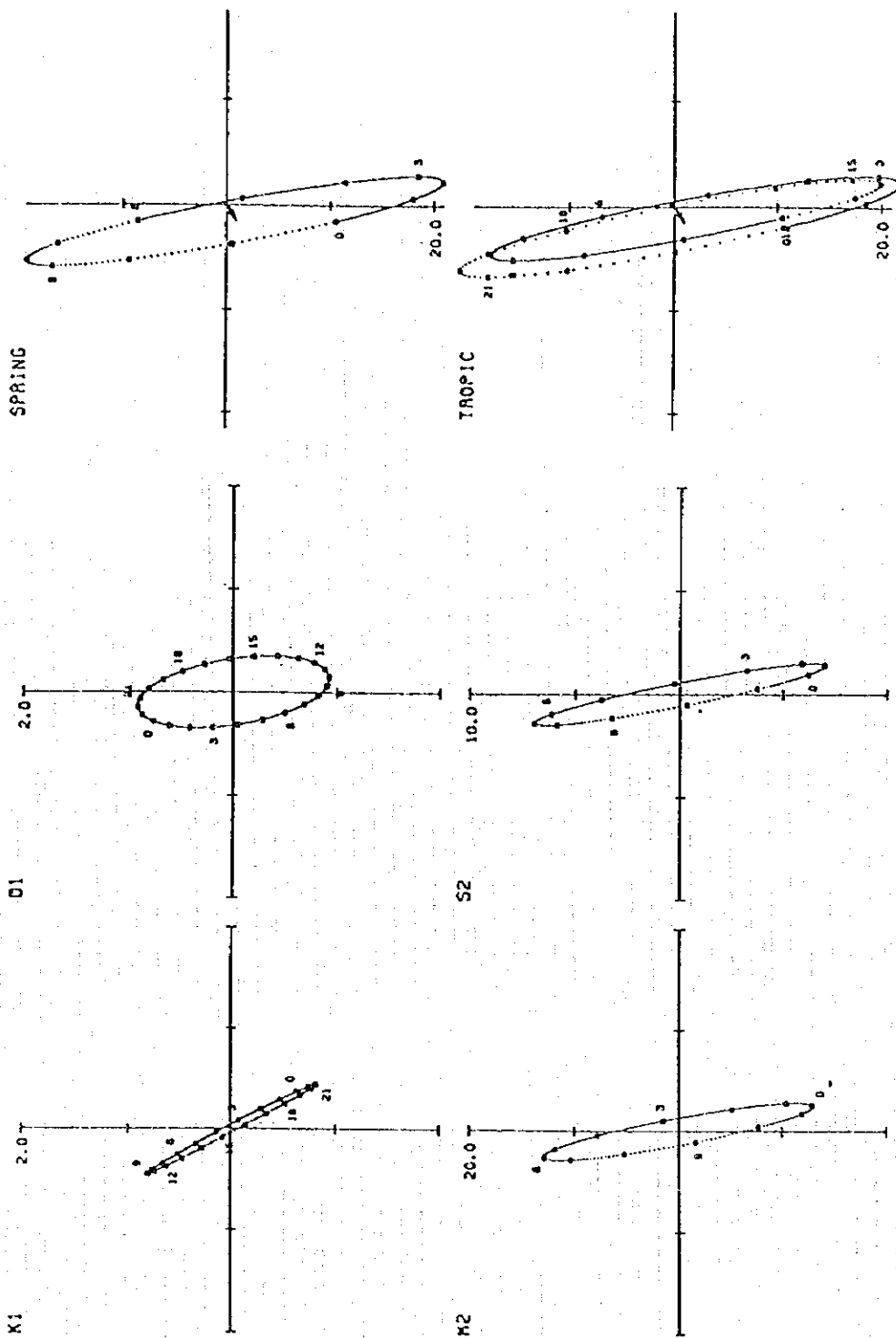


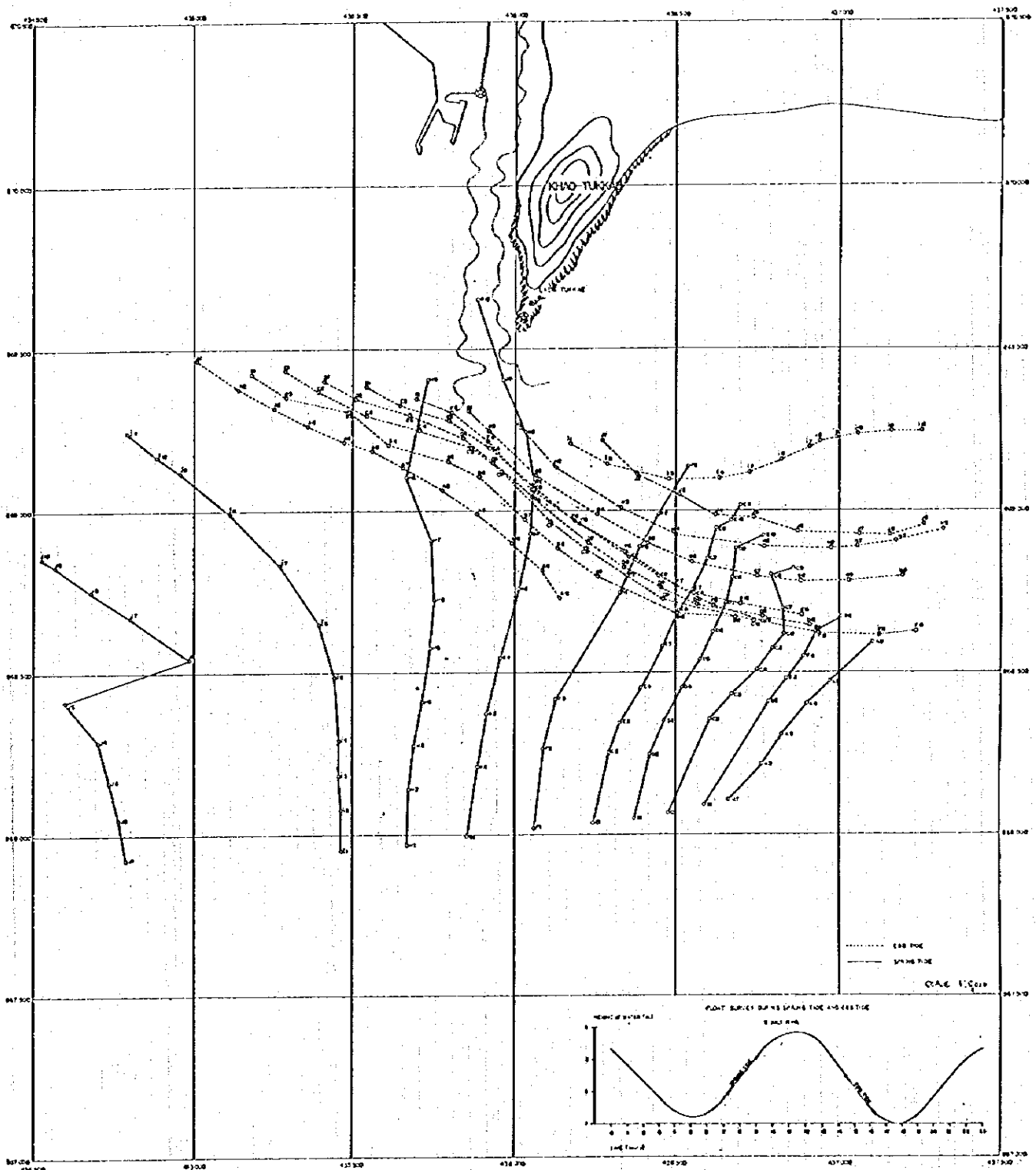
## **7. Current Measurement**

Observation Period : 27 June, 1996 ~ 12 July 1996

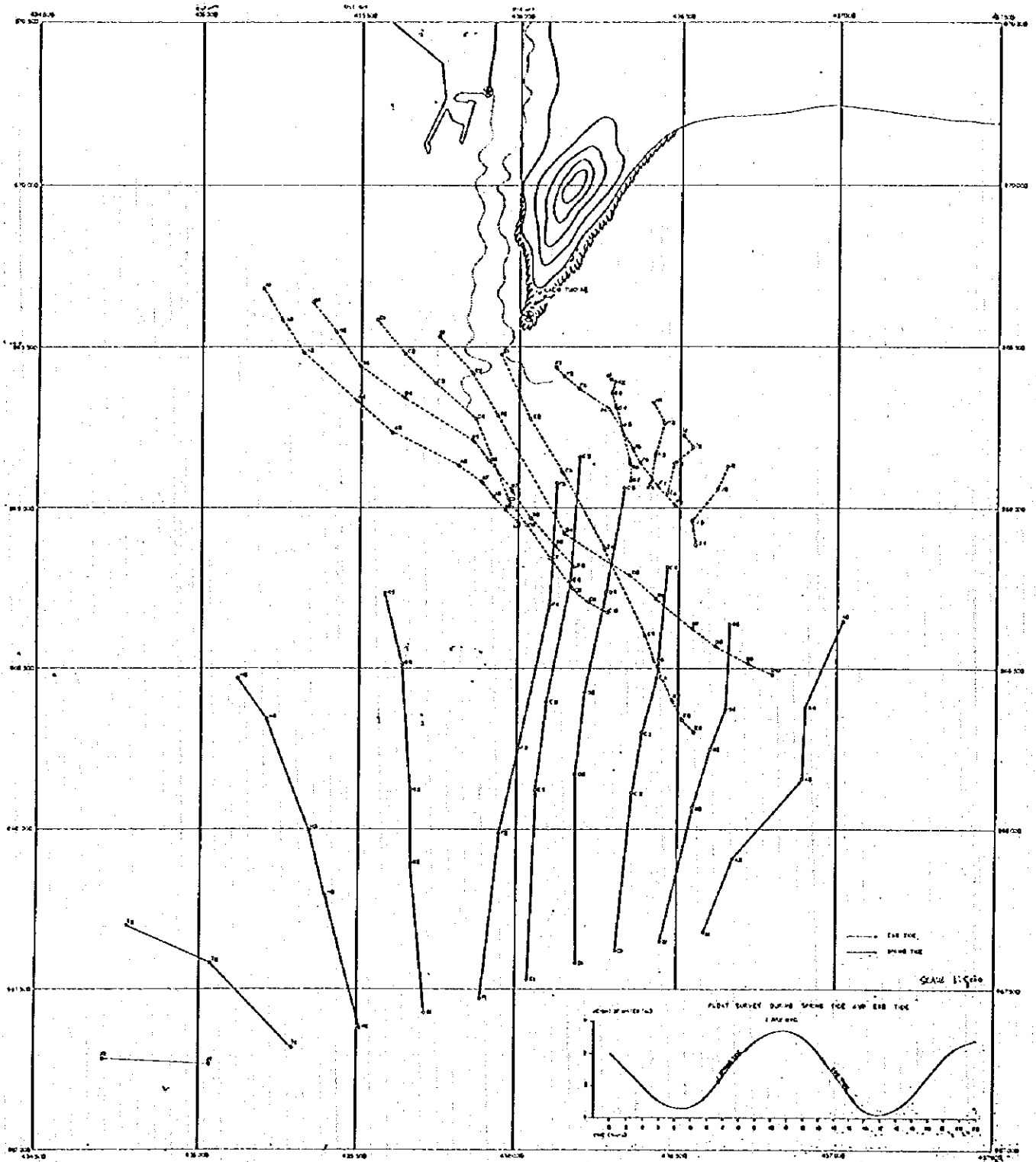


Current Ellipse

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Float Tracking (1)



Float Tracking (2)

**8. Environmental Data for the EIA , and Environmental Impact,  
Mitigation and Monitoring Plan**

**Table A4.16 Animals Observed in the Study Area**

Local Name	Scientific Name	Status
<b>BIRDS</b>		
<b>Family Accipitridae</b>		
1. Brahminy Kite	<i>Haliastur indus</i>	common resident
<b>Family Alcedinidae</b>		
2. White-throated Kingfisher	<i>Haleyon smymensis</i>	Very common resident
<b>Family Ardeidae</b>		
3. Cattle Egret	<i>Bubulcus idis</i>	Fairly common resident
<b>Family Artiodactyla</b>		
4. Mouse deer	<i>Tragulus javanicus</i>	Rare resident
<b>Family Batrachostomidae</b>		
5. Large-tailed Nightjar	<i>Caprimulgus macrurus</i>	Common resident
<b>Family Chloropsidae</b>		
6. Greater Green Leafbird	<i>Chloropsis sonnerati</i>	Common resident
<b>Family Columbidae</b>		
7. Spotted Dove	<i>Streptopelia chinensis</i>	Very common resident
