total		ant a times-den Service and an	l Tota	na sang

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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost	
,	Remove sludge					
	sludge volume	m3	6,000			
	vacumm pump truck 5m3	no. of trips	1,200	200	240,000	
	disposal to land area	m3	12,000	-		
	cleaning	hr	640	30	19,200	
	sub-total				259,200	
	Thermal insulation	ea.				
	remove existing wall insulation	m2	1,223	30	36,690	
	remove existing roofing insulation	m2	640	30	19,200	
	expanded polystyrene insulation,					
~	100mm on walls	m2	1,223	50	61,150	
ŝtel	expanded polystyrene insulation,					
12 Sludge Digester	75mm on roof	m2	640	40	25,600	
ē	pre-finished aluminum sheet metal					
96	cladding on walls	m2	1,223	150	183,450	
pn	scaffolding for working on walls	m2	1,223	175	214,025	
ŝ	hot welded synthetic roofing					
77	membrane	m2	640	100	64,000	
					604,115	
	Install new aluminium ladder and					
	platforms					
	remove existing	hr	24	30	720	
	new platform	m	15	750	11,250	
	new railings	m	35	100	3,500	
	sub-tota				15,470	
	Total for one (1) digester 878,78					
			Sector and the sector	(2) digesters		

Unit Cost Unit **Total Cost** Qty Facility **Description of Work** Seal cracks in walls, floors & construction joints Epoxy injection vertical cracks 100 65,700 657 m Epoxy injection horizontal cracks m 100 Epoxy injection cracks in floor m 150 100 15,000 Epoxy injection horizontal construction 134 100 13,364 m ioints 941 94,064 sub-total Repair concrete surfaces ea. *on top of walls top of tank walls **m**2 104 remove top 50mm concrete 622 21 30 hr refinish with 50 mm air entrained 104 27 2,749 m2 concrete epoxy resin coating to inside wall m2 405 50 20,263 surfaces sub-total 23,634 Repair reinforcing steel at base of exterior wall remove concrete over steel m2 47 20 947 m2 47 12 565 sand blast steel 15 Gas Storage Tank treat steel with rust inhibitor m2 47 10 471 new epoxy mortar cover, 50mm thick 1.0 1.000 1.000 m3 sub-total 2,984 Corrosion Protect Steel Roof m2 1.065 7,000 210,000 5 cranes (100ton) to lift & lower roof days 30 support with falsework m3 10,216 510,788 50 12 25,553 remove rust (sandblast) m2 2,129 tar epoxy chemical resistant coating to inside of dome m2 1,065 100 106,473 106,473 epoxy paint outside of dome m2 1,065 100 959,287 Remove all handrails, ladders and steel walkways ladders 40 40 ea. 1 48 10 481 railings m sub-total 521 49 Install new aluminium ladder and railings 1,000 1,000 ladder 1 ea. new railings 47 100 4,712 m Miscellaneous 7 700 4.900 dewatering days 15,000 15,000 new gas pressure relief valve 1 ea. 30,000 30,000 hot water piping ea. 1 concrete mortar on slab over piping 31,708 100mm m3 60 530 sub-total 81,608 1,162,098 Total cost



Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Seal cracks in walls & construction				
	ioints				
		m	194	100	19,35
		m		100	4,71
	Epoxy injection vertical construction				
		m	· #	100	· _
	Epoxy injection horizontal construction				
	joints	m	47	100	4,71
	sub-total		241		28,77
	Repair Expansion Joints	ea.			
	channel gasket for wall joints	m	17	50	87
	channel gasket for effluent launder				
	joints	m .	-	60	-
	" effluent chamber				
	joints	lm	-	60	-
	bottom gasket for floor joints	m	83	45	3,73
	sub-total		100		4,6
	Repair concrete surfaces				
	*on top of walls				
	top of tank walls	m2	24		· <u>·····</u> ·················
¥	top of effluent launder walls	m2	-		······································
an	sub-tota		24		
16 Sludge Holding Tank	remove top 50mm concrete	hr	6	30	1
Ē	refinish with 50 mm air entrained				
5		m2	24	27	6
T a	concrete sub-tota		<u> </u>	<u></u>	8
ð,	*on floors	<u>}</u>			
Ž	new screed on floor of effluent		· · · · · · · · · ·		
9	launder	m2			_
-	new screed on floor of tank	m2	714		
	sub-tota		714		
	remove 50 mm of existing screed	hr	143	30	4,2
	new 100mm concrete floor slab	m2	714	19	13,5
	reinforcement, No.10-11.3mm	kg	7,000	2	14,0
	remove scrappers	hr	30	30	9
	re-install and adjust scrapper height	hr	45	30	1,3
	sub-tota				34,0
	Repair reinforcing steel inside walls	·			<u>_</u>
	remove effluent weirs	hr	-	30	
	remove concrete over steel	m2	203	20	4,0
	sand blast steel	m2	203		2,4
	treat steel with rust inhibitor	m2	203	10	2,0
	new inside walls of clarifer, 150mm	+			
	concrete	m3	. 14	190	2,6
	reinforcement, No.10-11.3mm	kg	2,000		4,0
	modified formwork	m2	203		8,9
	epoxy resin coating at water line	m2	203		10,1
	reinstall & level effluent weirs	hr		30	, ,,
	reinstall & level effluent weirs sub-tota		+		34,2
	Sub-tota	<u>11</u>		_ <u></u>	1

