## Appendix 3 Proposed Rules of VINACOAL Environmental Fund

### 1) VINACOAL Environmental Fund

( )

- (a) In order to pay for its commitment to this agreement, VINACOAL will set up a mandatory "Environmental Fund". The fund will be set up in accordance with the terms in Article 4.3 of this Agreement.
- (b) VINACOAL will establish an Environmental Fund in accordance with the Prime Minister's Decision No.98/ITG. The Fund's assets will be used to implement the activities of the VINACOAL Environmental Improvement Program.
- (c) Beginning on January 1, 1999, each VINACOAL mining company will contribute money or commit an equivalent value of labor, materials and equipment usage to the Fund. Each company's contribution will be one percent (1 %) of its total revenue of the previous year. The "equivalent value" of in-kind contributions will be calculated by the same method as is used to develop the annual operating budgets for each VINACOAL mining company.
- (d) If the total contribution from all VINACOAL mining companies is less than VND 10 billion during any year, the required contribution for the next year will include the balance from the previous year. If the total contribution during any year exceeds 10 billion, then the balance will be applied to the next year's contribution.

# 2) Distribution of Fund assets

- (a) Money and in-kind commitments of labor, materials and equipment will be distributed from the Environmental Funds as follows:
  - i) Fifty percent (50 %) of the value distributed to the various VINACOAL company's mines, coal preparation plants, and coal transport facilities for use in installing pollution control measures and land restoration activities located within the various company's site boundaries;
  - ii) Forty percent (40 %) of the value distributed to VINACOAL for use in environmental restoration projects located outside of the mine

company's boundaries; and

- iii) Ten percent (10 %) of the value distributed to PCQNP for use in general environmental management activities in Quang Ninh Province, including civic awareness campaigns and the administration of environmental inspection and enforcement activities.
- (b) To the extent practicable, disbursements of Fund assets for the VINACOAL Environmental Improvement Program will be made on a regular, uniform basis throughout the period of this Agreement. At a minimum, at least thirty five percent (VND 17.5 billion) of VINACOAL's total obligation must be disbursed by December 31st, 2001, and one hundred percent (VND 50 billion) must be disbursed by July 1, 2004.

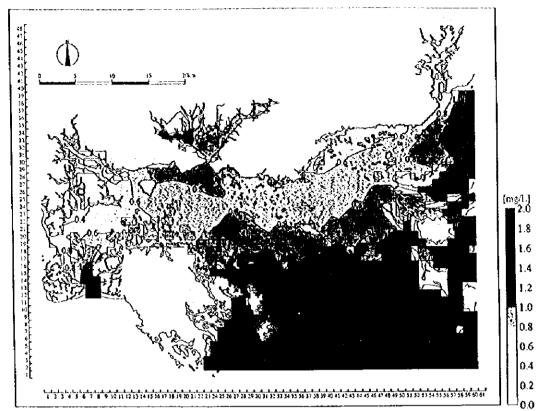
Source: Provincial Environmental Protection Standards for the Open Cast Coal Mining Industry in Quang Ninh Province (UNDP, 1998)

# Appendix 4 Water Quality Prediction by Scenarios

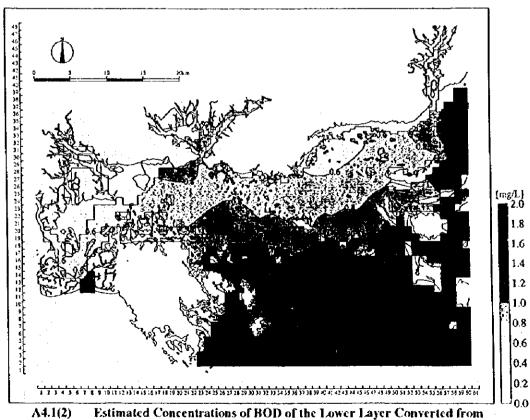
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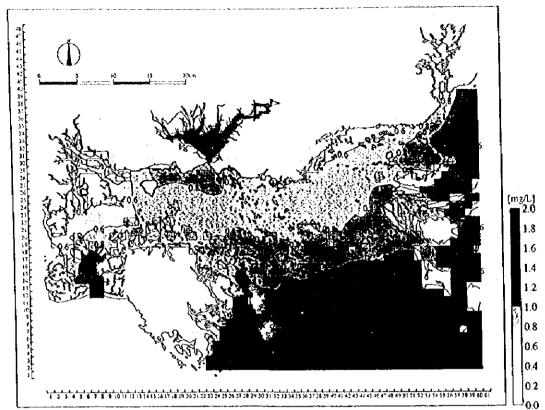




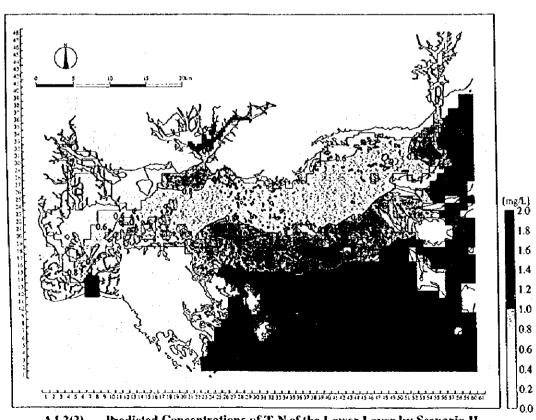
A4.1(1) Estimated Concentrations of BOD of the Upper Layer Converted from the Predicted COD by Scenario II



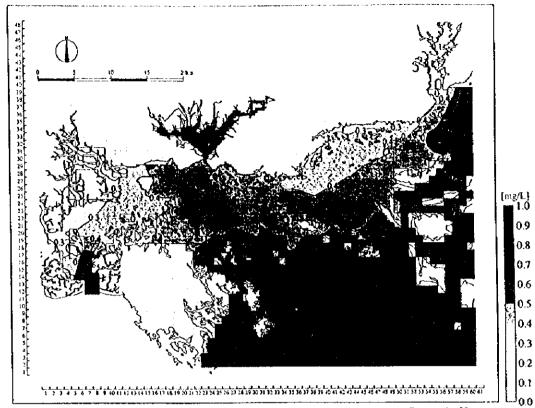
A4.1(2) Estimated Concentrations of BOD of the Lower Layer Converted from the Predicted COD by Scenario II



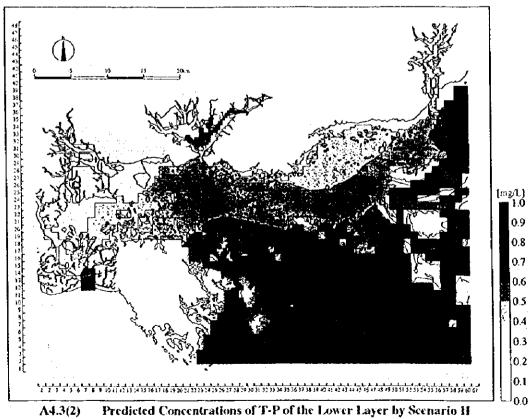
A4.2(1) Predicted Concentrations of T-N of the Upper Layer by Scenario II

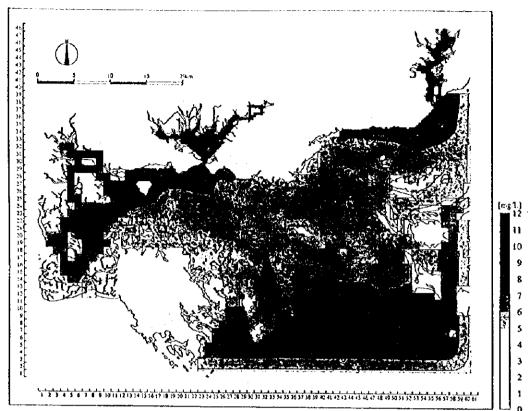


A4.2(2) Predicted Concentrations of T-N of the Lower Layer by Scenario II

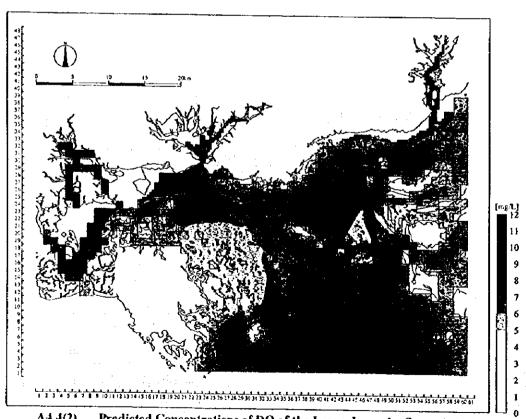


A4.3(1) Predicted Concentrations of T-P of the Upper Layer by Scenario II

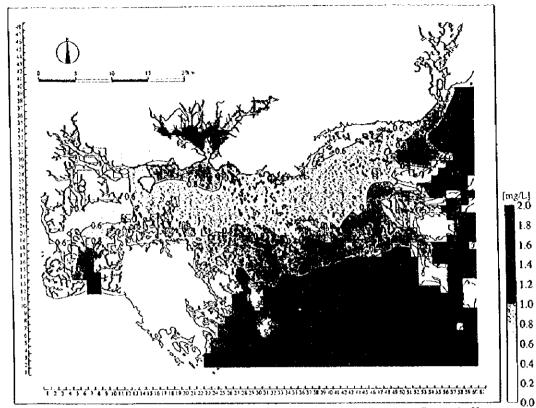




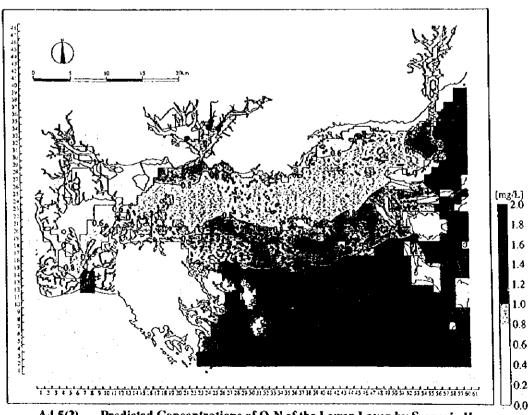
A4.4(1) Predicted Concentrations of DO of the Upper Layer by Scenario II



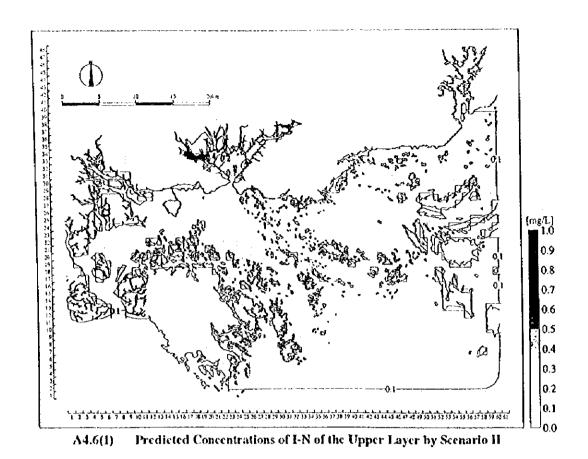
A4.4(2) Predicted Concentrations of DO of the Lower Layer by Scenario II



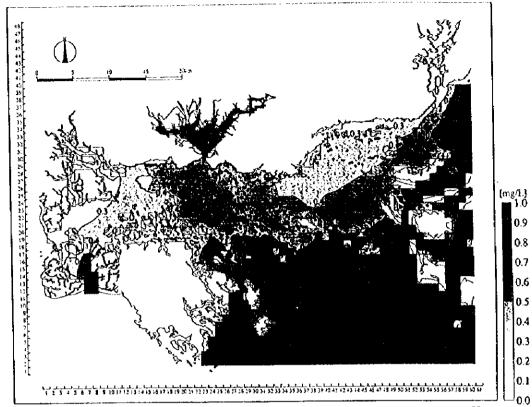
A4.5(1) Predicted Concentrations of O-N of the Upper Layer by Scenario II



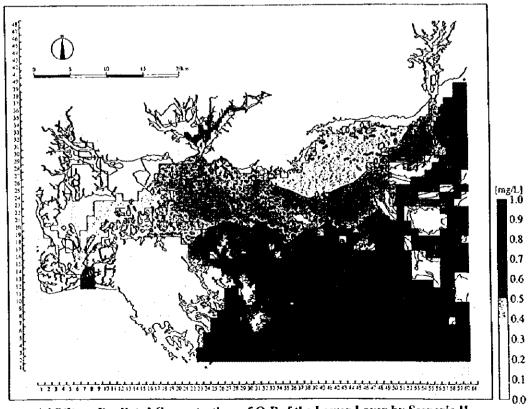
Λ4.5(2) Predicted Concentrations of O-N of the Lower Layer by Scenario II



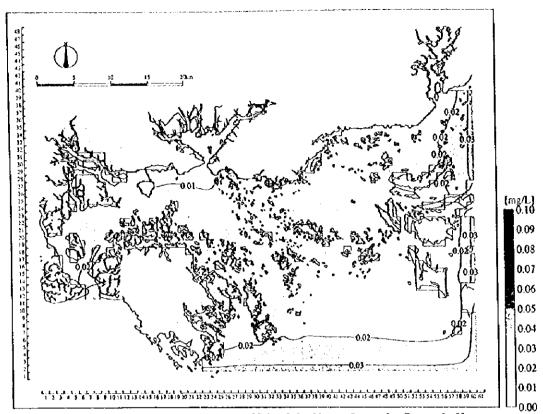
| Ing/L| | 10 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.



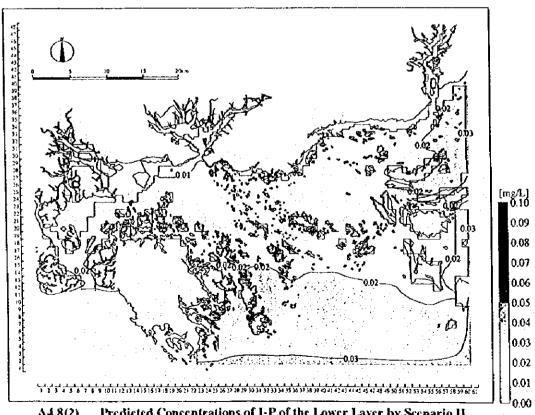
A4.7(1) Predicted Concentrations of O-P of the Upper Layer by Scenario II



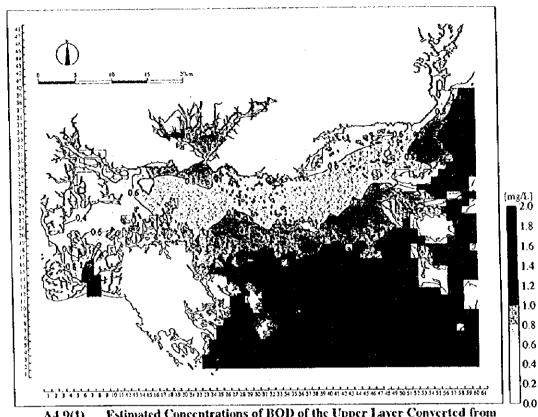
Λ4.7(2) Predicted Concentrations of O-P of the Lower Layer by Scenario II



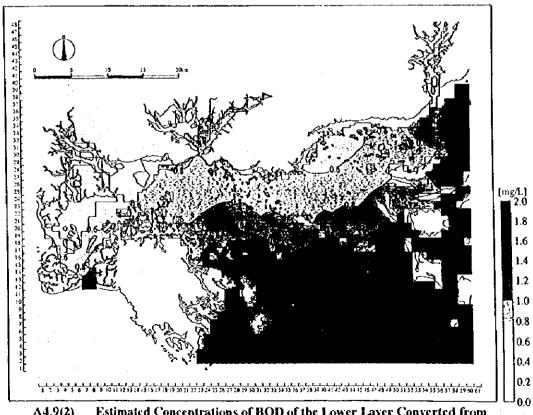
Predicted Concentrations of I-P of the Upper Layer by Scenario II A4.8(1)



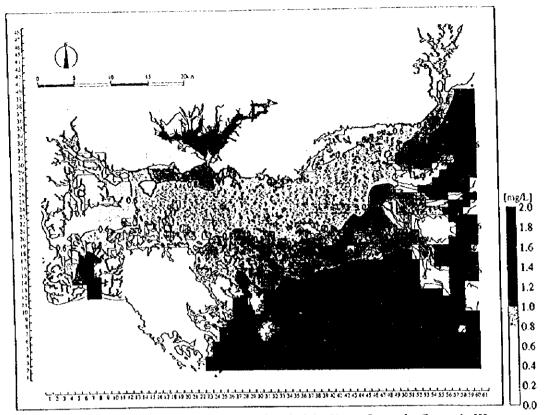
A4.8(2) Predicted Concentrations of I-P of the Lower Layer by Scenario II



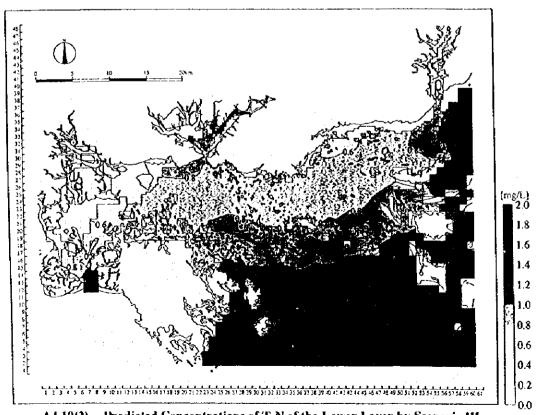
A4.9(1) Estimated Concentrations of BOD of the Upper Layer Converted from the Predicted COD by Scenario III