8. Thick-billed Pigeon	<i>Treron curvirostra</i>	Common resident
<b>Family Coraciidae</b>		
9. Indian Roller	<i>Coracias benghalensis</i>	Very common resident
<b>Family Corvidae</b>		
10. Large-billed Crow	<i>Corvus macrorhynchos</i>	Common resident
<b>Family Cuculidae</b>		
11. Greater Coucal	<i>Centropus sunensis</i>	Very common resident
12. Banded Bay Cuckoo	<i>Cacomantis Sonneratii</i>	Uncommon resident
<b>Family Dicaeidae</b>		
13. Yellow-vented Flowerpecker	<i>Dicaeum chrysorrheum</i>	Common resident
<b>Family Dicruridae</b>		
14. Bronzed Drongo	<i>Dierurus aeneus</i>	Common resident
<b>Family Laniidae</b>		
15. Brown Shrike	<i>Lanius cristatus</i>	Very common (winter visitor)
<b>Family Megalaimidae</b>		
16. Red-throated Barbet	<i>Megalaima</i>	Rare resident
<b>Family Meropidae</b>		
17. Chestnut-headed Bee-eater	<i>Merops lasehenaulti</i>	Common resident
<b>Family Motacillidae</b>		
18. Richard's Pipit	<i>Anthus novaeseelandiae</i>	Very common (winter visitor)

**Table A4.14 The plant species founded in Koh Si Rae**

No.	Local Name	Scientific Name
1	Yaang Paaraa	<i>Hevea brasiliensis</i>
2	Kaa Yee (Cashew Nut Tree)	<i>Anacardium occidentale</i>
3	Sato	<i>Parkia speciosa</i>