Cost Report - Civil Structures

Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost
	Remove all handrails, ladders and steel walkways				
×	ladders	ea.	1	40	40
an	railings	m	-	10	نه
н Т	access walkways (concrete)	m2	-	45	-
Ĭ	sub-total		1		4
Sludge Holding Tank	Install new aluminum ladder, walkways, and railings				
ğ	ladder	ea.	1	500	50
16 Slu	walkways (effluent launder) with railings two sides	m	-	500	-
	clean and paint existing railings	m	35	25	87
	sub-total				1,37

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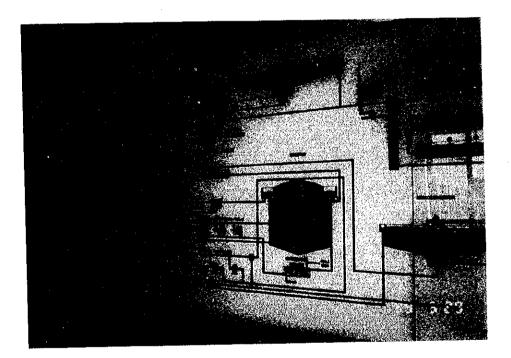
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Facility	Description of Work	Unit	Qty	Unit Cost	Total Cost	
	Seal leaks in wet well					
5	epoxy inject cracks	m	30	100	3000	
mping 1	Install new aluminium ladder and platforms					
ng p	open grating over wet well	m2	30	250	7,500	
dge pur station	ladder into wet well	ea.	1	500	500	
Sludge stat	new railings	m	27	100	2,700	
	sub-total	ea.			10,700	
17	Total 13,700					

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Q. ELECTRICAL LOAD & EQUIPMENT LISTS



APPENDIX Q. ELECTRICAL LOAD & EQUIPMENT LISTS

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1.	Electrical Load List	Q-2
2.	Electrical Equipment List	Q-7
3.	Mechanical Equipment List	Q-9

LIST OF TABLE

Table Q.1 ELECTRCAL LOAD LIST	Q-2
Table Q.2 ELECTRICAL EQUIPMENT LIST	Q-7

Appendix

Table Q.1 ELECTRICAL LOAD LIST

Equipment	Installed Load (kW)	Emergency Load(A) *1 (kW)	Emergency Load(B) *2 (kW)	Operation Hour * 3 (hr/day)	Consumed Power (kWh/day)	Note
0a-Pre-						·
treatment -Rail crane	4.7	4.7		1	4.7	
0b-Pre- screening Station	9 					
-Rough screen	2.5×3 =7.5	7.5	}	1	7.5	
-Fine screen	2.5×3	7.5		1	7.5	
-Lighting	=7.5	3		Ns	Ns	
1-Raw Water Pumping Station						
-Pump	160×4 =640	160×2 =320		24×2/4	7,680	
-Rail crane	4.7			Ns	Ns	
-Lighting	4	4		Ns	Ns	
2-Screening Station						
-Rough screen	2.5×4 =10	10		1	10	
-Fine screen	2.5×4 =10	10	2	1	10	
-Stop plank	1.1×2	2.2		Ns	Ns	
-Belt conveyer	=2.2	2.5		1	2.5	
-Rail crane	4.7			Ns	Ns	
-Lighting	4	4		Ns	Ns	
3-Aerated Grit Chamber						
-Bridge	1.5	1.5		24	36	
-Compressor-A	3.5	3.5		24	84	
-Compressor-B	1.5	1.5		24	36	