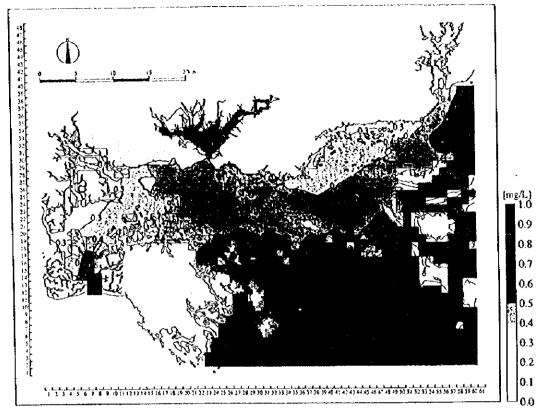
A4.9(2) Estimated Concentrations of BOD of the Lower Layer Converted from the Predicted COD by Scenario III



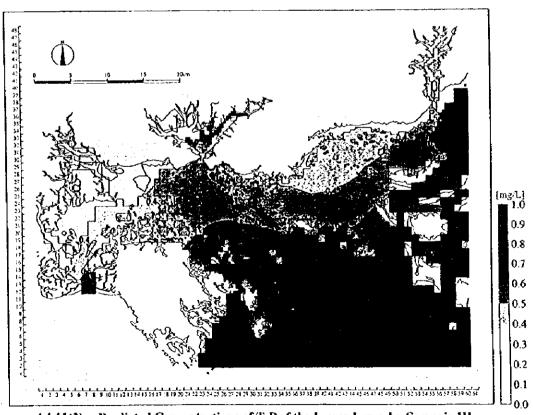
A4.10(1) Predicted Concentrations of T-N of the Upper Layer by Scenario III



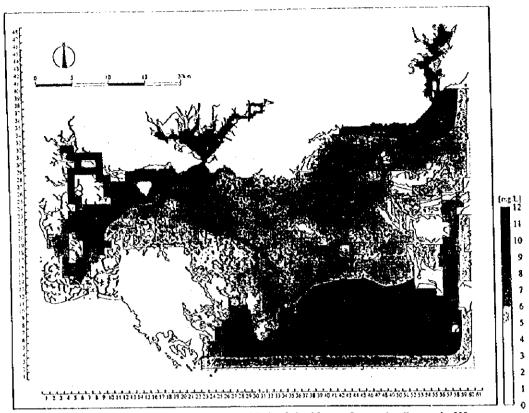
A4.10(2) Predicted Concentrations of T-N of the Lower Layer by Scenario III



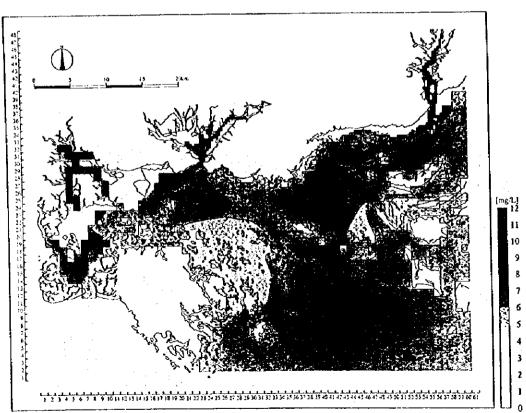
A4.11(1) Predicted Concentrations of T-P of the Upper Layer by Scenario III



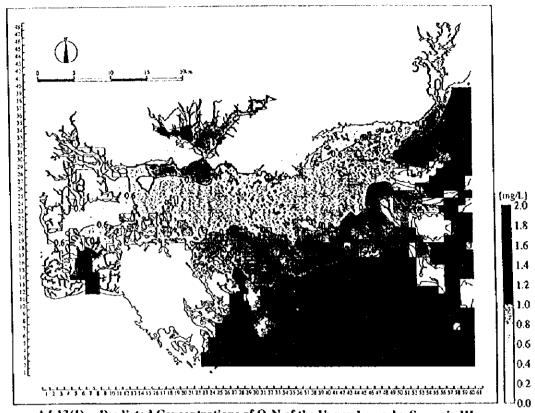
A4.11(2) Predicted Concentrations of T-P of the Lower Layer by Scenario III



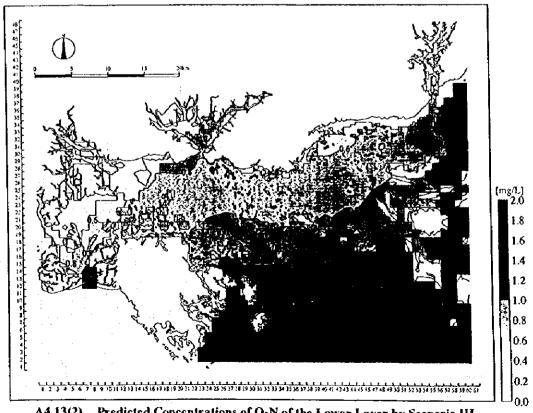
A4.12(1) Predicted Concentrations of DO of the Upper Layer by Scenario III



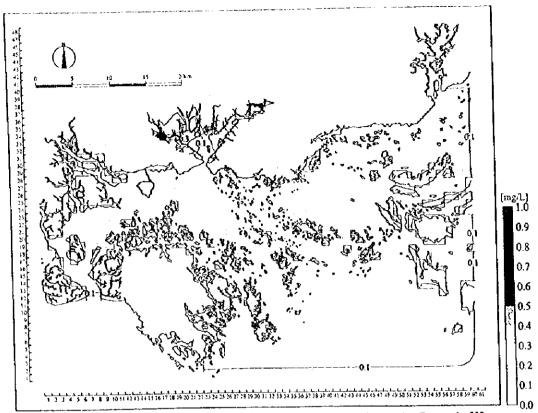
A4.12(2) Predicted Concentrations of DO of the Lower Layer by Scenario III



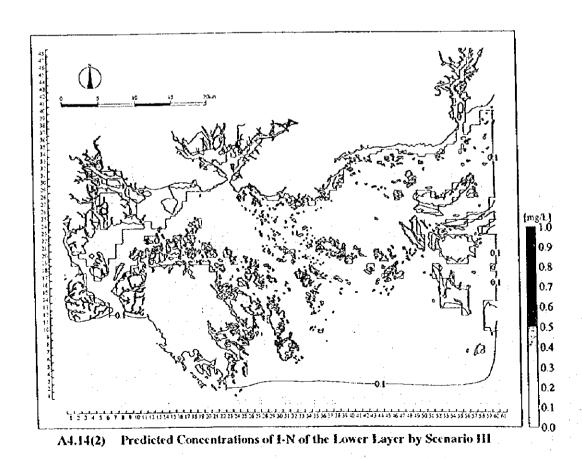
A4.13(1) Predicted Concentrations of O-N of the Upper Layer by Scenario III



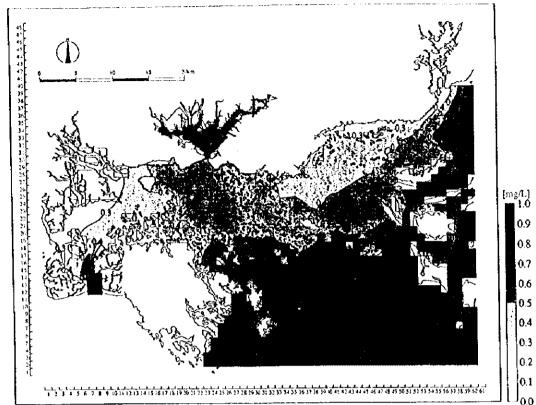
A4.13(2) Predicted Concentrations of O-N of the Lower Layer by Scenario III



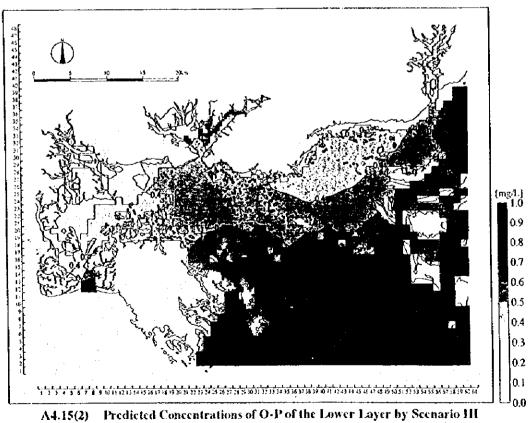
A4.14(1) Predicted Concentrations of I-N of the Upper Layer by Scenario III



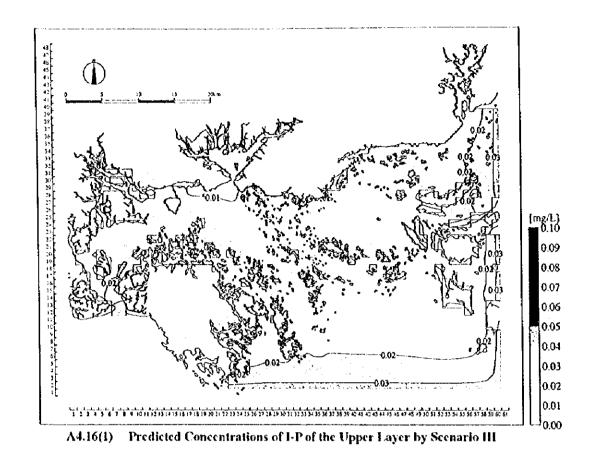
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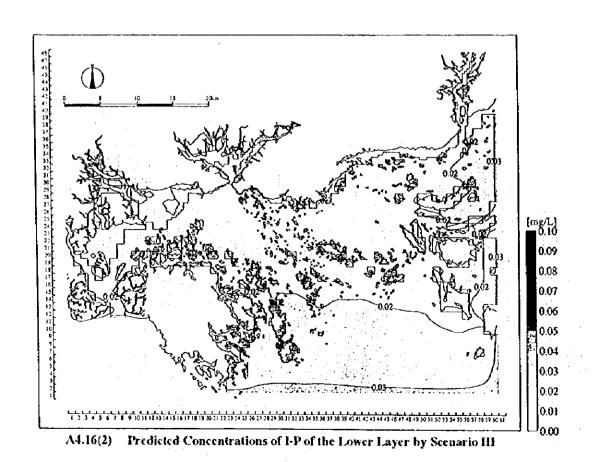


A4.15(1) Predicted Concentrations of O-P of the Upper Layer by Scenario III

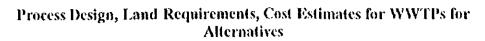


A4.15(2)





# Appendix 5



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24 m 5 m 5 m 5 m 5 m 5 m 5 m 5 m 5 m 5 m	204 TO 100 TO 10	150	450 150 150 150 150 150 150 150 150 150 1	75 M2 150 174 M2 150 00e devestaring and storings	75 m2 150 m2 150 200 200 200 200 200 200 200 200 200 2	75 mg 150	75 mg 150 mg 1500 mg 15	75 m2 150 m2 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 150 000 1	75 mg 150
2. m   2.	204 TO 400 TO 40		ye etorege building 174 mg 150	154 m2 150 Geo dermitaring and storage	150 150 Mg and storage	154 mg 156 mg 150 mg 157,500 mg 15% m	154 mg 150 cope description 150 cope dewnstrating and escription 200 150 mg 150 mg 150 mg 157,500 cope 15% cope	154 mg  Oge demakaring and storlage  150 mg	154 mg 150 mg 15
2 m 2 ca m 5 ca	204 m20 205 35 m20 206 25 m30 207 25 m30 207 25 m30 207 25 m30 207 27 m30 207 207 m30 207 m30 207 m30 207 m30 207 m30 207 m30 207 m30 20	60e develoring and storage	150 m2 300 150 m2 150 40 m2 1500	40 m2		15% 15% 25% 20% 20% 20% 20% 20% 20% 20% 20% 20% 20	15%	15% 15% 20% 3,711 m3/d TWAs	15% 15% 30% 3,711 m3/d TWAs 11 Works and Pump Station 12 Works and Pump Station 13 Works and Pump Station 14 Works and Pump Station 15 Works and Pump Station 16 Works and Pump Station 17 Works and Pump Station 18 Works and Pump Station 19 Works and Pum
2 m	25 25 mG 25	60e dewatering and storage 150 m2 150 m2 40 m2 100%	150 m2 150 m2 40 m2 20%	150 m2 40 m2 20%	20%	Add for else diet, control, atc 15% Add for else diet, control, atc 15% Add for else and forth 15% Add for else and forth 15%	15%	15% 15% 30% 3,711 m3/d TWAs	15% 20% 3,711 m3/d TWke
2 m 20a mo 00a 20a 20a 20a 20a 20a 20a 20a 20a 20a	204 mod 204 mod 205 mo	60e Gewatering and storings 150 m2 150 m2 40 m2 20%	150 m2 150 m2 40 m2 30 20%	150 m2 40 m2 20% bdgs	20% bdge	Add for river distriction and add for river world annual and for the state of the s			
TO TO THE TOTAL THE T	CONO O E BAIKET IN SECTION	3 8	8	Workendo	Add to hanseling and fronge				
'CONTONO O E BAIKMY 1970 EN 1991 E		8 8	8	Workstrate	Add for furnishing and fronge				
''' 7 6 6 6 6 6 6 6 7 K 9 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		600 development   150 m2   150	150 m2 300 150 m2 150 40 m2 1500 20% 127,500	150 m2 1500 20% 127,500 bdgs 127,500	20% 127,500 <b>Dógo</b>			3,711 m3/d TWkem	3,711 m3/d TWke

# A5.2 Don Dien WWTP - Alternatives 1.2, 2.2 (Level 1 Treatment)

Influent Characteristics

Flow, ROD		
200.		
Population m²/d kg/d SS.kg/d		
Domestic 120,200 14,424 4,568 4,568		
New Industry		
Extindustry 111 5 31		
Total 120,200 14,535 4,573 4,599		
DESIGN CRITERIA		PROCESS DESIGN
		Oxidation Ditch (Extended aeration)
Oxidation Ditch (Extended aeration)		
Studge loading rate	: 0.15 kgBOD/kgMt/SS	80D toading
Refertion at DWF	24 hrs	Ditch volume required for BOD load . 10,152 m3
MLSS concentration	3000 mg1	Ditch volume required for retention 14,535 m3
		Assume disch death
Depth	4 M	Therefore required area
Oxygen requirement		Assume ry lanes x length x width: 6 72 9 3868
Oxygen transfer	2 kgO2 kah	The same that we will be a second of the same that the sam
Pesk factor for aerator capacity	5	140
BOD removal	95%	Votumetric leading rate
RAS flow rate (max)	2 OWF	Oxygen requirement
RAS purroing head	<b>ø</b> m	Power consumption
No of RAS duty pumps	2	Assume number of aerators
No of RAS standby pumps	1	Individual aerator gewer
140 O 140 3 3 2 100 PO 103		Total Installed Power 362 kW
F1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Pump capacity 1211 m3.h
Final clarifiers	A#	RAS pump power 16.5 kW/pump
Maldmum upward velocity at DWF		***************************************
Side wall depth	( 2 m	Final clariflers
floor slope	7.5 deg	Required surface area
		Assume ra of tanks
		Required diameter
		Say diameter
		DW Fluoward velocity
		Vertical side wall depth
		Retention time fignoring hopper) 4.1 Fir @ DWF
A) . 4		Sludge
Studge	411-4-200-4	Studge Production 4,344 kg DS/d
Sludge production per kg BOO removal		Studge volume 869 m3/d
Solids content of surplus studge		
Studge thickener loading	50 m2.d1\$\$	Treasured transfer and an international and a second and
Studge thickener wall height	'	Assume or of tanks
Assume solids content of thichened studge	3.6% solids	Required diameter 11.8 m
Assume sludge density		Say diameter 12.0 m
Studge conditioning tank retention time .	1 day	Actual area
Death of conditioning tanks	3 m	Studge retention time
Operating period for mechanical dewatering		Surface loading
		Thickened studge volume
Solids content of dewatered sludge		Assume Nr of conditioning tanks
Storage time for dewatered studge	60 days	
Depth of storage of dewatered studge	1.5 m	Required conditioning tank area 47 m2
		Required dia of tank
		Assume dia 8 m
		Volume of dewatered studge
		Area studge storage building 695 m2
LAND REQUIREMENT AND COSTS		
FLOW 14,535 m3/3		
LAND COST 10 US \$/m2		
Oxidation Dilch		3888 m2
Final Tanks		1232 m2
		226 m2
Studge Thick Tanks		50
Studge Conditioning Tarits		695 m2
Studge Storage Building		
Other Structures		760 m2
Net Area of Structures		68\$1 m2
Site Multiplier		2.1
Site Area		1,44 ha
Buffer Zone		40 m around site perimeter
		4.11 ha
Total Area inc Buffer (for site length to breadth ratio of 2)		
Total Land Cost inc Buffer		411,429 US\$