4	Khanun	<i>Artocarpus heterophyllus</i>
5	Turian (Durian)	<i>Durio zibethinus</i>
6	Niang	<i>Archidendron jiringa</i>
7	Khanun Paan	<i>Artocarpus rigidus</i>
8	Non	<i>Vitex pinnata</i>
9	Kamcham	<i>Lepisanthes rubiginosa</i>
10	Ma Fai Kaa	<i>Baccaurea parvilora</i>
11	Maduea Uthumphon	<i>Ficus racemosa</i>
12	Riang	<i>Pakia timoriana</i>
13	Champaada	<i>Artocarpus integer</i>
14	Mamuang (Mango Tree)	<i>Mangifera indica</i>
15	Ma Klam Ton	<i>Adenantha pavonina</i>
16	Non See	<i>Peltophorum pterocarpum</i>
17	Rak Paa	<i>Semecarpus curtisii</i>
18	Phe Kaa (Broken Bones)	<i>Oroxylum indicum</i>
19	Maak (Betet Nut Palm)	<i>Areca catechu</i>
20	Waa Naa	<i>Eugenia pseudosubtilis</i>
21	Kradong Daeng	<i>Bhesa robusta</i>
22	Chammaliang	<i>Lepisanthes fruticosa</i>
23	Ko Muu	<i>Castanopsis javanica</i>
24	Tabaek	<i>Lagerstroemia calyculata</i>
25	Sathon Rok	<i>Elaeocarpus robustus</i>
26	Kameham	<i>Lepisanthes rubiginosa</i>
27	Yo Paa	<i>Morinda elliptica</i>
28	Ma Kok (Hoq Plum)	<i>Spondias pinnata</i>
29	Khai Nao	<i>Vitex glabrata</i>
30	Ka Oh	<i>Artocarpus elasticus</i>
31	Yuea Chong	<i>Sapium discolor</i>
32	Yaang Manmuu	<i>Dipterocarpus Kerrii</i>
33	Ma Phraao (Coconut Palm)	<i>Cocos nucifera</i>