Equipment	Installed Load (kW)	Emergency Load(A) *1 (kW)	Emergency Load(B) *2 (kW)	Operation Hour * 3 (hr/day)	Consumed Power (kWh/day)	Note
19-Air Blower						
Room						
-Blower	10×3 =30	30		24	720	
-Lighting		1		Ns	Ns	
4-Primary Sedimentation Tank	0.55.40	1.5		24	26	
-Bridge	0.75×2 =1.5	1.5		24	36	
9-Primary Sludge Pumping Station						·
-Pump	15×2	30		24	720	
-Lighting	=30 0.5	0.5		Ns	Ns	
10-Słudge Thickener						
-Mud beater	1.5×2 =3	3		24	72	
-Compressor	0.75×4 =3	3		24	72	
11-Thickened Sludge Pumping Station			- 			
-Pump	15×2 =30	30		24	720	
-Lighting	0.5	0.5		Ns	Ns	
Outdoor Lighting	3.5	3.5	3.5	10	35	
		F -				
Sub-total	814.3	484.9	3.5		10,253.2	
5-Aeration Tank			· · · · · · · · · · · · · · · · · · ·			
-Turbine	37×36 =1,332	37×18 =666		24	31,968	

Q -3

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Equipment	Installed Load (kW)	Emergency Load(A) * 1 (kW)	Emergency Load(B) *2 (kW)	Operation Hour * 3 (hr/day)	Consumed Power (kWh/day)	Note
6-Final Sedimentation Tank						
-Bridge	0.75×4 =3	3		24	72	
-Bridge	0.75×2 =1.5	1.5		24	36	Year 2015
8-Recycled Sludge Pumping Station						
-Pump	100×2 =200	100×1 =100		24×1/2	2,400	
-Rail crane	4.7			Ns	Ns	
-Excess sludge pump	6×2 =12	12		12	144	
-Lighting	0.5	0.5		Ns	Ns	
24-Service Water Pumping Station						
-Pump-A	37×2 =74	74		24	1,776	
-Pump B	22×2 =44	44		24	1,056	<u>,</u>
-Lighting	7	7		Ns	Ns	
A1-Chlorina- tion Building -Doser	0.3	0.3		24	7	Year 2015
-Rail crane						Year 2015
	4.7	4.7		0.5		
-Lighting	4	4		0.5	2	Year 2015
22-Reception -Lighting	0.5	0.5	0.5	10	5	

Q -4

Equipment	Installed Load (kW)	Emergency Load(A) *1 (kW)	Emergency Load(B) *2 (kW)	Operation Hour * 3 (hr/day)	Consumed Power (kWh/day)	Not
23-Administ- ration Building						
-Central control equipment	5	5	5	24	120	
-Lighting	38	38	38	10	380	
Outdoor Lighting	7.5	7.5	7.5	10	75	
Sub-total	1,738.7	968	51		38,043	
12-Sludge Digester -Lighting	1	1	1	Ns	Ns	
13-Boilor & Engine Generator Room						
-Old boiler	1.1×2 =2.2	2.2	2.2	24	53	
-New boiler	1.5	1.5	1.5	24	36	
-Mud recycle pump	18.5×3 =55.5	55.5	55.5	24	1,332	
-Service water pump	1.5×2 =3	3	3	8×1/2	12	
-Central heating pump	16.4	16.4	16.4	0	0	
-Lighting	5	5	5	10	50	
14-Gas Compressor Station			-			
-Recycle compressor	37×3 =111	111	111	24	2,664	
-Transfer compressor	30×3 =90	90	90	24	2,160	
-Lighting	. 1]	1	Ns	Ns	

Q -5

Equipment	Installed Load (kW)	Emergency Load(A) *1 (kW)	Emergency Load(B) *2 (kW)	Operation Hour * 3 (hr/day)	Consumed Power (kWh/day)	Note
16-Homoge- nised Sludge Holding Tank -Bridge	1.5			24	36	
17-Sludge Pumping Station				2-27T	50	
-Mud pump	1.5×5			24	180	
-Lighting	=7.5			Ns	Ns	
18-Sludge Dehydration						
-Filter press	1.5×5			8	60	
-Belt conveyer	=7.5			8	44	
-Rail crane	8			Ns	Ns	
-Polyelectro mixer	2.2×2 =4.4			8	35.2	
-Doser	0.3	-		8	2.4	
-Dosing pump	0.75×5 =3.75			8	30	
-Lighting	15			10	150	
Outdoor Lighting	2	2	2	10	20	
Sub-total	343.05	288.6	288.6		6,864,6	
Total	2,896.05	1,741.5	343.1		55,160.8	
Power demand	×0.7 * =2,028	×0.7 * =1,220	×0.7 * =240	. 		* Demand factor