Treatment)
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	:			COST ESTIMATE FOR:	WT BACM 107,01	Ž.	Amount	Amount
Intuent Characteristics Flow: BOD				Oxidation Offich (Extended senation)	d seration)	\$ 55	\$ \$5	GNV 000
5 9,64 P,E				M. Drokenski	# 30.0 			
Demonstro (13,500 (3,500 4,513 4,513 Notes (minutes)				Freeboard	EEC			
ı	1			Add for dyserment and		•	47,252	
			100 mg	Congress walk		97	297,114	
		1 (1 m) 1 m) 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1	Attached a special and a speci	Concrete floors		021 78 074470021	240,170	
SOURCE DESCRIPTION OF THE PROPERTY OF THE PROP		* Kin bassin	a'test styld	Add for EAM Awanto's and	1		967,274	12,574,558
NOTE OF THE PARTY		PROCESS DESIGN		RAS Pumping Station		3	46.800	
DESIGN CHIEFTING (F. C.		Oxidation Ditch (Extended seration)	eration)	Owl works		C. 101401.	100 50	
Oxidation Discription	0.15 kg800/kgML65	BOD lowers	4.318 kg/d	At & E works			57.11	1,463,062
Retention at OWF		Disch volume required for BCD loke	19.737 m3	FINE CLAMMER	2 %			
MUSB concentration		Astume dich dect.	€ 0.4	YVall thekness	£			
	2 1902/19BQD	Thursdove required over	3,433 m2 Web	FreeDowld	€ €			
Overgen transfer		Assume of large x larger x width	13,807 m3	Add for observets ento.		•	4	
Pask factor for earlier subhitty	******	Volumetre toeding rate		Excevabor	1.578 m3	90	49,417	
PAS flew rate (max)	3	O system requirement	9,204 kg/d		329 856 3m3	Š	8	
PAS pumping hand	E sp. r	Power contamporal		Congress hopper	149 33		9 1	
No of RAS duty purhase	·• -	Individual seriator power		Add for EBM equipment 27.0	2 Tanks	(C. 1897)1	274,631	3,570,204
No Of MASS summary Burger		Total Installed Power	W 25	Studge Thiotenaris	. e4			
Final darther	4	PAS pure power	15.6 kW/pump	Was punkment	E			
Masman sowerd velocity at DWF		Final clariflers	•	Franchist of section 10	E E			
About Miles of the control of the co	1.0	Required surface Mess.	2 t w	Add for charmes ato	- 22			
		Annual district	E 0.12	Exemples 30	21 21 21	4 5	2,700	
		Say diameter.	27.0 m	Contrate walk		. §	16,241	
		DWF upward velopity	0.00 PAT 00.00	Converse header	14 14 14		4,072	
		Various aids with depth	40 T S DWF	Add for EAM sterent.		UC1491/1	70.363	200
		endows.		Total cost of			138,438	
Skudge Standard The Fall removed	b.GOMBOD.4	Studge Producton	4,102 kg DG/d	Shoge develoring and atomic				
Course noward of sacrolus studge	0	Sludge volume accommon		O	E			
Slydge thetrane loadeng	50 m2 d/SS	Assessment and the second seco	25	100	E O			
Sudge thatener well helpfill		Pagured clamater		Ave depth of emith	£ 7			
Assume solids contant of thousand shope	1005 kg/m3	Cay dumentalian		٠.	150 m3	•	3	
Chalden conditions take retention time	1 044	Achie Nes	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Concession	23 23	340	7,009	
Depth of conditioning familia	E .	Studge retended tithe			21 21 1113	2 1	761.0	
1	2000 and a	Their and studge volume	DEM CCI	Miscarlandous	£ &	200	80.	
Solids contact of deviate ad whoose		Assume Nr of conditional turns		1	320 m3/sPet	8	290 061	
Cleaning to the region of developed historical		Required conditioning tank svest		Studge press building 2	200 m2	851	30 000	
		Assume dist.		Bludge atomage building	,	5	8	
		Volume of deviatered skiddle		Total of a second of a second	Sometering and store		306.325	3,960,237
		Aras shridge shorage building	7m oco .	Eudorige and Miscellaneous			;	
				Office, taboratory	220 m2	8 9	886	
				Workshop		000	00006	
LAND REQUIREMENT AND COSTS				Works Fundamy William	ૺ	202 500	40,500	
Fish	e e			Total cost of	8699 ····	P698	243,000	3,159,000
		3672 m2		4			2,041,241	26,536,132
Oudakon Otor		1145 m2		TAKEN THE PROPERTY OF THE PROP				
Control Texas		226 42		Add toy plac dist, combot, etc.	**		306,186	3,980,420
Sudde Conditions Tarks		26.85 26.83 26.83		Add for alte works annual annual and	\$		252.14 200.00	10.526.210
Chudge Storage Buildens		750 m2		Add for Profilms and Grant	<b>68</b>			
Service of the servic		5510 mZ		Total 0061 for	Total coet for	Tata . s. 137 . s. 137	3,508.400	45,622,245
Street Policy and an annual street an annual street and an annual street an annual street and an annual street and an annual street an annual street and an		, 2, t		Total cost including	Yoga cost including thirt World and Planto Station	p Stadon	745,595	22,692,609
Site Aven		40 m around one permuter			# S		2,269,610	29,884,929
Buffer John (1998) 10 to the langer to breadth ratio of 2)		2 69 Par			•			
TOTAL PURM INTO SANTON CONT.		568,132 US \$						
Total Land Cost inc Parist								

# A5.4 Don Dien WWTP - Alternative 4.2 (Level 1 Treatment)

Contraction			G	COST ESTIMATE FOR:	42,086 m3/d TW	Rate	Amount	Amount
Continued   Cont			o .	Nidetion Ditch (Extended 1 Nitropess (Extended 1 Headers of seth Ave dead of seth Ave dead of seth Erentebon Concess wate	3 m 2005	N 455	20 A02 50 50 50 50 50 50 50 50 50 50 50 50 50 5	<b>GNA</b> 0000
Contraction of the contraction		cess besick tion Ditch (Extended aerat	tion)	Concrete floors		78.0"WW0081	317.666	24 100 457
Description according to the control of the contr	)DivpMLSS	-	.955 kg/d .233 m3	Total cost PAS Pumping Stadon				
Victorian properties and management of the properties and manage				Civil works M & E works		00.4917	128,424	2,643,507
Victoria to Control (1997)   Victoria to Co				Total contument	7.7	ı		
Control issuement   Cont								
Maintain Accordance   15		-	als ago					
The companies of the companies   1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	oi e		.657 indvidey	-	4,974 m3	4	19,898	
Trainitional Power   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   177   1	. 5		W 6.84		582 m3	240	130,798	
Final clarifiers	<b>-</b> - 1	•	471 KW	. :	2,310 3mg	3 3	70,818	
Principal Control Broke   Principal Broke	i ec	Ower	47.5 KW/pump				215,376	
Concess with the control of a manual control	# ·			ont of	4 Tarvks		193,307	10,516,909
Surgering Control for the Co	r «X		, no.					
Control of the Cont	OC 4		E + 2	Ť				
Victorial and wild motion of the Compares whose   50 of 17 no. 5 of 15 no. 5	n G		AB MP OK	ँ				
Supplication   Supp	> (		£ 2 .		Om 710	240	0.670	
Success Procession   1,131 m/V   Active EAN servers   16   157 m)   154   154   154	z 6ngs	The transfer area to the control and a contr	3		165 m3	8	24,773	
Solution   Control of Control o	v		,657 kg DS/6	,		150	80.08 710.08	
Parameter   2 nt   Studge connecting and storage   1   1   1   1   1   1   1   1   1			283 M2	Ì	18 sa	***************************************	158,721	2,190,372
Survive endance of the first blanks at the first blanks blanks at the first blanks bla		1	2	Sludge dewatering and storage				
Sudge selection time   206 m2			F F	Ź,				
Concepte broader   Concepte br			308 m2	Ŋ.				
Package order   184 m3/d   Ecremation   19		•	3.7 m3/m2/d	ĸ				
Conclusion wildless			184 m3/d		\$ ; \$ !	<b>*</b> 0,7	20.5	
10 0%   12.877   12.84   12.87   12.84   12.87   12.84   12.84   12.87   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.84   12.		sours IV of conditioning lanks			2 E	961	906.6	
25 mild Subject to the service of th	ď		E		10.0%	12,877	1,286	
Success training	<b>4</b> 3	GRANTE CA	E i	244	30.0% 50.00%	00°	220,771	
1905 no. 150   150,774	• •		905 mg	ž	Q	150	30,000	
Total cost of sludge demaifeting and storagon   407,791					á	ž	135,774	
Other State				Total cost of sludge den	watering and atore		407,791	5,301,286
Votes Page   150   45,000   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150				Office, laboratory	300 m2	906	90.000	
Add for sets of furnity and future and futur				Workshop	300 m2	8	45,000	
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Sub-total				Total cost of		***************************************	306,000	3,978,000
Sub-fortal					•			
Add for else dati, contod, etc.   15%   571,492   Add for alta works				Sub-total	***************************************		7,909,947	95.529,316
Add for alte verke worke					45%		571,492	7,429,397
Add for Prelims and Gentlimming (2005) And site perimiter  Total cost for minimum 42,085 m3/d TM1s minimum 6,550,352  Total cost including thist Works and Pump Station 2,878,705  CM1. 4,577,957		1		Add for elte works	*4		657,216	8,543,807
Total cost for		2.09 ha		Add for Prelime and Gent	***		1,511,507	19,650,756
Total cost including thirt Works and Pump Station 7,426,510 MAE 2,800,706 GML 4,517,800		40 m around atte perumeter 4.47 ha		Total cost for	42,085 m3/d TWN		6,550,252	FE,153,277
MAE 2,404,706 CML 4,597,903		656,749 US 5		Total cost including Inh	t Works and Pum	p Station	7,426,510	96,544,626
				- 0	76E		2,878,706 4,597,800	59,771,442

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Amount	\$	į	080,485 981,699	211.106	1,977,000	966,330	736.113				26,000	150,085	95.178	228.152	and the same of			•	35,462	15.740	5,421 74 244	131,328					Š	6,527	054.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6	5,216	138.023	00 00 00 00 00 00 00 00 00 00 00 00 00	84 884	99,107	000'00	120 000	00016	306,000	4	3,671,064	590,660	667,759	1,535,845	6,655,327	7,643,595	2,719,150
Reta	ş	·	240	1500"WX"0.67	***************************************	UC1491/I	JC149175				4	240	3 3	UC1401/1	***************************************			,	240	06.	150						•	240	8	10.432	200	150	150		98	150	245 000	***************************************						***************************************	p Stadon	
55,111 m3/d TW	eration)	E E 6 66	29,561 m3 2,860 m3 6,411 m3			•	•	¥ <b>1</b>			6.502 M3	667 m3	3,015 3m3 621 m3	ļ	2				599 m	(OF 10)	e (			-				27 m2	16 m3	8008	DANKE	٥.		Total cost of skidge develoring and storage	300 m2	300 A2	2 C	- 1		Sub40tal	154	151	366	Total cost for 55,111 m3/d TWits	Total cost including inlet Works and Pump Stadon	***
55	Extended a			71 Of C	Total cost assessment marries and	-	Office Contract		E 65.0	1	X 20	7.67	100 to 10	₩ 39.0 €	101	:	E E	204	2,58	\$		1	nd setorage	- 00				3 62	Ŷ		276 m0/e/h/ft	ng 150 m2 uikding	5005 mG	at of aludge dow laneous			- FOOT	Total cost of						et for	el inchedang inle	2
COST ESTIMATE POR:	Oxidation Ditch (Extended seration)	Wall trickness Freeboard Ave death of exch. Add for charmets etc.	Excavabori Concrete walls	And for EBM Aerathra etc	Total com	Civil works	M & E works	Finel Clarifiers	Wall thokness	Ave depth of exc'n.	Add for charmele etc	Concrete wate	Concrete facts	Add for EAM ecraders	Total cost of	Wall moores.	Freeboard	Add for charmels etc. 20%	Ecovation	Concrete floors	Concrete hopper	Ago for E.S.W. springs.	Studge developing and storage	Conditioning lanks	Well thickness	Ave depth of exch	Add for charmels etc.	Concrete wate	Concrete floors	Macellaneous	Sludge belt presses	Studge prese building	Area	Total cost of sky	Office, laboratory.	Workshop	Worke Pumping attation	Age for Turnishing &		Sub-total	Add to else that control etc	Add for ells works	Add for Pretime and Gen130%	Total co	Totales	
coa	Oxic				ľ	ř	;	9 9288		2					JA				Ļ	ı			•											_									•			
				(uons	3,720 kg/d	8.273 m3	4 6	•		7.074 KQIG	3.537 antiony	24.6 KW	295 toV	62.6 KW/pump	04 VOY	*	E 10	0.48 m/n OK	E :	4.4 × 9.0%	3,537 kg DS/d	707 m3/d	2 20	10.6 m	£ (0)	Z 2 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	3.7 m3/m2/d	115 m30d	55 E 85	6 E	14 m3/d	566 m2														
				dended aer																			£					Me Languages	lank area		900	ndmo												site perimeter		
				Process beside Oxidation Ditch (Extended aeration)	BOD loading	Ditch volume required for 600 load	Assume dich depth	Therefore reducted area	Approx yatume, less.	Volumetric keging rate Oxvose requirement	Power consumption	Assume fumber of services Individual aerator power	Total Installed Power	Pump capacity RAS pump power	rmera	Assume or of lance	Recursed dameter	Say dameter DWF wormd velocity	Verucal ande wall depth	Retention time (ignoring hocoer) doe	Sudoe Production	Sludge volume	Angusted thickener Bron	Required districter	Say dameter	Actual Mex. Studon retention time	Surface tonding	Thickened skidge volume	Required conditioning lank area	Required the of laws.	Course of developed suctor	Area elyope storage building					9288 m2		2 8	558 772	850 m2	15691 m2	3.30 ha	40 m Around site perimeter	701.562 USS	
				Oxidatio	008	5 6	A59V	The s	Appr	and one one one one one one one one one one	Pow	Assu	Tota	<b>5 3</b>	Final clariflers	487	Rec	A S	>	Reta Sudo	Sing	SAN E	Had a	Tage .	Say	\$ 30 30	3	Ě	, and	E	\$ 5	₩.													•	
					0.15 KORODINGMLSS	15 No	Mary mg.	2 kg02/kg800		n Dwe	. E	re -		0.5 mh	E (1	7.5 deg					1 kg/kgBOD.e	*	SS NO PER BUSS	3.0% 80kds	ን ነውሞሪ	- day	10 hours/day	25 × select	a feet																	
	SS.kg/d	4.765 4.765	200		9.1	-	7		• • •	4 C				Ö		2.						8.2.0		3.0	1025	÷		\$2°							p.q	50 CF									8	
	000 000 000 000	2.578	2	seration)		-				-												:		annon a		em.	watering								55,111 m3:d	5									o breadh rabo o	
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Colon Sens Care and Constitution		A.a.	ŝ	DESIGN CRITERIA Oxidation Disch (Extended seration)	Sludge loading rate	Retendon at DWF	MUSS concentration Depth	Oxygen requirement	Oxygen transfer Peak factor for aniator capacity	SOC removal	HAS pumping hand	No of RAS duty outlos	100 mm 200 mm	Final clarifiers Management selection at CMF	Side wall debth	Moor alabe	•				doe Parge production per an BOD removal	Solids content of surplus shoos	Sludge Bissiener loading	Siludge (Nickener wall height Awarms solids coditent of fluchened sludge	Assume elucipe neneth	Sudge conditioning tank retention time	Depm of conditioning tarks	Solids content of dewnlated dudge	Storage hime for dewatered attoger.					LAND REQUIREMENT AND COSTS	FLOW	LAND COST	Osidation Oten	Final Tanks	Studge Thick Tanks	Studge Conditioning Tanks Studge Stateon Budden	Sugge Storage rund Other Shuctures	Net Area of Structures	Order Machipality	Ruther Zone	Total Area inc Buller into site length to breadon ratio of 2)	The said Contract
C sections		Semestic New Industry Extrodustry	#800	DESIG	đ	ก็	క్రి	ő	ő á	8.6	ริธิ	ž		9	, G	ž				ì	egbudo Ma	ហើ	ភ	o 4	: <b>4</b>	ເກ €	<b>9</b> 0	• vớ	un d	•				S ON S	1L		ć	Final	60.8	ජු ග්	S O	2	· 是 。	e Hou	fotel	15.57
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PROGESS DESIGN OXIdation Ditch (Extended seration) e001mmm
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1			876 B	Add to take management.	Yeaks		106.010	1,369,142
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THE REAL PROPERTY AND ADDRESS OF THE PARTY AND		Pagestal diameter	E 1	Exceletion 391	391 m3	•	36	
		Sow demand and property and the second	5	Contrate waste	76 AG	9,	16.17	
		ACIUM ACMS	2/2 K	Concrete foots named 71	۲ 5	Š	40.014	
		Section landing	3.5 m3/m2/d	Concrete happer	27	BC	100	
		Š	8 . S.	AGO TO EAM METERS	2	140411	76.541	976.879
		Assume N/ of conditioning laws.	·	Total cost of		-		
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AND SECUMBERS AND COSTS					£	•	5	
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				A LA LA LA FA LA	6	8.623	4,312	
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を受ける はない		1.27 ha		Total oper of				
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A5.10 Deo Sen WWTP -Alternatives 3.1, 3.2, 5.2 (Level 2 Treatment)	COST ESTIMATE FOR	Oxidation Other (Extended enretion)  Warning Control of the Contro		7.5 (5) (5) (1.5) (5) (1.5)	10 mg	A THE STATE OF THE	CO I markings Freeze Communication Communica	3.0 sWigama 3.0 sWigama	1,074 WWpump	10.5		20 M	8 ***	STO IN GO DAME	5,497 to 55.74 1,050 to 75.04 1,050 to 75.04	2 mily April April Charles Rouns	1	And the Eddings of the Colorest of the Colores	Confidence of the confidence o	Ave depth of eathering Aver free everyone etc.	Exception	Acoto Earl	SUCCESS DEFICIENCE CONTRACTOR OF CONTRACTOR		Section of the sectio	Wrading	200 HB /	Suppose and a suppose a suppose and a suppose and a suppose a	Apply for whose obes, market of, and Appl for one of the Morting and Confirmaness	Total cost Vermanness 13/70/ mOk Total cost Underland West We First end Ball Total cost Underland West West West William
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Level 2 Treatment)
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100 Carlos (100 Ca				Congression	2.570 10	340	616.001	
		WORKE DESIGNATION		Concrete hours	3.716 mJ	<u> </u>	) PT / CA	
DESIGN CATTERIA		Ovidation Ditch (Extended peration)	ŝ	Add for Ebbl Ametors etc	30	1500HW/D087	442,530	77,000
Oxidation Ditch (Extended seration)	P. Strate Court of Co.	BOD looks	6.426 ha/d	Total seef			i de la Calabi	
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AAL 30 September 20 September 2	3300 me/l	Occas volume recorded for retention	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	M & E works.		UC1491/3	8	701.019
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AAS for sale links	. OW		7.63) templifor	Stripper Yenda	7 5			
PAS LIGHTORING Frontil	£		991		•			
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Name and Associated Abstraction of the Association	~	RAS pure comments	120 mg/h	Condide works	. 195 B	9.5	3	
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0 5	G.15 MBODRIPHUSS 1000 mg/l 5 m	PROCESS DESIGN Sequencing Betch Reactor Trat oversors The contention The second Code are dead the winn section	6 7.5 4 7.5 9 7.5	Expandent 1,120 Constate wedle	2 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	240 240 250 250,047 250,045	12,913 181,373 98,774 82,626	
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(cur)	cost estimate for:	Oxidation Ditch (Extended seration)	Wall theatheast	Ave depth of each	Add for channels ofc	Excavator	Concrete Views	A section If A like how minches delic	Total cost	nas Buraing Station	Civil Rock	25 E 4078	Total costument	Pinal Clariflers	2		- ]/	Aggin chamble etc DUS	Ехсаумеро			Add for E&M screpers 39	Total cost of	Sludge Thickeners	Wall brokness	Freeboard	Ave death of extin	Add for charvers storm and and	EXCENTION	Coocrate floors		Agg for E&M attribut	Total cost of	Saudon devratering and storage	,	Francoard	Ġ	á	Excavabon	Concrete walls.	Concrete floors	Ariceleneous.	Charles Transcription		Studge storage building	Area was and another the standard	endeutskaasti bes sonomis	Office, teboratory	Workshop	Works Purposed schools	Total cost of		Sub-40tal	ale totales allocated and act	dd for elec dian, conven, ev	Add for Prelime and Gen L.		Total cost 10f	Total oget Moture	
r (Class A Arcam	COSTE	Oxids		•	•						į.		Artes	202.5		0 10 kg BOOMS	2 626 Kold	13 Invitoday	0.0	182 KW	W 90.			asse me							10 DE 16				£ 7.0	10.0 m	79 m2	2.0 m/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm/Cm	45 m3/d	-	14 112	£.3 m	£	\$ 3 m3/d												•				
A5.14 Moanh Bo Industrial WW IF (Class / Licalment)								VOICE	Oxidation Ditch (Extended seration)	Storage 1.3c	A volume required for BOD land.	Ditch volume required for retendon 13,775 ms	Ausume dign doof		A WILLIAM	5	•	C. C	- 3				UND DONAL					O CALE CONTROL OF THE CALE OF		6			Sugge volume	d						Thethered shidge volume	Assume to or company or many		Assume dia	Volume of dewatered aludge	Area sludde atornoe building					3672 m2	2389 m2	79 m2	20	21.0 A.C.	5829 m2	2.3	1.57 has stound alte perimeter	2 14 14	214.250 US &	
5.14 Hoanh								PROCESS DESIGN	Oxidation C	8	ă	å	, Ast	£ .	<b>*</b>	90	*	5 6		2	Tot	à	<b>3</b>	final clarifiers	2	2	Ė	* 2	\$ \$	ď	edpois	đ	ð, c	ř	đ	, v	¥	ี่ ชี้	₫ :	¢.	₹ 6	i di	₹ ₹	>	∢															
ζ										A 15 KGBODROMISS	12 Mg	2500 mg1	E	2 kg02/kg800	2 kgO2/kwh		×56	LS DWF	E	ou ·	_		0.5 mh	E	7.5 CMQ							1 kg/qB00.4	0.5%	50 m2.0155	2	2,0% BONDS	200 m 200 m	Ē	16 hours/day	55% totde	60 days	E oʻ																		
		ics Plan pool	Kgyd SS.Kg	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	o	0 27,550 1,392 2,554		,		(Extended astrait)					Werk			BOD I PRINCE AND	D45		ndby pumpe		hat cladiners	A VICTORY DE	SA WAR GROW								Chade group de ratio and remover		Studge mickener with height	Aggume apide content of thichened sludge	Assume shudge definity	Sludge conditioning tank retembor time	Depth of conditioning larks	Operating period for mediterior years and a second of the second of mediterior of shudden	Concern have for demonstrated adultion	Depth of storage of gewatered sludge				ENT AND COSTS	57,550 mg/d		Change of Assession (Onidation Orich)			į	man Tanka	Burtong		Defures			Total Avenue Buffer (for este length to breadh ratio of 2)	it inc Buffer
		influent Characteristics		Commette	New Industry	Evingating Total			DESIGN CRITERIA	Oxidation Dit	Shope loading rate	Retenden at DWF.	WESS CONCOM	Deot	School and the Control of the Contro	Onvoen Banater	Peak Inclor to	BODIANOS CONTRACTOR	BAS Aumono Need	No of PAS duly dumbe	No of RAS standby pumps	!	Final clarifiers	Maximum upw	NOW WALL	MODE BROWN						Shedge	Shoop egoing	Chicke theke	Sludge thickel	Aggume solid	Spake emuses	Sludge condit	Cepth of cork	Operation De	PANCE BONDE	Jens to most				AND REQUIREMENT AND COSTS	FLOW	CAND COST	Second Assessed		Oxidetion Often	First Table	Supple Freek Learns	Slugge Stornge Building	Other Structures	Net Area of Structures	Site Mulopher	Suffer Zone	Total Avenue	Total Land Cost inc Buffer