Source : SEATEC/BEST, 1997

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Table A4.16 (Cont'd)

Local Name	Scientific Name	Status
<b>Family Nectariniidae</b>		
19. Plain Sunbird	<i>Anthreptes simplex</i>	Fairly common resident
20. Olive-backed Sunbird	<i>Nectarinia jugularis</i>	Very common resident
22. Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>	Common resident
23. Black-headed Bulbul	<i>Pycnonotus atriceps</i>	Common resident
<b>Family Scluridae</b>		
24. Squirrels	<i>Sciurides</i>	Common resident
<b>Family Sturnidae</b>		
25. Common Myna	<i>Aeridotheres tristis</i>	Very common resident
26. Hill Myna	<i>Gracula religiosa</i>	Uncommon to fairly common
<b>Family Timaliidae</b>		
27. Brown Fulvetta	<i>Aloippe brunneicauda</i>	Fairly common resident
<b>MAMMAL</b>		
<b>Family Viverridae</b>		
28. Civet	<i>Viverra zibetha</i>	Rare resident
<b>Family Lorisidae</b>		
29. Slow Loris	<i>Nycticebus coucang</i>	Rare resident
<b>Family Tragulidae</b>		
30. Mouse Deer	<i>Tragulus javanicus</i>	Rare resident
<b>Family Cercopithecidae</b>		
31. Crab-Eating macaque	<i>Macaca fascicularis</i>	Rare resident
<b>Family Manidae</b>		
32. Pangolin	<i>Manis javanica</i>	Rare resident
<b>Family Pteropodidae</b>		
33. Bat	<i>Pteropus vampyrus</i>	Common resident
<b>Family Scluridae</b>		
34. Squirrels	<i>Callosciurus flavimanus</i>	Rare resident
<b>REPTILES</b>		
<b>Family Pythoridae</b>		
35. Molorus	<i>Python reticulatus</i>	Rare resident
<b>Family Varanidae</b>		
36. Varanus	<i>Varanus salvator</i>	Rare resident
37. Varanus	<i>Varanus bengalensis</i>	Rare resident

Source : SEATEC/BEST, 1997



**Table A4.17 Mangrove Species Found In Study Area**

Species	Local name	Family	Transect		
			I	II	III
<i>Acanthus ilicifolius</i>	Ngueak plaamo namngoen	Acanthaceae	o	o	o
<i>Avicennia officinalis</i>	Samae dam	Avicenniaceae	x	o	o
<i>Bruguiera cylindrica</i>	Thua khao	Rhizophoraceae	o	o	o
<i>Ceriops tagal</i>	Prong daeng		o	o	o
<i>Clerodendrum inerme</i>	Sammangaa	Verbenaceae	o	o	o
<i>Derris indica</i>	Yee nam	Papilionaceae	o	x	x
<i>Derris trifoliata</i>	Thopthaep nam		o	o	o
<i>Excoecaria agallocha</i>	Taatum thale	Euphorbiaceae	o	o	x
<i>Finlaysonia maritima</i>	Kra phoh plaa	Periplocaceae	o	o	o
<i>Hibiscus tiliaceus</i>	Po thale	Malvaceae	x	o	x
<i>Nypa fruticans</i>	Chaak	Palmae	o	o	o
<i>Phoenix paludosa</i>	Peng		o	x	x
<i>Pluchea indica</i>	Khluu	Compositae	o	o	x
<i>Rhizophora apiculata</i>	Kongkang-bilek	Rhizophoraceae	o	o	o
<i>R. mucronata</i>	Kongkang-bayai		o	x	x
<i>Sesuvium portulacastrum</i>	Phak bia thale	Aizoaceae	o	o	o
<i>Wedelia biflora</i>	Phak khraat thale	Compositae	o	o	o
<i>Xylocarpus granatum</i>	Ta buun khao	Meliaceae	o	o	o
<i>Xylocarpus moluccensis</i>	Ta buun dam		o	o	o

Source : SEATEC/BEST, 1997

o = present ; x = absent

**Table A4.18 Stand Density and Importance Value of Mangrove Species in the Study Area**

Species	density			average	importance value		
	(stem/ha)				(% )		
	I	II	III		I	II	III
1. <i>Rhizophora apiculata</i>	888	473	542	634	235.8	138.4	89.5
2. <i>Xylocarpus moluccensis</i>	100	313	628	347	43.7	91.8	82.1
3. <i>Xylocarpus granatum</i>	12	7	36	18	9.1	8.0	5.6
4. <i>Bruguiera cylindrica</i>	6	27	43	25	4.0	11.4	28.5
5. <i>Rhizophora mucronata</i>	6	0	0	2	3.8	0	0
6. <i>Avicennia officinalis</i>	0	40	221	87	0	21.6	49.2
7. <i>Ceriops tagal</i>	6	87	114	69	3.6	28.7	45.0
<b>Total</b>	<b>1018</b>	<b>947</b>	<b>1584</b>	<b>1183</b>	<b>300</b>	<b>300</b>	<b>300</b>