(Note) *1; In case of that the Generator (2pcs) are operated under cutting off of commercial electric power supply

*2; In case of that the Generator (1pcs) is operated under cutting off of commercial electric power supply, during maintenance stop of another Generator(1pcs)

***3** ; In summer season

Ns; Negligible small

Appendix

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Table Q.2 ELECTRICAL EQUIPMENT LIST(1/2)

Equipment	Qty.	Specification
0. Pre-treatment		
and Pre-screening Station		
-Local control panel	1 lot	Metal enclosed indoor type
-CCTV camera and monitor	1 lot	Monitor is installed in Administration
-Measuring instrument	1 pc.	PH
1. Raw Water Pumping Station	1	
-Local control panel	1 lot	Metal enclosed indoor type
-Measuring instrument	1 pc	Level
2. Screening Station		
-Measuring instrument	1 pc.	Level
5.Aeration Tank		
-Local control panel	1 lot	Metal enclosed indoor type
-Switch box for machine side	1 lot	Metal enclosed outdoor type
-Measuring instrument	4 pcs.	DO
7.Flow Metering		
-Measuring instrument	1 pc.	Flow
-Measuring instrument	1 pc.	pH
8.Recycled Sludge		
Pumping Station		
-Local control panel	1 lot	Metal enclosed indoor type
-Measuring instrument	1 pc.	Level
-Measuring instrument	1 pc.	Flow
9.Primary Sludge		
Pumping Station		
-Local control panel	1 lot	Metal enclosed indoor type
-Measuring instrument	1 pc.	Flow
11. Thickened Sludge Pumping Station		
-Local control panel	1 lot	Metal enclosed indoor type
-Measuring instrument	l pc.	Flow
12.Sludge Digester	_	
-Measuring instrument	2 pcs.	Temperature
13.Boiler	ļ	
& Engine Generator Room		
-Transformer	2 pcs.	1000 kVA, 10/0.4kV, 3ϕ , 50Hz Class H, Dry type
-HT switchgear	l lot	Metal enclosed indoor type
-Local control panel	1 lot	10kV
-Lovai control parte	1 101	Metal enclosed indoor type

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Equipment	Qty.	Specification
15.Gas Storage Tank	1	
-Measuring instrument	2 pcs.	Flow
16.Homogenized Sludge		
Holding Tank		
-Measuring instrument	1. <u>p</u> c.	Flow
18. Sludge Dehydration		
-Local control panel	1 lot	Metal enclosed indoor type
19. Air Blower Room		
-Local control panel	1 lot	Metal enclosed indoor type
20.Power Station		
-Transformer	2 pcs.	1600 kVA, 10/0.4kV, 3 ϕ , 50Hz Class H, Dry type
-HT switchgear	1 lot	Metal enclosed indoor type
n an		10kV
-LT power distribution / motor control panel	1 lot	Metal enclosed indoor type
21.Substation	5	
-Transformer	1 pc.	1600 kVA, 10/0.4kV, 3 ¢, 50Hz
		Class H, Dry type
-HT switchgear	1 lot	Metal enclosed indoor type 10kV
-LT power distribution / motor control panel	1 lot	Metal enclosed indoor type
23.Administration Building		
-Main control panel	1 lot	Metal enclosed indoor type
with mimic graphic -Operator console	1 lot	
-Data logging system	1 lot	Metal enclosed indoor type
-UPS	1 lot	Metal enclosed indoor type
24.Service Water		
Pumping Station		
-Local control panel	1 lot	Metal enclosed indoor type
-Measuring instrument	1 pc	Flow
Outdoor lighting fixture	1 lot	200W natrium lamp
with pole		-
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ELECTRICAL EQUIPMENT LIST(2/2)