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Amount	000 VND	9,313,665	1.672.475		5,575,874	672,083		2,457,000	20,922,642 3,138,397 3,609,157 8,307,060 35,971,281 41,666,527 15,356,602 26,511,125
Amount	20 04 04 05 05 05 05 05 05 05 05 05 05 05 05 05	205,519 330,521 78,605 716,450	51,463 77,180 128,652	11.122 73,096 153,634 39,667	428,913 428,913 616	5.321 5.321 7.1465 51.064 51.066	200 892 2704 2704 2704 2704 272 200 272	45,000 22,500 90,000 186,000	1,609,434 241,415 277,627 548,543 2,767,020 3,220,520 1,191,202 2,039,317
R.	\$5 4 4	240 150 1500*W*D.87	UC1491/7 UC1491/7	2840 150 150	UC1491/1	240 150 UC140177	2.4 150 150 150 150 150 150	300 150 150 150 150 150 150 150	rke mp Staffon
23,850 m3/d TW	seration)	1,110 m3 2,203 m3 05 km		2.760 mS 2.760 mS 2.760 mS 3.06 mS 3.06 mS 2.780 mS	2 2 4 5 5 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	51 51 m3 16 16 m3 10,000 10,000 10,000 10,000 10,000 10,000 10,000	Total cost of skudge deviatienty and storeds	Sub-botols
COST ESTIMATE POR:		Concrete floors 2,200 m3 Add to ESM ADD to E	RAS Pumping station Clui works M & E works	Trial Commune   Total Commune   Trial Commun			Elicavelori 51 Concrete with 16 Concrete stort 16 Concrete stort 16 Adeas to Feath 16 Sludge piere building 10 Sludge storege building 10 Adea	Total cont of studge de Buildings and sheorism rous Office, leboorator, Workshop, Wors America state Add for America and fittings.	Add for also works.  Add for profine and Gen'l
•		vation)	2,937 m3 4,0 m 2,981 m2 area		1986 and 25 and	4.1 W. 4. DON'S 1.136 Ag DES'C 227 Ag DES'C 27 Ag 4.5 Ag 9.0 Ag 9	40 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m		
		PROCESS DESIGN  Oxidation Ditch (Extended serstion)  BOD bloom	Dich vourse regulation of COUNTRY. Dich volume regulated for retembon. Assume dich deob. Therefore regulated area	Absurve or lenes is length is wridth.  Addition of the control of	Final clarifiers Required furface ven. Abactic for of thirth Required demeter Site dameter Site dameter Vente clarifiers Vente clarifiers Vente clarifiers	Relation time (cricing hopping) Sudge Production	Assume Ne of conditioning lanks sees. Required conditioning lanks sees. Reguled die of fahls. Assume Dis Committee of seed of the Committee of Seminister of	2005 2005 2005 2005 2005 2005 2005	142 m2 460 m2 5922 m2 2.3 m2 1.36 ha 1.99 ha 1.99 ha 1.99 ha
		O 16 KQBODNgMLSS	12 hvs 2500 mg/l 4 m 2 kg02Mg8OD	4900 M M M M M M M M M M M M M M M M M M	7.5 <b>6.</b>	1 kg/kgBOD d 0.5 kg/kgBOD d 10.0 kg/kg 10.2 kg/kg 10.2 kg/kg 10.3	e of deve		
	Plow. 600.  Population mid upid SS-spd Converte Converte New industry 20.850 1.190 2.211	DESIGN CATERIA (Extended peration) Suche londurine	Rejention at OWF MLSS concertivation Dood Concertivation	Cayger transfer.  Cayger transfer.  Real frector of Arektor capacity.  ROL surmount.  RAS surmount.  RAS surmount.  RAS surmount.  Rol surmount.  Rol standay ource.  Ringl clearities.	Nountern Layer of velocity At DAY? Store wall steps. Four store of the steps.	Sludge Sudae broduction per kig BOD removal Sudae production per kig BOD removal Sudae pretenter boshool Sludge pretenter boshool Sludge pretenter with freight Agarine alonge content of microared alonge According alonge content of microared alonge According period for mechanical dewistering Operating period for mechanical dewistering	WATARRED BLACKS  FORWARDER BANGOS  FORWARDER BAN	LAND COET  Extended Assumon (Oxidation Ditch)  Oxidation Ditch  Final Tanta  Suckey Trans	Success Control of Tailes Success Succ

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TOTAL STREET
Oxidation Ditch (Extended Berairon)
a 15 hgBOD:hgMLSS BOD leading
2500 mg/l Ditch volume required for retembori
2. xgO2/xgBOD Therefore required area
Volumetric foatong rate
r. s. CW/P
Assume number of services
The second secon
Pump capacity
HAS pump power
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Sev chameter
DWF upward velocity
Carbon sude wall depth
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25 / Bokok
60 days
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Volume of dewatered eludge
Avag studge storage building.

# **A5.17** Summary of Capital Costs

mestic Treatmen	1	1		Civil Cost,	M & E Cost,	Land Cost,	Total Cost,
Treatment Plant	Alternative	Flow, m <sup>3</sup> /d	BOD, kg/d	US\$	US\$	US\$	US\$
	1.1	3,711	1,145	845,500		213,616	1,789,86
	1.2	14,535	4,573	2,396,156	1,807,573	411,429	4,615,15
	2.1	3,711	1,145	845,500	730,751	213,616	1,789,8
	2.2	14,535	4,573	2,396,156	1,807,573	411,429	4,615,1
	3.1	3,711	1,145	845,500	730,751	213,616	1,789,8
Don Dien	3.2	13,731	4,318	2,299,610	1,745,585	399,132	4,444,3
	4.1	3,711	1,145	845,500	730,751	213,616	1,789,8
	4.2	42,085	5,955	4,597,803	2,828,706	656,769	8,083,2
	5.1	55,111	3,723	4,924,445	2,719,150	701,562	8,345,1
	5.2	65,071	6,877	6,518,127	3,577,882	856,508	10,952,5
	1.1	10,849	3,430	2,815,122	2,320,742	439,962	5,575,8
	2.1	10,849	3,430	2,815,122	2,320,742		5,575,8
Dong Dang	3.1	10,849	3,430	2,815,122	2,320,742		5,575,8
	4.1	38,399	4,812	6,048,585	4,531,166		11,361,1
	5.1	10,849	3,430	2,815,122			5,575,
	1.1	22,104	6,985	5,142,080			9,816,
	1.2	22,104	6,985	5,142,080		ŧ i	9,816,0
	2.1	22,104	6,985	5,142,080			9,816,0
	2.2	22,104	6,985	5,142,080			4
Deo Sen	3.1	19,740		4,403,294	_		9,030,0
Dec Sen	3.2	19,740		4,403,294			9,030,0
	4.1	22,104		5,142,080			
	4.2	22,104		5,142,080			
	5.1	20,340		4,611,057	L	-	
	5.2	19,740	1				
Bach Dang	All	7,311		1,261,019			
Cam Pha	All	5,511	1,715	1,147,031	924,818	255,457	2,327,

Industrial Treatment

idustrai Freatmei		,		Civil Cost,	M & E Cost,	Land Cost,	Total Cost,
Treatment Plant	Alternative	How, m³/d	BOD, kg/d	USS	USS	US\$	US\$
	1.1	23,850	1,196	2,039,317	1,181,202	189,713	3,410,233
	1.2	23,850		2,039,317	1,181,202	189,713	3,410,233
	2.1						
	2.2						
<i>.</i>	3.1						
Cai Lan	3.2						
	4.1	23,850	1,196	2,039,317			
	4.2	23,850	1,196	2,039,317	1,181,202	189,713	3,410,233
Hounh Bo	5.1						
	5.2						
	1.1	27,550	1,382	1			
	1.2	27,550	1,382	t .		<u> </u>	
	2.1	27,550	1,382	2,273,828		1 !	
	2.2	27,550	1,382	2,273,828	1,286,164	214,250	3,774,242
	3.1	İ					
	3.2				ł.	1	
	4.1		1	1			j
	4.2	1				Į	
	5.1						į
	5.2					]	
Lang Bang	All	2,560	108	370.302	328,210	38,996	737,50°.

# A5.18 Annual Running Costs for Preferred Alternative

AND THE PROPERTY OF THE PROPER	Vilking - II			O & M costs, US \$	sis, US S	Ver	Aeration	Pui	Pumping	Gener	Cieneral Power	Sludge Co	Sludge Conditioning	Total
Treatment Plant	Flow. m 'year	Civil cost. US \$	Civil cost, M & J. Cost, Civil Works 15.8 1/5.8 (#. 0.60%) of cost	Civil Works (v; 0.60% of cost	M & E Works (ii) 1.75% of cost	kWhyear	Annual cost. US \$ @ 0.0\$ US \$/kWh	kWh/vear	Annual cost, US S @ 0.05 US SÆWh	kWb/year	Annual cost, US \$ @ 0.05 US \$\$KWh	MgDS/year	Annual cost, US S @ 25 US S MEDS	Annual Running Cost US S
Don Dien	5.011.815	2,698,742	1.745,585	16.192	30,548	1,497,267	74,863	273,123	13,656	262,800	13,140	1,497	37,432	185,831
Deo Sen	7.205.100	7,205,100 5,040,079	7,990,000	30,240	69.825	2,702,916	135,146	445.002	052,22	394.200	19,710	3,892	97,305	374,476
Bach Dang	2.668,515	2.668,515 1.825,684	1,202,078	t56'01	21.036	880,430	220.44	517.57	3,636	131,400	6.570	999	16.639	102,856
Cam Pha	2.011.515	1,402,488	924.818	8.415	16.184	594.676	29,734	109,619	5,481	131,400	6.570	\$65	14,867	81.251
								-	Total Domastic WWTP 2016 Bunning Costs	WWTP 30	6 Running Cos	١		744.435