Source : SEATEC / BEST, 1997

**Table A4.19 Mangrove Sapling and Seedling Density In the Study Area**

Species	density (stem/ha)							
	Sapling				Seedling			
	I	II	III	average	I	II	III	average
1. <i>Rhizophora apiculata</i>	1647	707	729	1028	6980	200	1540	2907
2. <i>Xylocarpus moluccensis</i>	59	220	207	162	0	20	90	37
3. <i>Xylocarpus granatum</i>	29	32	0	20	0	0	0	0
4. <i>Bruguiera cylindrica</i>	0	47	336	128	0	1600	1560	1053
5. <i>Rhizophora mucronata</i>	0	20	50	23	0	0	0	0
6. <i>Avicennia officinalis</i>	0	0	0	0	0	8	90	57
7. <i>Ceriops tagal</i>	0	127	421	183	10	10	90	37
<b>Total</b>	<b>1735</b>	<b>1153</b>	<b>1743</b>	<b>1544</b>	<b>6990</b>	<b>1910</b>	<b>3370</b>	<b>4093</b>

Source : SEATEC / BEST, 1997

Table A4.20 Mammals, Birds, Reptiles and Amphibians observed in the study area (Mangrove Ecosystem)

Species English Name	Scientific Name	Habitat types Mangrove Laem Tukkae	Mudflat Ban Tha Chin	Other sandy shore woodland	Status in Thailand	Occurrence (seasonality)	Protection by WAPPA 2535
<b>Mammals</b>							
House Shrew	<i>Crocidura murina</i>	interview	-	-	no data	commensal	-
Grey-bellied Squirrel	<i>Callosciurus caniceps</i>	-	-	1, 4	no data	localised	-
Black Giant Squirrel	<i>Raiufa bicolor</i>	-	-	2	uncommon	widespread	1
Water Rat	<i>Rattus spec.</i>	likely present	1	likely present	-	-	-
Bat (unidentified)	-	>10, >10	-	present	-	-	probably 1
Crab-eating macaque	<i>Macaca fascicularis</i>	15-20	-	-	uncommon	localised	1
<b>Birds</b>							
Chinese Pond-Heron	<i>Ardeola bacchus</i>	-	3	-	very common	winter visitor	1
Chinese Egret	<i>Egretta euphotes</i>	-	2, 5	-	very rare	winter visitor	1
Great Egret	<i>Egretta alba</i>	-	4, 4	-	common	winter visitor	1
Little Egret	<i>Egretta garzetta</i>	-	>10, >10, >10	-	common	winter visitor	1
Little Heron	<i>Butorides striatus</i>	1, 1	1, 3, 1	-	common	resident	1
Black Bittern	<i>Dupetor flavicollis</i>	1	-	-	common	winter visitor	1
or Yellow Bittern	or <i>Ixobrychus sinensis</i>	-	-	-	very common	resident	1
Lesser Whistling Duck	<i>Dendrocygna javanica</i>	2	-	-	common resident & winter visitor	2	2
Brahminy Kite	<i>Haliastur indus</i>	>5, >5, >5	>5, >5, >5	2, 2	common	resident	1
Pacific Golden Plover	<i>Pluvialis fulva</i>	-	1, 2	-	very common	winter visitor	1
or Grey Plover	<i>Pluvialis squatarola</i>	-	-	-	common	winter visitor	1
Little Ringed Plover	<i>Charadrius dubius</i>	-	6, >10	-	common	winter visitor	1
Kentish Plover	<i>Charadrius alexandrinus</i>	-	>10	-	common	winter visitor	1
Malaysian Plover	<i>Charadrius peronii</i>	-	probably present	-	localised, uncommon	resident	1
Lesser Sand Plover	<i>Charadrius mongolus</i>	-	>100, >100	-	very common	winter visitor	1
Greater Sand Plover	<i>Charadrius leschenaultii</i>	-	>10, >100	-	common	winter visitor	1
Whimbrel	<i>Numenius phaeopus</i>	-	1, 2, 1	-	common	winter visitor	2

Table A4.20 (cont'd)