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MECHANICAL EQUIPMENT

0A **Pre-Treatment Grit Chamber** 1,500 mm width x 1,500 mm length 3 sets 0A.1 Automatic Gate; Grab bucket capacity of 0.3 m3 1 set 0A.2 Grab Bucket; Grit hopper capacity of 10 m3 0A.3 Grit Hopper; 3 sets **0B Pre-Screening Station** 0B.1 2,500 mm width x 2,500 mm length 3 sets Inlet Automatic Gate: 0B.2 Automatic Coarse Screen; 50 mm opening x 2,000 mm width 3 sets 0B.3 Automatic Medium Screen: 25 mm opening x 2,000 mm width 3 sets 0B.4 Outlet Automatic Gate: 2,500 mm width x 2,500 mm length 3 sets Hopper capacity of 20 m3 **OB.5** Screenings Hopper; 3 sets **Pumping Station: Screw Pump; Archimedean Spiral** 1. 1.1 Screw Pump; 78 m3 / min x 8.91 m 4 sets 2. **Screening Station** 2.1 Inlet Automatic Gate; 1,500 mm width x 1,500 mm length 4 sets 2.2 Automatic Fine Screen; 6 mm opening x 1,500 mm width 4 sets 2.3 Outlet Automatic Gate: 1,500 mm width x 1,500 mm length 4 sets 3. **Aerated Grit Chamber: Sand Bridge Trap** 3.1 Inlet Gate: 1,500 mm width x 1,500 mm length 3 sets 3.2 2,000 mm width x 1.5 kw 1 set Sand Bridge Trap; with 3 sets of air lift pipes 1,000 mm width x 1,000 mm length 3.3 Scum Outlet Gate; 3 sets 3.4 Outlet Gate: 2,000 mm width x 2,000 mm length 3 sets 4. **Primary Sedimentation Tank** 2 sets 4.1 Peripheral Drive 52 m diameter x 2.8 m depth x 0.75 kw with Scum Skimmer; 5. **Aeration Tank** 5.1 Surface Aeration Turbine; 2,000 mm diameter x 37 kw 36 sets **Final Sedimentation Tank** 6. 6.1 Center Drive 52 m diameter x 2.8 m depth x 0.75 kw 4 sets

with Scum Skimmer;

	with bould beam or,		
7.	Flow Meter		
7.1	Flow Meter with Level Meter and	Transducer	
			1 set
8.	Recycled Sludge Pumping Stati	on: Screw Pump; Archemedean Spiral	
8.1	Screw Pump;	200 m3 / min x 8 m x 100 kw	2 sets
9.	Primary Sludge Pumping Statio	n	
9.1	Sludge Pump with Induce Screw;	5.0 m3 / min x 11 m x 15 kw	2 sets
10.	Sludge Thickener		
10.1	Center Drive with Picket;	30 m diameter x 3.5 m depth x 1.5 kw	2 sets
11	Thisland Chulas Damains Sta	4:	
11.	Thickened Sludge Pumping Sta	•	0 /
11.1	Sludge Pump with Induce Screw;	1.0 m3 / min x 49 m x 22 kw	2 sets
12.	Sludge Digester		
12.1	Sludge Pump with Induce Screw;	3.75 m3 / min x 9 m x 11 kw	3 sets
12.2	Heat Exchanger	Heat exchange capacity of 3,350J	2 sets
	with Double Tube;		
13.	Boiler, Engine, Generator Roon	n	
13.1	Digested Gas Boiler;	650,000 kcal / h x 110 ° C x 6 bars	2 sets
13.2	Digested Gas/Diesel Oil,	1,000 rpm x 900 kw	2 sets
	Dual Fuel Diesel Engine;		•
14.	Gas Compressor Station	500 N. 2 /1 01 271	<u> </u>
14.1	Digested Gas Mixing Blower;	582 Nm3 / h x 2 bars x 37 kw	3 sets
14.2	Digested Gas	400 Nm3 / h x 2.2 bars x 30 kw	3 sets
	Transporting Blower;		
15.	Gas Storage Tank		
15.1	Gas Storage Tank	Storage Capacity of 5,000 Nm3 / h	1 set
	with Water Seal;		:
16.	Homogenized Sludge Holding '	Fank	
16.1	Center Drive with Picket;	30 m diameter x 3.5 m depth x 1.5 kw	1 set

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17.	Sludge Pumping Station		
17.1	Moineau Pump;	6 ~ 28 m3 / h x 15 m x 1.5 kw	5 sets
18.	Sludge Dehydration		
18.1	Belt Filter Press;	3 m width x 140 kg / h filter capacity	5 sets
x	1.5 kw		
19.	Air Blower Room		
19.1	Air Blower for	13 Nm3 / min x 1 bar x 10 kw	3 sets
	Aerated Grit Chamber;		
20.	Service Water Pumping Station	1	
20.1	Plant Water Transporting Pump;	1.2 ~ 2.1 m3 / h x 7.1 m x 37 kw	2 sets
20.2	Hydrant Water	0.36 ~ 0.84 m3 / h x 6.85 m x 22 kw	2 sets

Transporting Pump;

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