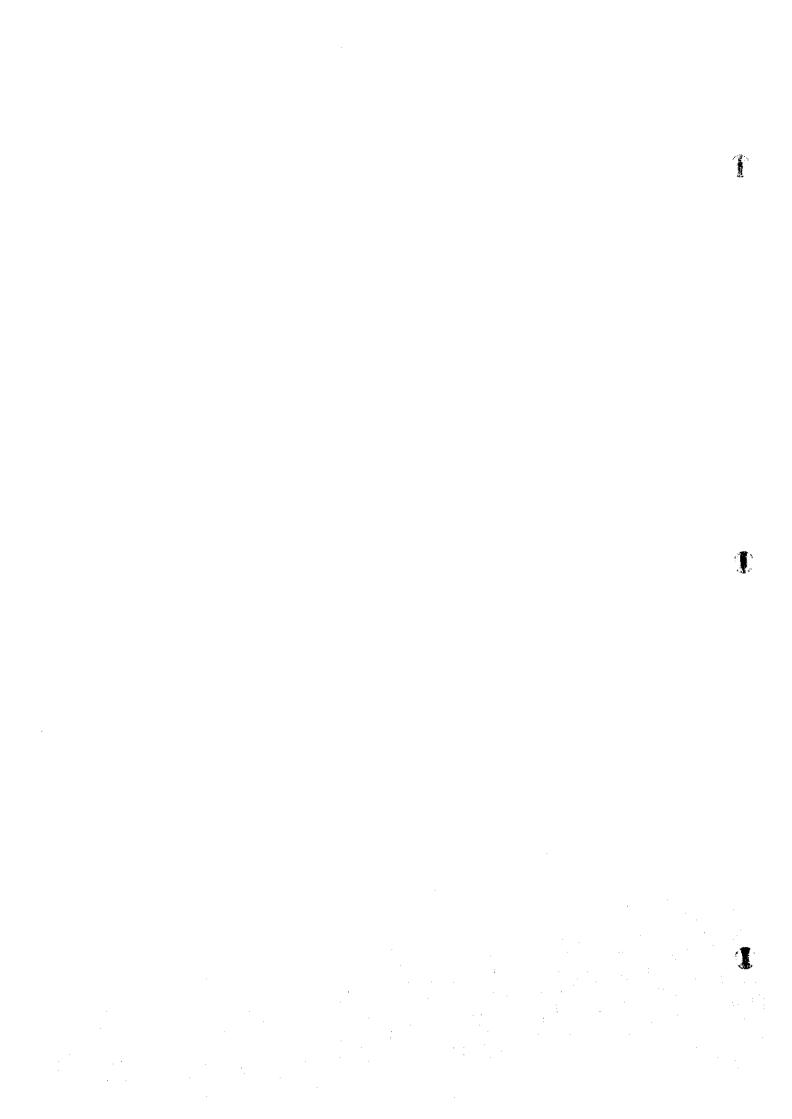
INDUSTRIAL WWTP - ANNUAL RUNNING COSTS (2010)	VTP - ANNU.	AL RUNNIN	0.0513(20)	- 1						,		Charles O.	4.6.00	1
				O & M COSTS, US ?	Kr. USS	- Ver	Aeration	3	Jumping Suidway	Cener	General Fower	Single Co	Stude Conditioning	,000
Treatment Plant	Flow, m <sup>2</sup> /year	Civil cost. US S	M & E Con. US S	Civil cost. M & E Cost. Civil Works M & Costs US S (c) Works US S 0.60% 1.75% of cost of costs	ш 🕏 🖫 7	kWh/year	Annual cost. US \$ @ 0.05 US \$AWh	KWh/year	Annual cost, US S @ 0.05 US S/kWh	kWh/year	Annual cost, US S @ 0.05 US SAWA	unual cost. US S @ MgDS/year 0.05 US S:kWh	Annual cost, US \$ @: 25 US \$/MgDS	Annual cost, Annual Running US \$ @: Cost 25 US \$ US \$ US \$ SMgDS
કેલ્લ્લ કેલ્લ	(X)+"+£6	862'60+	012,826 302,904 004,450	2.456	5,744	6rt*LE	1,872	126,021	2,546	131,400	6.570	37	936	20,124

Total Domestic + Industrial WWTP 2010 Running Costs

764.539 US \$/year

# - Appendix 6 Cost Estimate for Alternatives

		Page
A6.1	Cost Estimate for Alternative 1.1	A6-1
A6.2	Cost Estimate for Alternative 1.2	A6-2
A6.3	Cost Estimate for Alternative 2.1	A6-3
A6.4	Cost Estimate for Alternative 2.2	A6-4
A6.5	Cost Estimate for Alternative 3.1	A6-5
A6.6	Cost Estimate for Alternative 3.2	A6-6
A6.7	Cost Estimate for Alternative 4.1	A6-7
A6.8	Cost Estimate for Alternative 4.2	A6-8
A6.9	Cost Estimate for Alternative 5.1	A6-9
A6.10	Cost Estimate for Alternative 5.2	A6-10



A6.1 Cost Estimate for Alternative L1

A6.1 Cost Estimate for A				
Component	Unit	Quantity	Rate, US\$	Amount, USS
OMESTIC	- 1			
Don Dien				İ
Sewerage	km	13.3	128,000	1,702,000
Main collectors including pump stations	km population	15,000	123,000	1,560,000
Local sewerage in new development  Local sewerage in existing development	population	15,000	76	1,140,000
Wastewater Treatment	primarica	1.3424.72		11110,000
Oxidation Ditch	L.S.	1	1,789,866	1,790,000
Sub total for Don Dien	140.	-	i	6,192,000
Dong Dang				
Sowerage				1
Main collectors including pump stations	km	10.4	208,000	2,163,000
Local sewerage in new development	population	50,000	104	5,200,000
Local sewerage in existing development	population	40,200	76	3,055,000
Wastewater Treatment		•		
Oxidation Ditch + Phosphorus Removal	1. S.	1	5,575,827	5,576,000
Sub total for Dong Dang				15,994,000
Deo Sen				
Sewerage				1
Main collectors including pump stations	km	12.4		1
Local sewerage in new development	population	l .	l	1
Local sewerage in existing development	population	\$3,700	76	6,361,000
Wastewater Treatment			l	
Oxidation Ditch + Phosphorus Removal	L.S.	1	9,816,626	
Sub total for Deo Sen			İ	30,434,000
Bach Dang	1	1	İ	
Sewerage		8.7	160,000	1,392,000
Main collectors including pump stations	km			
Interceptor sewers and structures	population population	1	1	1
t ocal sewerage in new development  Local sewerage in existing development	population			l '
Vastewater Treatment	bykalanon	2.,,500	1	
Sequencing Batch Reactor	L.S.		3,027,76	3,028,000
Sub total for Bach Dang				8,420,000
Cam Pha	1	1		
Sewerage	l	1		J
Main coffectors including pump stations	km	5.0	160,00	0 896,000
Interceptor sewers and structures	population	20,000	o' 2	0 400,000
Local sewerage in new development	population	5,00	10	4 520,000
Local sewerage in existing development	population	n 20,00	7	6 1,520,00
Wastewater Treatment	į		1	
Oxidation Ditch	1.8.	1	2,327,30	6 2,327,00
Sub total for Cam Ph	ii i		i	5,663,00
INDUSTRIAL				
Cal Lan Industrial Zone		İ		
Collection System including pump stations	km	6.		1
Effluent Treatment Plant	1_ S.		1 3,410,23	
Sub-total for Cai I an Ind Zon	٩	Į.	1	5,206,00
Hoanh Bo Industrial Zone		. ا	114.64	1 706 66
Collection System including pump stations	km	5.		
Effluent Treatment Plant	I. S.		3,774,24	3,774.00 5,450.00
Sub-total for Hoanh Bo Ind Zon	"]	1	Ì	3,43030
Lang Bang			9 146,00	00 423,00
Collection System	km L.S.	2	1 737,50	1
Effluent Treatment Plant Sub-total for Lang Rac	i		137,3	1,161,0
Sub-total for Lang Bar	*	<del> </del>	1	78,600,0
Sub-total for Alternative 1.1		10	α l	7,860,0
Engineering and supervision costs Institutional strengthening and pubic awareness	1		7 52	4,323,0
Institutional strengthening and public awareness  Contingencies		10	1	9,078,0
T COMPRESSION :	1	1 10	** [	2,070,07

A6.2 Cost Estimate for Alternative 1.2

A6.2 Cost Estimate for Component	Ucit	Quantity	Rate, USS	Amount, US\$
OMESTIC			<b>-</b>	
Don Dien	İ			
Senerage			1	
Main collectors including pump stations	knı	13.3	128,000	1,702,000
Local sewerage in new development	population	15,000	104	1,560,000
Local severage in existing development	population	15,000	76	1,140,000
Wastewater Treatment	3	- '		
Oxidation Ditch	L. S.	i	4,615,158	4,615,000
Sub total for Don Dien	7, 1-1	Ť		9,017,000
,				
Dong Dang		,		
Sewerage	kus	10.4	208,000	2,163,000
Main collectors including pump stations  Local sewerage in new development	population	50,000	101	5,200,000
•	population	40,200		3,055,000
Local sewerage in existing development	1. S.	1	479,671	450,000
Teansfee pumping station	km	8.0	170,000	1,360,000
Pumping main		0.0	10,000	12,258,000
Sub total for Dong Dang			]	11,210,000
Deo Sen	1		}	
Sowerage	1	12.4	315,000	3,906,000
Main collectors including pump stations	km	100,000	1 1	10,400,000
Local sewerage in new development	population	83,700	i	6,361,000
Local sewerage in existing development	population	8.5,700	76	0,001,000
Wastewater Treatment		١,	A 014 434	9,817,000
Oxidation Ditch + Phosphorus Removal	1. S.	1 '	9,816,626	
Sub total for Deo Sec	<b>'</b>	İ		30,484,00
Bach Dang				
Seworage				
Main collectors including pump stations	km	8.7	1	1,392,000
Interceptor sewers and structures	population		i .	400,00
Local sewerage in new development	population			2,080,00
Local sewerage in existing development	population	20,000	76	1,520,00
Wastewater Treatment	1	•	ı	
Sequencing Batch Reactor	LS.		3,927,762	3,028,00
Sub total for Bach Dan	E		1	8,420,00
Care Pha	1			ì
Sewerage		1		
Main collectors including pump stations	km	5.6		
Interceptor sewers and structures	population		1	
Local sowerage in new development	population			1
Local sewerage in existing development	population	20,00	0] 76	1,520,00
Wastewater Treatment	1		1	1
Oxidation Ditch	L.S.	1	1 2,327,306	2,327,00
Sub total for Cam Pt	ı.a	1		5,663,00
INDUSTRIAL	1	1	1	i
Cal Lan Industrial Zone	1			]
Collection System including pump stations	km	6.	3 285,000	1,796,00
Effluent Treatment Plant	I_S.		1 3,410,233	3,410,00
Sub-total for Cai Lan Ind Zor	se .	1		5,206,00
	1		1	ì
Hoanh Bo Industrial Zone		1		
Collection System including pump stations	km	5	.4 316,000	1,706,0
Effluent Treatment Plant	1. S.		1 3,774.24	1
Sub-total for Hoanh Bo Ind Zo		1		5,450,0
One total for strains for the str				
Lana Rana	Ì			1 .
Lang Rang Collection System	kra	,	.9 146,00	0 423,0
Collection System	L.S.	•	1 737,50	1
Effluent Treatment Plant	1		1 /3/,30	1,161,0
Sub-total for Lang Ba	11 <u>K</u>			77,632,0
Sub total for Ahernative 1.2			٦.	
Engineering and supervision costs	-	10		7,769,0
Institutional strengthening and public awareness	1		3	4,273,0
Contingencies Total Alternative 1.2		10	·* 1	8,973,0
				98,704,0

A6.3 Cost Estimate for Alternative 2.1

A6.3 Cost Estimate for A			D. t. 1158	Amount, USS
Composest	Ueit	Quantity	Kate, USS /	Amount (191)
OMESTIC		1		-
Don Dlen			1	- 1
Sewerage	km	13.3	128,000	1, 202,000
Main collectors including pump stations  Local sewerage in new development	population	15,000	104	1,560,000
Local sewerage in new development	population	15.000	76	1,140,000
Wastewater Treatment	Ahamara	,		
Oxidation Ditch	I.S.	1	1,789,866	1,790,000
Oxidation trace Sub total for Don Dien	•••	1		6,192,000
- '			ł	
Dong Dang				i
Sewerage  Main collectors including pump stations	km	10.4	208,000	2,163,000
Local sewerage in new development	population	50,000	101	5,200,000
Local sewerage in existing development	population	40,200	76	3,055,000
Wastewater Treatment		· [		1
Oxidation Ditch + Phosphorus Removal	1. S.		5,575,827	5,576,000
Sub total for Dong Dang	]	1	Ī	15,994,000
Dro Sen		!	1	- 1
Sewerage			ŀ	ì
Main collectors including pump stations	ka	12.4	315,000	3,906,000
Local sewerage in new development	population	100,000	101	10,400,000
Local sewerage in existing development	population	83,700	76	6,361,000
Wastewater Treatment	' '			
Oxidation Ditch + Phosphorus Removal	I. S.	- 1	9,816,626	9,817,000
Sub total for Deo See	.[	Ĭ ,		30,454,000
Rach Dang				
Sewerage				
Main collectors including pump stations	km	8.7	160,000	1,392,000
Interceptor sewers and structures	population	20,000	20	400,000
Local sewerage in new development	population	20,000	104	2,080,000
Local sewerage in existing development	population	20,600	76	1,520,000
Wastewater Treatment	l' '			j
Sequencing Batch Reactor	ŁS.	1 1	3,027,762	3,628,000
Sub total for Bach Dan	<u>s</u> ]			8,420,000
Caro Pha		}		
Sewerage	1			
Main collectors including pump stations	kın	5.6	160,000	826,000
Interceptor sewers and structures	population	20,000	20	400,000
Local sewerage in new development	population	5,000	104	520,000
Local sewerage in existing development	population	20,000	76	1,529,000
Wastewater Treatment		1		1
Oxidation Ditch	L.S.	'	2,327,306	<del></del>
Sub total for Cam Pl	ıa e		1	5,663,000
INDUSTRIAL		1		i
Cai Lan Industrial Zones			1	ļ
Cai Lan Collection System including pump stations	km	6.3		1
Cai Lan Main Pump Station	LS.	1	1 '	
Cai Lao Pumping Maio	kan	8.4	240	
Sub-total for Cai Lan Ind Zon	es	1		4,408,000
Hoanh Bo Industrial Zone			1	<b>i</b> .
Collection System including pump stations	km	5.4		1
Effluent Treatment Plant	L.S.		1 3,774,243	
Sub-total for Hoanh Bo Ind Zo	ne e		İ	5,480,000
Lang Bang			1	
Collection System	kon	2.	1	•
Effluent Treatment Plant	L.S.	i	737,50	
Sub-total for Lang Ba	ng		<b>↓</b>	1,161,00
Sub total for Alternative 2.1	1		1	77,802,00
Engineering and supervision costs		101		7,780,00
Institutional strengthening and pubic awareness	1	. 51	1	4,279,00
Contingencies		101	<b>{</b> ]	8,986,00
Total Alternative 2.1		·		98,847,00

A6.4 Cost Estimate for A		2.2		
Composent	Unit	Quantity	Rate, US\$	Amount, US\$
DOMESTIC	1			
Don Dien	i	i		ļ
Sewerage	1			
Main collectors including pump stations	kra	13.3	128,000	1,702,000
	Population	15,000	104	1,560,000
Local sewerage in existing development	роривнюв	15,000	76	1,140,000
Wastewater Treatment	•	_		4 4 5 000
Oxidation Ditch	L.S.	ı	4,615,158	4,615,000
Sub total for Don Dien				9,017,000
Dong Dang				
Seweinge		,,,	208,000	2,163,000
Main collectors including pump stations	lin.	10.4 50.000	1 - ''	5,200,000
Local sewerage in new development	population	40,200		3,055,000
Local sewerage in existing development	bobnegasia	40,200		480.000
Transfer pumping station	L.S. ka	8.0	1	
Fumping main	KGY	3.0	170,000	12,258,000
Sub total for Dong Dang		1	1	12,230,000
Deo Sen				1 1
Severage	<b>.</b>	12.4	315,000	3,906,000
Main collectors including pump stations	kn:		1	L k
Local sewerage in new development	population		1	
Local sewerage in existing development	Population	0.5,100	1 "	11,.01,000
Wastewater Treatment	L.S.	1	9,816,626	9,817,000
Oxidation Datch + Phosphorus Removal  Sub-total for Dec Sen		i '	2,010,020	30,484,000
		1		
Bach Dang		İ		1
Sewerage	km	8.	7 160,000	1,392,000
Main collectors including pump stations	population			
Interceptor sewers and structures	population		" <b>l</b>	k ' 1
Local sewerage in new development  Local sewerage in existing development	population			
Wastewater Treatment	1	1	Ï	1
Sequencing Batch Reactor	1. s.		3,027,76.	3,028,000
Sub total for Back Dang	1 .	ĺ		8,420,000
Cam Pha	1	1		
Sewerage	1		-	1 1
Main collectors including pump stations	km	5.	.6 160,00	0 896,000
1 sterceptor sewers and structures	populatio	20,00	2	0 100,000
Local sewerage in new development	populatio		20 10	4 520,000
Local sewerage in existing development	populatio		20 7	6 1,520,000
Wastewater Treatment	1''	1		1
Oxidation Ditch	L.S.		1 2,327,30	6 2,327,000
Sub total for Cam Ph	.3	ì		5,663,000
INDUSTRIAL			_ <u> </u>	
Cai Lan Industrial Zones			-	
Cai Lan Collection System including pump stations	km	6	285,00	1,796,000
Cai Lan Main Pump Station	LS.	ļ	1 595,63	78 596,000
Cai Lao Pumping Main	kan		3.4 2-	10 2,016,000
Sub-total for Cai Lan Ind Zon	es	1	Ļ	4,408,000
Hoanh Bo Industrial Zone	-	İ		
Collection System including pump stations	km		5.4 316,0	00 1,706,000
Effluent Treatment Phast	1. S.		1 3,774,2	42 3,774,000
Sub-total for Hoanh Bo Ind Zo	pe			5,450,000
Lang Bang		1		1 441
Collection System	km	İ	2.9 146,0	60 423,000
Effluent Treatment Plant	LS.		1 737,5	09 738,000
Sub total for Lang Ra		1		1,161,000
Sub total for Alternative 2.1	1			76,891,000
Engineering and supervision costs	I	ı	0%	7,689,000
Institutional strengthening and public awareness	ļ	l l	5%	4,229,000
Contingencies			0.4	8,881,000
Total Afternative 2.2				97,690,000