Species English Name	Scientific Name	Habitat types Mangrove Laem Tukkao	Mudflat Ban Tha Chin	Other sandy shore, woodland	Status in Thailand	Occurrence (seasonality)	Protection by WARPA 2535
Wood Sandpiper	<i>Tringa glareola</i>		1		very common	winter visitor	1
Common Redshank	<i>Tringa totanus</i>		3, 2		very common	winter visitor	1
Common Greenshank	<i>Tringa nebularia</i>		3 to 5		common	winter visitor	1
Common Sandpiper	<i>Actitis hypoleucos</i>	1, >10	>100, >100	1, 1	very common	winter visitor	1
Terek Sandpiper	<i>Xenus cinereus</i>		>10, 2		fairly common	winter visitor	?
Little Tern	<i>Sterna alifrons</i>		2, 12		common	resident	1
Thick-billed Pigeon	<i>Treron curvirostra</i>	6, 1			common	resident	2
Green Imperial Pigeon *	<i>Ducula aenea</i>	3			<b>uncommon, declining</b>	resident	2
Spotted Dove	<i>Streptopelia chinensis</i>	5, 3, 4			very common	resident	1
Zebra Dove	<i>Geopelia striata</i>	1			common	commensal resident	1
Greater Coucal	<i>Centropus sinensis</i>			1 (call)	very common	resident	1
Common Kingfisher	<i>Alcedo atthis</i>		2		very common	winter visitor	1
Coppersmith Barbet	<i>Megalaima haemacephala</i>			1	very common	winter visitor	1
Swiftlet (Unidentified)	<i>Aerodramus species</i>		>10, >10	>10	very common	resident	1
White-bellied Swiftlet *	<i>Collocalia esculenta</i>	2			<b>uncommon or rare</b>	resident	1
Asian Palm-Swift	<i>Cypsiurus balasiensis</i>		>10, >10	>10, >10	very common	resident	1
Pacific Swift ?	<i>Apus pacificus</i>	>5			fairly common	winter visitor	1
House Swift	<i>Apus affinis</i>	>5, >5		>10	common	resident	1
Barn Swallow	<i>Hirundo rustica</i>	>10, >5	>10, >10	>10	very common	winter visitor	1
Yellow wagtail	<i>Motacilla flava</i>	4, >5, 2, 1	1	>5	very common	winter visitor	1
Large Wood-Shrike	<i>Tephrodornis virgatus</i>			1	common	resident	1
Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>	1		3	common	resident	1
Olive-winged Bulbul	<i>Pycnonotus plumosus</i>				common	resident	1
Black Drongo	<i>Dicrurus macrocerus</i>			1	very common	winter visitor	1
Ashy Drongo ?	<i>Dicrurus leucophaeus</i>	1			common	resident	1
Large-billed Crow	<i>Corvus macrorhynchos</i>	2, 2, 1		2	common	commensal resident	1
Inomate Warbler ?	<i>Phylloscopus inornatus</i>			1	very common	winter visitor	?
(Oriental) Magpie-Robin	<i>Copsychus saularis</i>	2, 2		1	very common	resident	1
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>			1	very common	winter visitor	1

Table 4.20 (cont'd)

Species English Name	Scientific Name	Habitat types Mangrove Laem Tukkae	Mudflat Ban Tha Chin	Other sandy shore, woodland	Status in Thailand	Occurrence (seasonality)	Protection by WARPA 2535
Pied Fantail	<i>Rhipidura javanica</i>	1			very common	resident	-
Common Mynah	<i>Acridotheres tristis</i>	2, >5, >5		8, 1	very common	commensal resident	1
Brown-throated Sunbird	<i>Anthreptes malacensis</i>			1	very common	resident	1
Olive-backed Sunbird	<i>Nectarinia jugularis</i>			1	common	resident	1
Eurasian Tree-Sparrow	<i>Passer montanus</i>			>5, >5	very common	commensal resident	-
Scaly-breasted Munia	<i>Lonchura punctulata</i>			about 20	very common	resident	-
Unidentified Passeriform	--			2	-	-	-
Unidentified large bird	--	2			-	-	-
<b>Reptiles</b>							
House gecko	<i>Hemidactylus frenatus</i>	1			very common	widespread	-
Water Monitor	<i>Varanus salvator</i>	interview			fairly common	widespread	2
Striped Sun-Skink	<i>Mabuya multifasciata</i>	-			very common	widespread	-
File Snake	<i>Acrochordus granulatus</i>	1	likely present		fairly common	localised	-
Cantor's Water Snake	<i>Cantoria violacea</i>	possible	present (lit.)		very rare	localised	-
Dog-faced Water Snake	<i>Cerberus rhynchops</i>	2	present		uncommon	localised	-
Crab-eating Snake	<i>Ferdonia leucobalia</i>	possible	present (lit.)		rare	localised	-
Mangrove Pit Viper	<i>Trimeresurus purpureomaculatus</i>	interview			uncommon	localised	-
<b>Amphibians</b>							
Crab-eating Frog	<i>Rana cancrivora</i>	1	2		fairly common	localised	-

Notes: where more than one number is given for a species in a particular habitat, the numbers indicate the number of animals observed in separate observation sessions. New species records for Phuket province are indicated with an asterisk (\*).

Source : SEATEC / BEST, 1997

Table A4.22 Water Quality of Phuket Bay : September 1996

station	water depth (m)	depth (m)	temp (oc)	pH	Do (mg/l)	cond (mmole/cm <sup>2</sup> )	sali (ppt)	trans (m)
1	1.3	1.0	30.3	8.16	3.99	50.56	32.9	0.5
		1.2	30.4	8.16	3.90	50.45	32.9	
2	2.0	1.0	30.3	8.16	3.51	48.04	32.2	0.5
		1.5	30.2	8.16	3.40	50.24	32.8	
3	1.3	1.0	31.0	8.20	3.40	51.27	33.3	0.5
4	1.2	1.0	30.3	8.07	4.07	50.92	32.8	0.5
		1.2	30.2	8.03	4.12	50.87	33.2	
5	3.6	1.0	30.0	8.17	4.40	50.70	33.1	1.5
		2.0	29.5	8.10	5.60	51.01	33.4	
		3.0	29.4	8.09	5.45	51.06	33.4	
5		3.5	29.4	8.10	5.02	51.04	33.4	
6	3.8	1.0	29.7	8.96	5.05	51.04	33.2	2.0
		2.0	29.6	8.86	5.02	51.10	33.4	
		3.0	29.2	8.85	5.02	51.03	33.4	
		3.5	29.2	8.87	4.89	50.98	33.3	
7	1.8	1.0	29.8	8.16	5.15	50.95	33.3	1.0
		1.5	29.8	8.12	5.10	50.95	33.3	
8	6.1	1.0	29.6	8.47	5.07	50.97	33.3	2.5
		2.0	29.4	8.40	5.05	51.04	33.3	
		3.0	29.3	8.38	5.05	51.06	33.4	
		4.0	29.3	8.40	4.85	51.08	33.4	
		5.0	29.1	8.42	4.80	51.05	33.4	
		6.0	29.1	8.44	4.80	51.03	33.4	
Std. Water Quality (Pollution Control Dept., 1995)			No over 3°C from the nature	7.0-8.5	More than or as 4 ppm	No limit	Change from nature < 10%	Change from nature < 10%

Source : SEATEC / BEST, 1997

**Table A4.23 Water Quality of Phuket Bay : November 1996**

station	water depth (m)	depth (m)	temp (°c)	pH	Do (mg/l)	cond (mmole/cm <sup>3</sup> )	sall (ppt)	trans (m)
1	3.3	1.0	28.1	8.34	3.92	41.91	26.2	0.5
		2.0	28.2	8.39	3.48	43.97	27.5	
		3.0	28.2	8.43	3.40	43.52	27.9	
2	1.2	1.0	28.4	8.78	3.90	42.72	27.4	0.5
		1.2	28.4	8.95	3.82	43.62	27.7	
3	1.2	1.0	28.6	8.95	3.90	41.94	26.8	0.8
		1.2	28.6	8.90	3.82	43.84	27.4	
4	1.0	1.0	28.7	9.00	3.81	42.75	27.4	0.6
5	4.3	1.0	28.4	8.84	3.45	48.26	31.4	1.5
		2.0	28.4	8.84	3.40	48.38	31.4	
		3.0	28.4	8.79	3.40	48.45	31.5	
		4.0	28.5	8.81	3.20	48.83	31.7	
		4.3	28.5	8.39	3.20	48.79	31.7	
6	4.1	1.0	28.4	8.98	3.45	48.59	31.6	2.2
		2.0	28.4	8.93	3.40	48.59	31.6	
		3.0	28.4	8.92	3.40	48.62	31.6	
		4.0	28.4	8.94	3.38	48.55	31.6	
7	1.4	1.0	28.9	8.97	3.50	48.79	31.6	1.2
		1.4	28.9	8.95	3.50	48.81	31.6	
8	6.3	1.0	28.5	8.93	3.46	48.91	31.9	2.2
		2.0	28.4	8.91	3.40	48.97	31.9	
		3.0	28.4	8.91	3.35	49.04	31.9	
		4.0	28.4	8.91	3.30	49.04	31.9	
		5.0	28.4	8.92	3.31	49.02	31.9	
		6.0	28.4	8.90	3.20	49.04	31.9	
Std. Water Quality (Pollution Control Dept., 1995)			No over 3°C from the nature	7.0-8.5	More than or as 4 ppm	No limit	Change from nature < 10%	Change from nature < 10%

Source : SEATEC/BEST, 1997

Table A4.24 Nutrient Concentrations (mg/l) in Phuket Bay

Parameter	September 1996								November 1996									
	Station								Station									
	1	2	3	4	5	6	7	8	Average	1	2	3	4	5	6	7	8	Average
NO <sub>2</sub> (S)	0.0720	0.0696	0.0406	0.0288	0.0241	0.0312	0.0395	0.0223	0.0356	0.0377	0.0186	0.0217	0.0153	0.0069	0.0063	0.0134	0.0034	0.0139
(B)	.	.	.	.	0.0252	0.0235	.	0.0140	.	.	.	.	.	0.0087	0.0188	.	0.0015	.
NO <sub>3</sub> (S)	0.6479	0.5516	0.4641	0.3905	0.4248	0.5240	0.0333	0.3294	0.4414	0.4081	0.3255	0.2548	0.2803	0.1084	0.0927	0.1387	0.0455	0.1700
(B)	.	.	.	.	0.3511	0.4927	.	0.2822	.	.	.	.	.	0.1074	0.0563	.	0.0524	.
SiO <sub>2</sub> (S)	0.5575	0.8336	0.6516	0.3553	0.5001	0.4934	0.3184	0.2680	0.4301	0.9246	0.9041	1.0422	0.6482	0.1501	0.1602	0.1333	0.0725	0.4001
(B)	.	.	.	.	0.2408	0.2747	.	0.2374	.	.	.	.	.	0.1296	0.1501	.	0.0660	.
PO <sub>4</sub> (S)	0.0034	0.0037	0.0034	0.0012	0.0019	0.0016	0.0016	0.0009	0.0022	0.0059	0.0040	0.0019	0.0012	0.0009	0.0006	0.0003	0.0012	0.0016
(B)	.	.	.	.	0.0012	0.0019	.	0.0019	.	.	.	.	.	0.0009	0.0006	.	0.0003	.