を

A6.5 Cost Estimate for A				
Component	Unit	Quantity	Rate, US\$	Anount, US\$
MESTIC				
Don Dien		l		
Sewerage	km	13.3	128,000	1,702,000
Main collectors including pump stations Local sewerage in new development	nii population	15,000	125,000	1,560,000
Local sewerage in new development	population	15,000	76	1,140,000
Wastewater Treatment	propertion	11-10-00	•0	1,0 10,000
Oxidation Ditch	1. S.	1	1,759,866	1,790,000
Sub total for Don Dien			, .	6,192,000
Dong Dang				
Sewerage				
Main collectors including pump stations	km	10.4	208,000	2,163,00
Local sewerage in new development	population	50,000	104	5,200,00
Local sewerage in existing development	population	40,200	76	3,055,00
Wastewater Treatment				
Oxidation Ditch + Phosphorus Removal	L.S.	1	5,575,827	5,576,00
Sub total for Dong Dang				15,994,00
Deo Sen				
Sewerage		1	j	
Main collectors including pump stations	km	12.4	3	1
Local sewerage in new development	population	1		
Local sewerage in existing development	population	74,000	76	5,624,00
Wastewater Treatment	, .		0.030.00	0.010.00
Oxidation Ditch + Phosphorus Removal	1 - S.	i '	9,030,086	9,030,00
Sub total for Deo Sen	ļ		i	27,920,00
Bach Darg				1
Sewerage	km	8.7	160,000	1,392,00
Main collectors including pump stations	population	1		1
Interceptor servers and structures	population		1	
Local sewerage in new development  Local sewerage in existing development	population	1	1	
Wastewater Treatment	1			1
Sequencing Batch Reactor	L.S.		3,027,76	3,028.0
Sub total for Bach Dang				8,420,0
Caro Pha			1	1
Sewerage				
Main collectors including pump stations	km	5.4	160,00	0,698
Exterceptor sewers and structures	population	20,00	) 2	0 400,0
Local sewerage in new development	population	5,00	) 10	520,0
Local sewerage in existing development	population	20,00	7	6 1,520,0
Wastewater Treatment	1	]	1	
Oxidation Ditch	1. S.		1 2,327,30	
Sub total for Cam Ph	' <b> </b>			5,663,0
NDUSTRIAL :				İ
Cai Lan + Hoanh Bo Industrial Zones				
Cai Lan Collection System including pump stations	km	6.	E	1
Hoanh Bo Collection System including pump stations	km	5.		
Cai Lan Main Pump Station	LS.		595,67	
Hoanh Bo Main Pump Station	L.S.	.	1 733,09	1
Cai Lan Pumping Main	km	8.	i	1
Hough Bo Pumping Main	km	8.	0 24	1,920.0 8,767.0
Sub-total for Cai Lan + Hoanh Bo Ind Zone	<b>S</b> ]		l	8,707,
Lang Bang	1	١,	9	0 423,6
Collection System	km L.S.	1 '	1 737.50	1
Effluent Treatment Plant Sub-total for Lang Ban	1		1 35.3	1,161,
Sub-total for Alternative 3.1	•		1	74,117,
Sub total for Americative 3.1  Engineering and supervision costs	ĺ	10	%	7,412,
Institutional strengthening and public awareness		1	7 74	4,076,
Contingencies		10		8,561.
Total Alternative 3.1	- t		- 4	94,166,
Eran Charles	<del></del>	<del></del>		
e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de				
Δ6 - 5	· .			
A6 - 5	· .			

A6.6 Cost Estimate for A	Unit	Quantity	Rate, US\$	Amount, US\$
Component	Uni	Quantity	Kaie, cisa	Zuikiula, Goş
OMESTIC	- 1			
Don Dien			j	
Sewerage				
Main collectors including pump stations	km	13.3	128,000	1,702,000
	population	15,000	104	1,560,000
Local sewerage in existing development	population	15,600	76	1,140,000
Wastewater Treatment				
Oxidation Ditch	1. S.	1	4,444,327	4,444,000
Sub total for Don Dien				8,846,000
Dong Dang				•
Sewerage				
Main collectors including pump stations	km	10.4	203,000	2,163,000
** *	population	45,000	104	4,680,000
Local sewerage in new development	population	38,500	i	2,926,000
Local sewerage in existing development	L. S.	,47,200	479,671	480.000
Transfer pumping station		,	l '	1
Pumping main	km	8.0	170,000	
Sub total for Dong Dang				11,609,00
Deo Sen		1	1	Ì
Sewerage				
Main collectors including pump stations	km	12.4	i -	1
Local sewerage in new development	population	1	1	
Local sewerage in existing development	population	74,900	76	5,624,00
Wastewater Treatment		1		<b>!</b>
Oxidation Ditch + Phosphorus Removal	L.S.	1	9,030,036	9,030,00
Sub total for Deo Sen			1	27,920,90
Bach Dang				
Sewerage	<b>!</b>			ł
Main collectors including pump stations	km	3.7	160,000	1,392,00
Interceptor sewers and structures	population	20,000	20	400,00
Local sewerage in new development	population		1	2,080,00
	population	ŀ	1	
Local sewerage in existing development	Proposition	20,,,,,	1	1
Wastewater Treatment	L.S.		3,027,762	3,028,00
Sequencing Batch Reactor		1	3.0.27,702	8,420,00
Sub total for Bach Dang				0,420,00
Cam Pha	1			
Sewerage		1		
Main collectors including pump stations	km	5.0		
Interceptor sewers and structures	populatio	1		
Local sewerage in new development	population	n <b>5,0</b> 0		
Local sewerage in existing development	populatio	n 20,00	0 70	1,520,0
Wastewater Treatment		1		
Oxidation Ditch	1. S.		2,327,30	6 2,327,0
Sub total for Cam Ply	,	i	1	5,663,0
INDUSTRIAL				
Cai Lan + Hoanh Bo Industrial Zones	Ł			1
Cai I an Collection System including pump stations	km	6.	3 285,00	0 1,796,0
Hoanh Bo Collection System including pump stations	km		4 316,00	1
Cai Lan Main Pump Station	1.S.		1 595,67	1
	1.S.	1	733,00	
Hoanh Bo Main Pump Station	km	8.	1	
Cai Lan Pumping Main	1	1	.0 24	
Hoanh Bo Pumping Main	km		~	
Sub-total for Cai Lan + Hoanh Bo Ind Zone	S			8,767,0
1.ang Bang				
Collection System	km	2	.9 146,00	
Effluent Treatment Plant	L S.		3 737,50	738,0
Sub-total for Lang Ban	e			1,161,0
Sub total for Alternative 3.2				72,386,0
Engineering and supervision costs	1	10	%	7,239,0
Institutional strengthening and pubic awareness	1		5%	3,981,0
Contingencies		10	1	8,361,0
Commences				91,967,0

A6.7 Cost Estimate for A	Unit	Quantity	Rate, USS	Amount, US\$
Composest	Ura	Quantity	Kate, USS	Amount, USS
DOMESTIC				
Don Dien				
Sewerage	D	.,,	128,000	1 703 000
Main collectors including pump stations	km	13.3 15,000	125,000	1,702,000 1,560,000
	population	15,000	76	
Local sewerage in existing development	popublica	15,000	10	1,140,000
Wastewater Treatment			1.760.044	. 700 000
Oxidation Ditch	L.S.	'!	1,789,866	1,790,000
Sub total for Don Dien				6,192,000
Dong Dang				
Sowerage			208,000	3.143.000
Main collectors including pump stations	kns	10,4		2,163,000
Local sewerage in new development	population	50,000	104	5,200,000
Local sewerage in existing development	population	40,200	76	3,055,000
Wastewater Treatment				
Oxidation Ditch + Phosphorus Removal	1. S.	1	11,361,156	
Sub total for Dong Dang				21,779,000
Deo Sen	į			1
Sewerage				
Main collectors including pump stations	ker	12.4	1	
Local sewerage in new development	population	100,000		
Local sewerage in existing development	population	83,700	76	6,361,000
Wastewater Treatment				i
Oxidation Ditch + Phosphorus Removal	LS.	1	9,816,626	
Sub total for Deo Sea			İ	30,484,000
Bach Dang				
Sewerage			ļ	1
Main collectors including pump stations	kat	8.7	160,000	1,392,00
Interceptor sewers and structures	population	20,000	20	400,00
Local sewerage in new development	population	20,000	104	2,080,00
Local sewerage in existing development	population	20,000	76	1,520,000
Wastewater Treatment	i		1	ĺ
Sequencing Batch Reactor	1. S.	1	3,027,762	3,028,00
Sub total for Rach Dang				8,420,00
Cam Pha				ł
Sewerage	1			
Main collectors including pump stations	km	5.6	160,000	896,00
Interceptor sewers and structures	population	20,000	20	400,00
Local sewerage in new development	population	5,000	104	520,00
Local sewerage in existing development	population	20,000	70	1,520,00
Wastewater Treatment				
Oxidation Ditch	L.S.		2,327,300	2,327,00
Sub total for Cam Pha	1	1		5,663,00
INDUSTRIAL	1			
Cai Lan Industriai Zone		İ		
Collection System including pump stations	km	6.3	285,000	1,796,00
Effluent Treatment Plant	LS.	1	3,410,233	3,410,00
Sub-total for Cai Lan Ind Zone		1		5,206,60
Hoanh Bo Industrial Zone	1		i	
Collection System including pump stations	km	5.4	316,00	1,706,00
Effluent Treatment Plant I		1		0
Sub-total for Hoanh Bo Ind Zone	.]	1		1,706,00
			ŀ	2,:::,::
Lang Bang	kor	2.5	9 146,00	0 423,00
Collection System	L.S.		737,50	1
Effluent Treatment Phot			1 /3/,30	
Sub-total for Lang Bang	<del> </del>		<del> </del>	1,161,00
Sub total for Alternative 4.1		100	,	80,611,00
Engineering and supervision costs		107		8,061,00
Institutional strengthening and pubic awareness	ł	10%		4,434,00
Contingencies				9,311,00

Note: 1. Treatment costs included in domestic wastewater treatment

A6.8 Cost Estimate for Alternative 4.2 Quantity Rate, US\$ Amount, US\$ Uzit DOMESTIC Don Dlea Sewerage 128,000 1.702.000 Main collectors including pump stations km 111 population 15,000 104 1,560,000 Local sewerage in new development 1,140,000 Local sewerage in existing development population 15,000 76 Wastewater Treatment Oxidation Ditch 1. S. 8,683,279 8,083,000 12,485,000 Sub total for Don Dien Dong Dang Sewerage 208,000 2,163,000 Main collectors including pump stations knı 10,4 population 50.000 5.200.000 Excal sewerage in new development. LOS 40,200 3,055,000 Local sewerage in existing development population 479,671 480,000 L S. Transfer pumping station Pumping main km 8.0 170,000 1,360,000 12,258,000 Sub total for Dong Dang Dec Sen Sewerage 315,000 3,906,000 Main collectors including pump stations km 12.4 100,000 10,400,000 Local sowerage in new development aoiteirgog 101 poputation 6,361,000 Local sewerage in existing development 83,700 76 Wastewater Treatment Oxidation Direk + Phosphorus Removal 1. 8. 9,816,626 9,817,000 30,484,000 Sub total for Deo Sea Boch Dang Sewerage Main collectors including pump stations 160,000 1,392,000 km 400,000 Interceptor sewers and structures рорыктов 20,000 20 Local sewerage in new development population 20,000 104 2,080,000 Local sewerage in existing development population 20 000 1,520,000 76 Wastewater Treatment Sequencing Batch Reactor 1. S. 3,027,762 3.028,000 Sub total for Bach Dang 8,420,000 Cam Pha Sewerage Main collectors including pump stations 160,000 596,000 km 5.6 Interceptor sewers and structures population 20,000 400,000 Local sewerage in new development population 5,000 104 \$20,000 Local sewerage in existing development рорацию 20,000 76 1,520,000 Wastewater Treatment Oxidation Dach L.S. 2,327,306 2,327,000 Sub total for Cam Pha 5,663,000 INDUSTRIAL Cai Lan Industrial Zone Collection System including pump stations km 285,000 1.796,000 Efficent Treatment Plant L.S. 3,410,233 3,410,000 Sub-total for Cai Lau Ind Zone 5,206,000 Hoanh Bo Industrial Zone Collection System including pump stations kın 5.4 316,000 1,706,000 Hoanh Bo Main Pump Station LS. 733,005 733,000 Hoaph Bo Pumping Main km 8.0 240 1,920,000 Efficient Treatment Plant Sub total for Hoanh Bo Ind Zone 4,359,000 Lang Bang Collection System km 2.9 146,000 423,000 Effluent Treatment Plast L.S. 737,509 738,000 Sub-total for Lang Bang 1,161,000 Sub total for Alternative 1.2 80,036,000 Engineering and supervision costs 10% 8,004,000 Institutional strengthening and public awareness 4,402,000 5% Costingencies 9,244,000

Total Alternative 4.2

Note: 1. Treatment costs included in domestic wastewater treatment

101,686,000

A6.9 Cost Estimate for A	Unit	Quantity	Rate USS	Amoust USS
Component	3,01	2247011		Talloring St.
Don Dien				
Sewerage				
Main collectors including pump stations	km.	13.3	128,000	1,702,000
Local sewerage in new development	propulation	15,000	101	1,560,000
Local sewerage in existing development	population	15,000	76	1,140,000
Wastewater Treatment				.,,
Oxidation Ditch	1.5	1	8,345,157	8,345,000
Sub total for Den Dien	'		, .	12,747,000
Dong Dang	•			
Sowerage				
Main collectors including pump stations	ksn	10.4	208,000	2,163,000
Local sewerage in new development	population	50,000	104	5,200,000
Local sewerage in existing development	population	40,200	76	
Wastewater Treatment				
Oxidation Ditch + Phosphorus Removal	1.8	1	5,575,827	5,576,000
Sub total for Dong Dang		_	.,,	15,994,000
Deo Sen				
Seworage				
Main collectors including pump stations	kna	12.4	315,000	3,906,000
Local sewerage in new development	population	90,000	1 .	
Local sewerage in existing development	population	79,000	76	6,004,000
Wastewater Treatment	[' '			
Oxidation Ditch + Phosphorus Removal	1. S.	ı	9,251,833	9,252,000
Sub total for Deo Sec				28,522,000
Rach Dang		]	ĺ	]
Sewerage	Į.	i		i
Main collectors including pump stations	kes	8.7	160,000	1,392,000
Interceptor sewers and structures	population	20,000		1
Local sewerage in new development	population	20,000	10	2,080,000
Local sewerage in existing development	population	20,000	70	1,520,000
Wastewater Treatmoot	[' '		1	Į.
Sequencing Batch Reactor	I.S.	1 :	3,027,76	3,028,000
Sub tetal for Bach Dan	ا.	i		8,420,000
Cam I'ba	1			
Scwerage			1	
Main collectors including pump stations	km	5.4	160,00	896,000
Interceptor sewers and structures	population	20,00	2	409,000
Local sewerage in new development	population		01 (0	520,000
Local sewerage in existing development	population	20,00	7	6 1,520,000
Wastewater Treatment	] .		1	i .
Oxidation Ditch	LS.	1	2,327,30	6 2,327,000
Sub total for Cam Fb	a	ł		5,663,000
INDUSTRIAL	1			1
Cai Lan + Hoanh Bo Industrial Zones	1	i	1	Į.
Cai Lan Collection System including pump stations	km	6.	3 285,00	0 1,796,000
Hosah Bo Collection System including pump stations	km	5.	4 316,00	0 1,706,00
Cai Lau Main Pump Station	LS.	1	1 595,67	8 596,00
Hoanh Bo Main Pump Station	L.S.		1 733,00	5 733,00
Cai Lan Pumping Main	km	8.	1 24	0 2,016,00
Hoard Bo Pumping Main	kms	8.	0 24	0 1,920,00
Effluent Treatment Plants	1		1	o
Sub-total for Cai Lan + Hoanh Bo lad Zon	es.	1	1	8,767,00
Lang Bang			1	
Collection System	km	2	9 146,00	0 423,00
Efflicat Treatment Plant	LS.	1	737,50	9 738,00
Sub-total for Lang Bar	•		1	1,161,00
Sub total for Alternative 5.1	<u> </u>			81,274,00
Engineering and supervision costs		10	7 <sub>4</sub>	8,127,00
Inditational strengthening and pubic awareness		5	. 1	4,470,00
Confingencies		10		9,387,00
Total Alternative 5.1	<del></del>			103,258,00

A6.10 Cost Estimate for Alternative 5.2 Unit Quantity Rate, US\$ Amount, US\$ Component DOMESTIC Don Dien Sewerage 128,000 1,702,000 Main collectors including pump stations km 13.3 population 15,000 104 1,560,000 Local sewerage in new development 1,140,000 Local sewerage in existing development population 15,000 76 Wastewater Treatment Oxidation Dirch 1. S. 1 10,952,517 10,953,000 15,355,000 Sub total for Don Dien Dong Dang Sewerage 208,000 2,163,000 10.4 Main collectors including pump stations Lat 4.680,000 45,000 101 Local sewerage in new development population population 38,500 2,926,600 Local sewerage in existing development 479 671 450,000 Transfer pumping station **L.S.** 170,000 1,360,000 8.0 Pumping main km 11 609 000 Sub total for Dong Dang Deo Sen Sewerage 315,000 3,906,000 12.4 km Main collectors including pump stations 9.360.000 Local sewerage in new development population 90.000 104 population 5,624,000 74,000 Local sewerage in existing development Wastewater Treatment 9,030,086 9,030,000 1. S. Oxidation Ditch + Phosphorus Removal 27,920,000 Sub total for Deo Sea Bach Dang Sewerage Main collectors including pump stations 160,000 1,392,000 8.7 km 400,000 20,000 Interceptor sewers and structures population 20 20,000 104 2,030,000 Local sewerage in new development population 1.520,000 20,000 76 Local sewerage in existing development population Wastewater Treatment 3 027,762 3,028,000 Sequencing Batch Reactor 1. S. 8,420,000 Sub total for Back Dang Cam Pha Sewerage 160,000 896,000 5.6 Main collectors including pump stations km 400,000 population 20,000 20 Interceptor sewers and structures 520,000 population 5,000 104 Local sewerage in new development 1,520,000 Local sewerage in existing development population 20,000 76 Wastewater Treatment Oxidation Ditch L. S. 2.327,306 2,327,000 Sub total for Cam Pha 5,663,000 INDUSTRIÁL Cai Lan + Hoanh Bo Industrial Zones 1,796,000 Cai Lan Collection System including pump stations 285 000 316,000 1,706,000 5.4 Hoanh Bo Collection System including pump stations km 595,678 596,000 Cai Lau Main Pump Station LS. 733,005 733,000 LS. Hound Bo Main Pump Station 2,016,000 Cai Lan Pumping Main kan 8.4 240 8.0 240 1,920,000 Hoanh Bo Pumping Main km Effluent Treatment Plant1 8,767,000 Sub-total for Cai Lan + Hoanh Bo Ind Zones Lang Bang 146,000 423,000 2.9 Collection System km Effluent Treatment Plant I. S. 737,509 738,000 1,161,000 Sub-total for Lang Bang 78,895,000 Sub total for Alternative 5.2 7,890,000 Engineering and supervision costs 10% 5% 4,339,000 Institutional strengthening and public awareness 9,112,000 10% Contingencies Total Alternative 5.2

Note 1. Treatment costs included in domestic wastewater treatment

# Appendix 7 Example of Questionnaire for Landscape Value Monitoring

I Questionnaire for tourists
Q1: Where is your favorite scene among the landscape of Ha Long Bay? Please identify three places.
Ans.:
Q 2: Where do you like to visit to enjoy the landscape of Ha Long Bay? Please identify three places.
Ans.:
Q 3: Which feature of the landscape in Ha Long Bay do you like?
Please put a tick on the items that you agree. Any ticks will do.
, team part and an array of
Ans.: Diversity of landscape composed of various islands
☐ Natural impression without artificial scenes
☐ Aesthetic beauty of islands and sea
Prominence that cannot be seen in other places
Peculiarity of strange rocks and grottos
☐ Magnificent and spreading view
☐ Others
Please specify:
Q 4: What is your favorite point of the landscape in Ha Long Bay? Please put a tick on the items that you agree. Any ticks will do.
Ans.  Shape of islands
☐ Combination of islands
☐ Surface of islands
☐ Sheer cliffs
☐ Strange rocks
☐ Grottes
☐ Water color
☐ Water clearness
☐ Trees on the islands
☐ Birds
☐ Mangrove swamps
Coral reefs
☐ Sky and clouds
Scene of fishing operation

Scene of t	lishing boats
Scene of s	sailing boats
□ Scene of a	anchored boats
Others	
Please	e specify :
Q 5 : Do you have any	y dissatisfaction about the landscape of Ha Long Bay?
	_
Ans.: 🗌 Yes	□ No
<b>↓</b>	
Q 5-1 : If	yes, what is the point that you feel dissatisfied?
F	Please put a tick on the items that you agree.
£	Ans.:  The surface of islands is dirty because of landslide.
	The water color is dirty.
	☐ The water clearness is low.
	☐ The floating garbage is abundant.
	☐ The oil slick is abundant.
	☐ The trees on the islands is poor.
	☐ Birds are few.
	☐ Mangrove swamps is small.
	☐ Coral reefs is poor.
	☐ The sand beach is dirty.
	☐ The scene of fishing village is messy.
	☐ The cruising ships are visual pollution.
	☐ The anchored boats are visual pollution.
	☐ The landscape of mainland is messy.
	☐ Others
	Please specify:

	re are the popular tourism spots in Ha Long Bay? se specify five places.
Ans. : _	
-	
-	
-	
	ch route do you usually use when you guide tourists by boat?
Plea	se draw it on the attached map.
Ans. : (	Please draw it on the following map.)
	ch feature of the landscape in Ha Long Bay do you like?
Plea	se put a tick on the items that you agree. Any ticks will do.
Ans. : 1	☐ Diversity of landscape composed of various islands
	☐ Natural impression without artificial scenes
	☐ Aesthetic beauty of islands and sea
	☐ Prominence that cannot be seen in other places
	☐ Peculiarity of strange rocks and grottos
	☐ Magnificent and spreading view
	☐ Others
	Please specify:
Q4:Wha	at is your favorite point of the landscape in Ha Long Bay?
Plea	ase put a tick on the items that you agree. Any ticks will do.
Ans. [	] Shape of islands
C	☐ Combination of islands
[	☐ Surface of islands
{	☐ Sheer cliffs
[	☐ Strange rocks
[	☐ Grottos
(	☐ Water color
[	Water clearness
	Trees on the islands
	] Birds
. (	☐ Mangrove swamps
· : [	Coral reefs
(	☐ Sky and clouds
	Scene of fishing operation
	☐ Scene of fishing boats
ĺ	☐ Scene of sailing boats

LI Scene of a	menorea poats
☐ Others	
Please	specify:
O 5 · Do vou have any	dissatisfaction about the landscape of Ha Long Bay?
	c on the item that you agree.
ricase put a ner	ton the nem that you agree.
Ans.: 🔲 Yes	□ No
<b>V</b>	
•	, what is the point that you feel dissatisfied?
	se put a tick on the items that you agree.
	•
Ans.	:   The surface of islands has changed because of landslide.
	The water color has become dirty.
	☐ The water clearness has degraded.
	☐ The floating garbage has increased.
	☐ The oil slick has increased.
	☐ The trees on the islands have reduced.
	☐ The number of birds has reduced.
	☐ The area of mangrove swamps has reduced.
	☐ The area of coral reefs has reduced.
	☐ The sand beach has become dirty.
	☐ The scene of fisherman village has become messy.
	☐ The emising ship has become an eyesore.
	☐ The anchored boat has become an eyesore.
	☐ The landscape of mainland has become messy.
	☐ Others
	Plassa specify:

Y.

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### III Questionnaire for resident

()

Q 1: Is there any good landscape that you willingly watch near your residence?

Please specify the name and the location of those places. (At most five places)

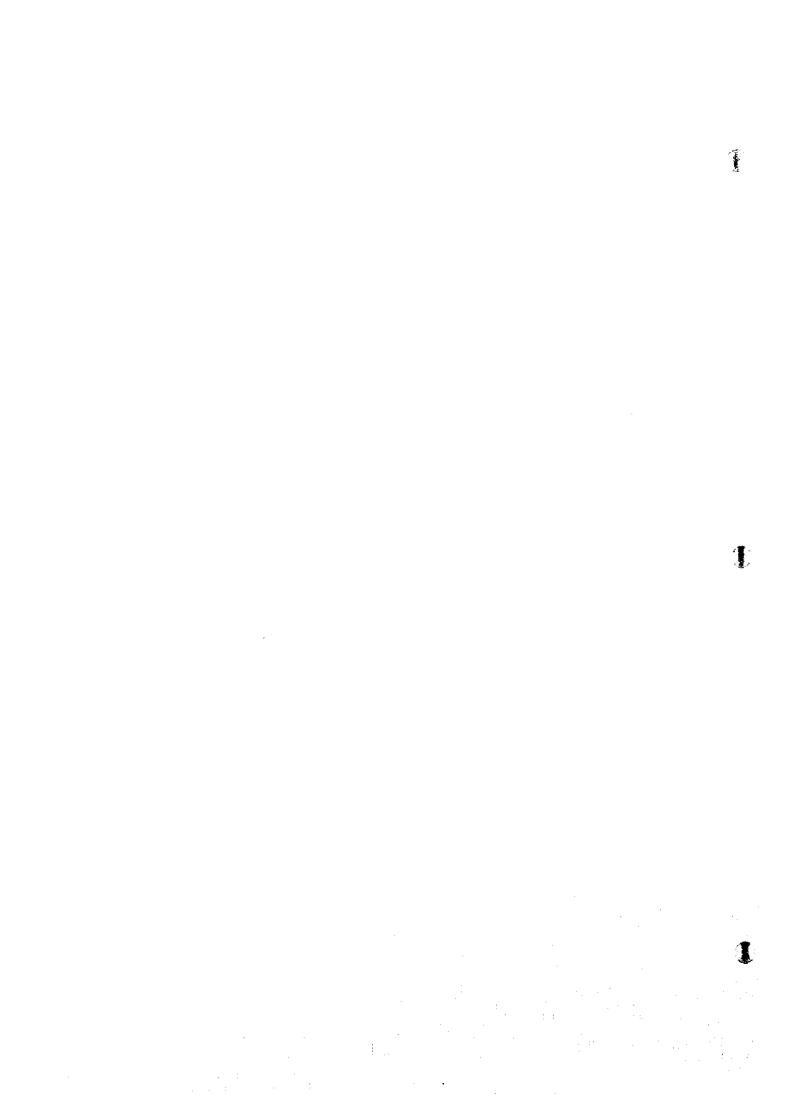
Ans.:					
- Name of the pl	lace -	- 1.0	cation of t	he place -	
(A)				<del>-</del>	
(B)				<del></del>	
(C)					
(D)					
(E)					
Q 2: What is your favorite point about abo	ve-mentioned	olace?			
Please put a tick on the items that you			o.		
Treate for a new on the new year					
Ans.					
( Your favorite point )	(A)	(B)	(C)	(D)	(E)
- Mountain					
- Trees and woods					
- Grassy plain					
- Flower					
- Lake and pond					
- Sea					
- Beach					
- Sheer cliff					
- Rocky shore					
- Coral reef					
- Strange rock					
- Birds and animals					
- Farm					
- Orchard					
- Mangrove swamp					
- Row of trees					
- Row of houses and streets					
- Buildings such as dam					n
- Night scene				П	
- Sky and clouds					U
- Spacious view			Ü	П	Ц
- Composition of view				Ц	
- Other point					
Please specify below.			:		
(A)					
(B)					
(C)		<del></del>		- <del>-</del>	
(D)					
(E)	11	<del></del>	<u> </u>	-	<del></del>

Q 3: Is there any places of whic	h landscape has been degraded near your residence?
	nd the location of those places. (At most five places)
Ans. :	

- Name of the place -	- Name of the place -		- Location of the place -				
(a)							
(b)		<del></del>		- <del></del> -			
(c)							
(d)							
(c)							
4: What is the main reason that has degraded							
Please put a tick on the items that you ago	ree. Any u	CKS WIII O	() <b>.</b>				
Ans.:							
( Main reason )	(a)	(b)	(c)	(d)	(c)		
- Digging mountain							
- Deforestation							
- Decrease of green							
- Deterioration of water quality							
- Decrease of birds and animals							
- Decrease of paddy and dry field	$\Box$						
- Construction of large building							
- Construction of houses							
and factories							
- Construction of road							
- Construction of power-transmission							
and steel tower							
- Reclamation							
and shoreline protection works							
<ul> <li>Clash of colors and shape of</li> </ul>							
building					· 🖸		
<ul> <li>Messy scene under construction</li> </ul>							
<ul> <li>Increase of wasteland and weeds</li> </ul>					$\Box$		
<ul> <li>Old and outmoded building</li> </ul>							
- Increase of wastes							
- Increase of population							
and so crowded					. 🗓		
- Increase of cars and motorbikes							
- Showy sign board							
- Disturbance against splendid view					· U		
- Confusion caused by various		<u>:</u>	_				
factors							
- Deterioration of sky view		<u> </u>	_	·	-		
caused by air pollution					. 🔲		

- 0	ners	
	Please specify below.	
	(a)	
	(b)	
	(c)	
	(d)	· <b>-</b>
	(a)	

()



# Appendix 8 Results of Questionnaire Survey on Willingness to Pay

The detail results of the questionnaire survey, including the tourists' and local residents' WTPs for conservation of the Ha Long bay area's environment, with simple statistical analysis are summarized as below by category of interviewees in order of the question item numbers.

(1) Foreign tourists (145 samples) and Vietnamese tourists (145 samples) to Ha Long city

Q1. Name of the hotel/guest-house you are staying now?

Sample foreign tourists were staying at 14 different guest houses or hotels in Ha Long city. Around 50 % out of the samples were staying in the Hotel I, II & III (Quang Ninh Tourist Company) at the Bai Chay side as in the below table. Hotels used by local tourists are more various. Sample Vietnamese tourists were staying at 23 different guest houses or hotels including VINACOAL guest house. More popular are the 3 hotels in the table accounting for more than 50 % of the samples.

Popular Tourist Hotels in Ha Long City

Foreign	Tourists	Vietnamese Tourists			
Top 3 Popular Hotels	No. of Samples	1 %	Top 3 Popular Hotels	No. of Samples	%
1. Hotel I, 11 & 111	73	50	1. Ha Long Hotel	29	20
2. Cong Doan Hotel	32	22	2. Son Long Hotel	26	18
3. Vuon Dao Hotel	12	8	3. Hong Ngoc Hotel	20	14
Total	117	80	Total .	75	52

Q2. Total number of days you stayed already and will stay in Ha Long city this time? 79 % (115 samples) of the interviewed foreign tourists and 76 % (110 samples) of the interviewed Vietnamese tourists planned to stay in Ha Long city only for  $1 \sim 2$  days. Tourists answering more than 4 days are 3 foreign and 10 Vietnamese samples only.

Stay Duration of Tourists in Ha Long City

Tourists	Foreig	Foreign		ese
Duration	No. of Samples	%	No. of Samples	%
1 ~ 2 days	115	79	110	76
3 ~ 4 days	27	18	25	17
5 ~ 6 days	1	1	6	4
More than 7 days	2	1	4	3
Total	145	100	145	100

### Q3. Your permanent residence?

The sample foreign tourists were coming from 21 countries including Japan. Over one third (36 %) of foreign tourists were Europeans. The most major country as the tourists' permanent residence is China followed by France and Taiwan as below:

Residence Countries	No. of Samples	%
China	36	25
France	32	22
Taiwan	22	15
Europe	20	14
Others	35	24
Total 21 countries	145	100

The sample Vietnamese tourists were coming from all over the country. Nearly two thirds (63 %) of Vietnamese tourists were from the north part of Vietnam, assumingly because of short distance for travel.

Residence in Vietnam	No. of Samples	%
North Part (including Hanoi)	92	63
Middle Part	25	17
South Part (including Ho Chi Minh)	28	19
Total	145	100

### Q4. Transportation means where you entered the Ha Long city?

All the sample foreign tourists used either hired cars (chartered bus or taxi, 89 %) or private cars (11 %) to visit Ha Long city. There were no cases of other transportation such as ship and local bus at all. As for the Vietnamese tourists, 88 % of the samples used either hired cars (chartered bus or taxi, 69 %) or private cars (19 %) to visit Ha Long city. The rest all entered into the city by local bus or private motorcycle.

1

### Q5. Your main purpose to visit Ha Long city?

A major part (81 %) of the foreign samples visited Ha Long city on vacation, although the rest (19 %) were on business or only stop-by for other destination. On the other hand, 71 % of the Vietnamese samples visited Ha Long city on business, while Vietnamese tourists purely on vacation account for only 21 %. It is mostly that the survey period is during tourism off-season for Vietnamese.

### Q6. Number of your tour group members?

Foreign tourists can be largely divided into a small group up to 10 members (52 %) and a large group more than 10 members (48 %), as shown below:

Number of Tour Members	No. of Samples	%
Alone	4	3
2 ~ 5 persons	38	26
6 ~ 10 persons	34	23
More than 10 persons	69	48
Total	145	100

Most of the Vietnamese tourists (about 80 %) visited Ha Long city in a small group like 2 ~ 5 members. This smallness of group size can be supposed to be related with their major purpose of business to visit the city clarified in Q5.

Q7. Places where you visited on vacation in the last 10 days before coming to Ha Long city?

Most of the interviewed foreign tourists had visited other places on vacation before coming to Ha Long city, which means that Ha Long bay area is only one of their destinations for the present vacation trip. Other foreign countries such as Malaysia, Singapore and Thailand had been sometimes passed by in addition to Hanoi (77 samples), Ho Chi Minh (34 samples), Hue (30 samples) and other Vietnamese tourism spots.

Over 70 % of the all Victnamese samples had visited other places on vacation, although Ha Long bay area was a single destination for 66 % (61 samples) of the tourists coming from the north part. The places depend on their residences, but more popular places for vacation are found to be Hanoi (51 samples), Hai Phong (14 samples) and Hoa Lu in Ninh Binh province.

Q8. Places where you will visit on vacation in 10 days after leaving Ha Long city? To this question, most foreign samples also answered to visit Hanoi (43 samples), Ho Chi Minh (38 samples) and so on for recreational purpose. It confirms that foreign tourists have multiple destinations, not only Ha Long bay area.

As for the Vietnamese samples, it is again confirmed that a major part (70 out of 92 samples) of the north-part tourists came only to Ha Long bay area on vacation although 11 samples still planned to move to Mong Cai after Ha Long city. On the other hand, overall statistics shows that about 52 % (75 samples) of the total Vietnamese samples were scheduled to go to other places following Ha Long city, including Mong Cai (38 samples) and Hanoi (19 samples).

### Q9. Number of your household members including you?

99 % of the foreign tourists samples have family members less than 7. Average number of family members per household (HH) of the foreign tourists is calculated as 3.5 persons/HH. 94 % of the Victnamese tourists samples have family members less than 7. Average number of family members per household (HH) of the Victnamese tourists is calculated as 4.6 persons/HH, as below.

Number of Tourists' Household Members

Tourists	Foreign		Vietnamese		
No. of HH Members	No. of Samples	%	No. of Samples	%	
1 ~ 3 persons/HH	75	52	16	11	
4 ~ 6 persons/HH	68	47	120	83	
7 ~ 10 persons/HH	0	0	8	6	
More than 10 persons/HH	2	1	<u>i</u>	0	
Total	145	100	145	100	
Average IIII Members	3.5 persons/HH		4.6 persons / H	11	

Q10. Amount of your household's monthly total income (before tax payment) on average during the last 12 months?

Approximately a half of the foreign tourists obtain income less than US\$ 2,000/HH/month, while another half's income is US\$ 2,000 or more/HH/month. Average monthly income of the foreign tourists is US\$ 2,451/HH/month and US\$ 700/person/month by dividing with the average number of family members of 3.5 persons/HH (Q.9), which is equivalent to over 20 times of average monthly wage rate in Quang Ninh province (VND 400,000/person/month). Average monthly income of the Victnamese tourists is VND 3,434,000 (US\$ 260) /HH/month and VND 747,000 (US\$ 57) /person/month by dividing with the average number of family members of 4.6 persons/HH (Q.9), which is nearly twice as much as the average monthly wage.

Average Monthly Income of Tourist Household

Tourist	Monthly	Income / IIII	Monthly In-	come / person	Ratio of Per-bead
L	US\$/HH	VND/IIII	US\$/person	VND/person	Income to QN Wage
Foreign	2,451	32,353,200	700	9,240,000	23.1 times
Victnamese	260	3,434,000	57	747,000	1.9 times

Note: Exchange rate = VND 13,200 / US\$

In accompany with future economic activities and urban development, environment of the Ha Long city and the Ha Long bay will be degraded, conserved or improved with proper environmental protection measures. Please envisage the following three future images in your mind, and continue to answer the questions below:

### Image A: Very polluted

Ha Long city will be very much polluted by water contamination, air pollution, unmanaged solid waste, etc. so that Ha Long bay's water quality and environment becomes as bad as being improper for bathing, cruising and commercial fishery at all.

### Image B: No change - conserved as now

Essential anti-pollution measures will be carried out to let present environmental conditions remain at the same level as now, so that you can enjoy the similar services from the Ha Long bay tour like now.

### Image C: Slightly cleaner water

Full-scale anti-pollution and conservation measures will be implemented, and environmental quality of the Ha Long bay could be a little bit more improved than now providing clear water for bathing and cruising.

- Q11. In order to prevent severely degraded environmental situation of Ha Long bay (Image A described in the above), how many percentages to your household's monthly income will you donate every year?
- Q12. In order to conserve the present environmental situation of Ha Long bay (Image B described in the above), how many percentages to your household's monthly income will you donate every year?
- Q13. In order to realize slightly better environmental situation of Ha Long bay (Image C described in the above), how many percentages to your household's monthly income will you donate every year?

As tabulated below, more than two thirds of the sample foreign tourists have some willingness-to-pay (WTP) for any conservation levels (Images A ~ C) of Ha Long bay area's environment in the future. More than three quarters of the sample Vietnamese tourists also have some WTP for conservation levels (Images B and C), although the samples less than 50 % like to donate for Image-A level. It means that these tourists expressing WTP clearly feel some value on aesthetic and recreational amenity of the area.

Willingness-To-Pay (WTP) Ratio to Tourists' Income

Percentage to	ſ				Numbe	r of To	urist Sa	mples				
Monthly Income	(	)11 (In	rage A)				iage B)		(	)13 (In	rage C	)
per Tourist Household	FN	%	VN	%	FN	%	VN	%	FN	%	VN	%
0.0 % (no interest)	51	35	76	52	37	26	36	25	31	21	23	16
Less than 0.1 %	27	19	34	23	29	20	38_	26	22	15	40	28_
0.1 ~ 0.5 %	32	22	25	17	43	30	44	30	38	26	40	28
0.6 ~ 1.0 %	15	10	8	6	12	8	13	9	19	13	17	12
More than 1.0 %	20	14	2	1	24	17	14	10	35	24	25	17
Total	145	100	145	100	145	100	145	100	145	100	145	100

Note: FN = Foreign tourists, and VN = Victnamese tourists

Image B is most approximate to goals of the proposed EMP (Scenario II), so that the tourists' WTP for environmental conservation of the Ha Long bay area was calculated based on the answers to Q.12 in order to estimate benefit from conserved aesthetic and recreational amenity, as follows:

- 1) Average WTP of tourists for whole value (US\$/HH/year)
  - =  $[Total of (Q10 \times Q12)] / 145$  samples
- 2) Average WTP of tourists for whole value (US\$/person/year) = 1) / Q9
- 3) Average WTP of tourists for non-use value (US\$/HH/year)
  - = Average of (Q10 x Q12) for samples choosing Item 2 or 3 in Q14
- 4) Average WTP of tourists for non-use value (US\$/person/year) = 3) / Q9
- 5) Average WTP of tourists for use value (US\$/HH/year)
  - = Average of (Q10 x Q12) for samples choosing Item 1 in Q14
- 6) Average WTP of tourists for use vale (US\$/person/year) = 5) / Q9

WTP as a whole of the interviewed foreign tourists is about 10 times as much as the Victnamese tourists because of their higher income level. The foreign samples express use value of twice as much as the non-use value on the environmental conservation of the bay, while the Victnamese WTP for non-use and use is almost the same level.

Average WTP of Tourists for Conservation of Ha Long Bay (Scenario II)

Tourist	Whole Wil	(US\$/year)	Non-use Wf	P (US\$/year)	Use WTP (US\$/year)		
l Carist	1) per 11H	2) per head	3) per IIII	4) per head	5) per HH	6) per head	
7) Foreign	10.9	3.1	6.2	1.8	12.5	3.6	
8) National	1.4	0.3	1.2	0.3	1.0	0.2	
7)/8)	8 times	10 times	5 times	6 times	13 times	18 times	

Note: The Whole WIP is weighted average of the Non-use WIP and the Use WIP, not total WIP.

## Q14. On your future vacation opportunities, you will?

Possibility for Tourists to Visit the Bay Again

Possibility Item	Number of Samples					
	Foreign	%	Vietnamese	9		
1. most fikely visit again Ha Long city.	107	74	95	66_		
2. least likely visit again Ha Long city.	12	8	11	0		
3. visit other places rather than Ha Long city.	26	18	49	34		
Total	145	100	145	100		

Nearly three quarters of the foreign tourists and two thirds of the Vietnamese tourists are possible repeaters to Ha long bay. The tourists from the middle and south parts of Vietnam expressed more possibilities of repetition rather than those from the north part, in terms of sample ratio.

And here it is assumed that tourists both showing any WTP in Q11 ~ 13 and choosing Item 2 or 3 in Q14 put some non-use value on Ha Long bay's environment, while tourists both showing any WTP in Q11 ~ 13 and choosing Item 1 in Q14 feel use value. Combining data of Q12 and Q14 under this assumption, WTP-holders ratios—can be calculated for non-use and use values as shown in the next. Both the foreign and Vietnamese tourists who put use value on the bay are more than those putting non-use value. From this table, it is also recognized that three quarters of the whole interviewed tourists feel some benefit from environmental conservation of the bay area.

Ratio of WTP Holders in Tourists for Environmental Conservation

Tourist	Foreign	Vietnamese
1. Ratio expressing WTP for Non-use Value (%)	14	21
2. Ratio expressing WFP for Use Value (%)	61	53
1+2. Total Ratio expressing WIP either for Non-use or Use Value (%)	75	74

# Q15. Your general impression on Ha Long bay?

Points for each aspect in the questionnaire are regarded as "bad impression" for  $1 \sim 3$ , "acceptable level" for  $4 \sim 7$  and "good impression" for  $8 \sim 10$ . The table below shows ratios of these impressions of foreign tourists by aspect of the bay area.

Aspects more related to the proposed EMP activities are No.1, 2 and 9 ~ 12. At least 80 % of the foreign tourists and 89 % of the Vietnamese tourists have acceptable or good impression on these 6 key aspects of Ha Long bay area. Therefore, the EMP conservation

scenario (II) rather than improvement scenario (III) of the present environment is quite appropriate from the major viewpoints of foreign tourists.

It is also noted that about 40 % of Vietnamese samples complain on high price level in Ha Long bay area.

General Impression of Tourists on Ha Long Bay Area

No.   Aspects of Ha Long Bay		% of "Bad"		% of "Acceptable"		% of "Good"		Total
		FN	VN	FN	VN	FN	VN	200/2
1	Beach	20	11	45	68	35	21	100
2	Water in the bay	15	4	43	59	46	37	100
3	Services in restaurants	6	2	42	86	52	12	100
4	Food in restaurants	3	3	43	54	53	43	100
5	Price level	6	39	65	61	38	1	100
6	People's hospitality	3	3	40	80	57	17	100
7	Transportation to Ha Long	36	26	56	72	17	2	100
8	Boat service in the bay	6	7	56	83	39	10	100
9	Cleanliness of the city	14	3	68	94	17	2	100
10	Noise and air	20	10	59	86	21	5	100
11	Scenery in the city	7	6	54	65	39	29	100
12	Scenery in the bay	1	1	11	6	88	93	100

Note: FN = Foreign tourists, and VN = Vietnamese tourists

# Q16. What is your favorite point of the landscape in Ha Long Bay?

Among various points presented in the questionnaire, the following 4 points were felt highly favorite by over 40 % of both the foreign and Vietnamese tourists. These 4 points should be especially considered in the proposed conservation plan for landscape management. And it is interesting that a sample tourist coming from U.S.A. expressed favor to coal mine, although this case might be quite exceptional.

Favorite Points of Ha Long Landscape to Tourists

Favorite Points	Foreign Tou	rists	Victnamese Tourists		
<u> </u>	No. of Samples	% (/145)	No. of Samples	% (/145)	
Shape of islands	104	72	125	86	
Grottos (caves)	90	62	124	86	
Combination of islands	60	41	107	74	
Scene of fishing boats	60	41	105	72	

### O17. Do you have any dissatisfaction about the landscape of Ha Long bay?

65 % (94 samples) of the foreign tourists as well as 80 % (116 samples) expressed dissatisfaction about the landscape of Ha Long bay. These rates are very contradictory compared with Q15's ratios of "bad impression" on beaches (No.1), water in the bay (No.2), cleanliness of the city (No.9), scenery in the city (No.11) and scenery in the bay

(No.12), all of which are 20 % and 11 % at most for foreign and Vietnamese samples respectively. So it could be assumed that some part of "acceptable impression" ratios of Q15 were reflected on these figures of 65 and 80 %.

### Q18. If yes to Q17, what is the point that you feel dissatisfied?

Among various dissatisfactory points, the followings were pointed out by over 40 % of both the dissatisfied 94 foreign and 116 Vietnamese tourists in Q17. These 4 major points have to be duly considered in environmental conservation or improvement planning under the proposed EMP.

Dissatisfactory Points of Ha Long Landscape to Tourists

Dissatisfactory Points	Foreign Tourists		Vietnamese Tourists		
	No. of Samples	% (/94)	No. of Samples	% (/ 116)	
Floating garbage has increased.	53	57	102	88	
Sand beach has become dirty.	40	43	82	71	
Water clearness has degraded.	60	64	70	60	
Oil slick has increased.	40	43	48	41	

### (2) Local residents in Quang Ninh province (215 samples)

### Q1. Your address?

Numbers of interviewed samples are allocated into 13 city, towns or districts all over the province, as described in Section 10.2.2.

### Q2. Number of your household members including you?

90 % of the local samples have family members between 3 and 6. Number of family members is averaged to 4.2 persons/household (HH).

### Q3. Main occupations your household members live on?

Top 4 major occupations of the samples' households are as follows:

Occupation	No. of Samples	% (/215)	
Public civil servant	81	38	
Agriculture/Forestry	73	34	
Private services	56	26	
Coal-mining/processing industry	41	19	

Q4. Amount of your household's monthly total income (before tax payment) on average during the last 12 months?

91 % of the local samples get income less than VND 2000,000/HH/month. Average income of the samples is approximately VND 1,049,000 (US\$ 79) /HH/month or VND 250,000 (US\$ 19) /person/month by dividing with the average number of family members of 4.2 persons/HH (Q2).

Q5. You or your household members have visited the Ha Long city or Ha Long bay for recreational purpose, not for working?

Frequency	No. of Samples	%
1. Never	20	9
2. Less than one time a year	120	56
3. 2 ~ 5 times a year	71	33
4~6. More than 5 times a year	4	2
Total	215	100

65 % (Item 1 + Item 2) of the sample local residents have not been to Ha long bay for recreational purpose on an annual basis. And here it is assumed that local residents both showing any WTP in Q8 ~ 10 and choosing Items 3 ~ 6 in Q5 feel use value while local residents both showing any WTP in Q8 ~ 10 and choosing Item 1 or 2 in Q5 put some non-use value on Ha Long bay's environment. Combining data of Q9 and Q5 under this assumption, 30 % and 53 % of local residents are calculated to express use value and non-use value respectively.

Q6. How do you usually come to the coast of the Ha Long city?

170 sample residents (79 %) come to the city by local line-bus, hired car or private motorbike, while 19 samples use boats or ships.

Q7. Average stay-duration when you visit the Ha Long city or Ha Long Bay on vacation? 106 samples answered that they stayed at least one over-night, while 85 samples stay less than 10 hours/visit.

Q8. In order to prevent severely degraded environmental situation of Ha Long bay (Image A), how many percentages to your household's monthly income will you donate every year?

Q9. In order to conserve the present environmental situation of Ha Long bay (Image B), how many percentages to your household's monthly income will you donate every year?

Q10. In order to realize slightly better environmental situation of Ha Long bay (Image C), how many percentages to your household's monthly income will you donate every year? As tabulated below, more than 60% of the sample local residents have some WTP for any conservation levels (Images A ~ C) of Ha Long bay area's environment in the future. These local residents expressing WTP clearly feel some value on aesthetic and recreational amenity of the area.

Percentage of	Number of Samples						
Monthly Income/IIII	Q8 (Image A)	%	Q9 (Image B)	%	Q10 (Image C)	%	
0.0 % (no interest)	39	18	35	16	23	11	
Less than 0.1 %	42	20	45	21	42	20	
0.1 ~ 0.5 %	88	41	89	41	96	45	
0.6 ~ 1.0 %	43	20	42	20	42	20	
More than 1.0 %	3	1	4	2	12	6_	
Total	215	100	215	100	215	100	

Image B is most approximate to goals of the proposed EMP (Scenario II), so that local residents' WTP for environmental conservation of the Ha Long bay area was calculated based on the answers to Q9 in order to estimate benefit from conserved aesthetic and recreational amenity, as follows:

- 1) Average WTP of local residents = [Total of (Q4 x Q9 / Q2)] / 215 samples = US\$ 0.1 /resident/year
- 2) Average WTP of local residents as non-use value
  - = Average of (Q4 x Q9) for samples choosing Item 1 or 2 in Q5
  - = US\$ 0.3 /HH/year
- 3) Average WTP of local residents for use value
  - = Average of (Q4 x Q9) for samples choosing Items  $3 \sim 6$  in Q5
  - = US\$ 1.1 /HH/year
- Q11. Is there any good landscape that you willingly watch near your residence? Major places having better landscape are ranked as below:

Places (city/town/district)	No. of Samples
1. Yen Tu (Uong Bi district)	63
2. Tra Co (Mong Cai district)	50
3. Quan Lan island (Van Don district)	30
4. Qua Ong pagoda (Cam Pha town)	20
5. Long Tien pagoda & Bai Tho limestone (Ha Long city)	19
6. Vang island (Van Dong district)	16
7. Quynh pagoda & An Sinh temple (Dong Trieu district)	7

Q12. What is your favorite point about above-mentioned places?

Major favorite points are classified into mountain, trees & woods, beach, spacious view, composition of view, historical heritage and so on.