Source : SEATEC/BEST, 1997

Remark : (S) = Surface

(B) = Bottom

. = No Sampling



Table A4.25 BOD<sub>5</sub> (mg/l) in Phuket Bay

Level	September, 1996								November, 1996							
	Station								Station							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Surface	3.20	3.10	2.40	1.80	1.00	0.70	2.30	1.60	4.40	2.00	6.00	4.50	2.20	2.00	4.20	5.00
Bottom	-	-	-	-	2.50	1.90	-	2.40	-	-	-	-	2.80	2.20	-	4.20
Average	2.08 ± 0.78								3.60 ± 1.41							

Source : SEATEC / BEST, 1997 Remark : - = No Sampling

Table A4.26 Chlorophyll Concentration (mg/m<sup>3</sup>) in Phuket Bay

Parameter	September, 1996								November, 1996									
	Station								Station									
	1	2	3	4	5	6	7	8	Average	1	2	3	4	5	6	7	8	Average
Chlorophyll a (S)	2.566	2.507	0.767	0.151	0.183	0.239	0.074	0.100	0.654 ±	0.579	0.495	0.784	0.297	0.365	0.531	0.227	0.160	0.421 ±
(B)	-	-	-	-	0.302	0.122	-	0.187	0.950	-	-	-	-	-	0.496	-	0.272	0.190
Chlorophyll b (S)	0.109	0.139	0.036	0.031	0.013	0.001	0.006	0.025	0.043 ±	0.022	0.055	0.019	0.007	0.000	0.044	0.007	0.000	0.024 ±
(B)	-	-	-	-	0.006	0.032	-	0.025	0.045	-	-	-	-	-	0.060	-	0.022	0.022
Chlorophyll c (S)	0.341	0.325	0.029	0.012	0.041	0.042	0.006	0.053	0.097 ±	0.137	0.197	0.167	0.026	0.025	0.143	0.019	0.020	0.093 ±
(B)	-	-	-	-	0.004	0.066	-	0.148	0.123	-	-	-	-	-	0.148	-	0.046	0.071

Source : SEATEC / BEST, 1997 Remark : - = No Sampling

(S) = Surface

(B) = Bottom

Table A4.27 Suspended Solid Concentration (mg/m<sup>3</sup>) in Phuket Bay

Level	September, 1996								November, 1996							
	Station								Station							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Surface	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.04	0.01	0.01	0.01	0.01
Bottom	-	-	-	-	0.02	0.01	-	0.01	-	-	-	-	0.02	0.01	-	0.01
Average	0.02 ± 0.01								0.02 ± 0.01							

Source : SEATEC / BEST, 1997

Remark : - = No Sampling

Table A4.28 Grease and Oil Concentration (mg/l) in Phuket Bay

Level	September, 1996								November, 1996							
	Station								Station							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
0.35	0.35	0.2	0.1	nd	nd	nd	nd	nd	0.38	0.35	0.22	0.11	nd	nd	nd	nd
Average	0.02 ± 0.01								Average = 0.02 ± 0.01							

Source : SEATEC / BEST, 1997

Remark : nd = not detectable

Table A4.29 Coliform Bacteria and Faecal Bacteria (MPN/100ml.) in Phuket Bay

Parameter	September, 1996								November, 1996									
	Station								Station									
	1	2	3	4	5	6	7	8	Average	1	2	3	4	5	6	7	8	Average
Coliform bacteria	750	450	100	100	8	11	17	11	181 ± 274	710	380	170	100	5	12	14	11	175 ± 251
Faecal bacteria	320	350	40	15	<2	<2	4	4	122 ± 166	300	310	100	15	<2	<2	4	5	122 ± 146

Source : SEATEC / BEST, 1997

Table A4.30 Oxidisable organic matter (%) in Sediments of Phuket Bay

Level	September 1996								November 1996							
	Station								Station							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
0 cm.	2.77	2.30	2.86	1.22	1.34	1.05	1.11	2.69	3.80	3.12	2.60	1.01	1.24	1.17	1.01	1.96
5 cm.	3.13	1.87	2.99	1.20	1.30	1.04	0.98	2.06	3.25	3.05	-	1.02	1.21	1.14	0.87	1.60
10 cm.	-	2.28	-	1.17	-	-	-	2.04	-	-	-	-	-	-	-	1.41
15 cm.	-	-	-	-	-	-	-	2.44	-	-	-	-	-	-	-	-
Average	1.892 ± 0.752								1.841 ± 1.841							

Source : SEATEC / BEST, 1997

Remark : - = No Sampling

Table A4.31 Heavy Metals Concentrations ( $\mu\text{g/g}$  dry weight) from Sample Taken in Phuket Bay  
(One Sample per Station)

Surface Grab Samples (To depth of  $\leq 6$  cm.)

Parameter	September, 1996								November, 1996									
	Station								Station									
	1	2	3	4	5	6	7	8	Average	1	2	3	4	5	6	7	8	Average
Pb	43.34	27.77	3.03	5.79	3.25	12.99	17.66	7.24	$14.96 \pm 3.21$	36.96	20.69	2.09	2.56	13.40	15.29	14.45	9.07	$14.31 \pm 2.56$
Sn	24.16	18.64	10.75	10.04	15.81	<0.31	<0.31	<0.31	$10.04 \pm 5.36$	9.49	7.18	2.62	1.06	0.15	3.65	0.15	0.15	$13.06 \pm 6.23$
Zn	124.40	66.80	23.87	19.79	52.43	22.48	20.57	53.54	$47.99 \pm 2.66$	127.57	70.29	13.88	20.27	9.74	23.30	21.98	21.98	$41.87 \pm 1.23$
Cu	11.67	8.05	7.72	6.29	8.35	5.61	7.42	6.44	$7.69 \pm 2.96$	12.05	10.64	7.62	4.89	6.67	6.49	8.56	5.69	$7.83 \pm 3.35$

Core Samples

Parameter	St.3, 431088 N, 869359 E 26/1/97		St.5, 435927 N, 868656 E 6/2/97	
	Marine Clay		Sand, Medium to Coarse	
	3 m.	5m.	1m.	3m.
Pb	0.1939	0.6866	0.1719	0.6498
Sn	17.7732	10.8281	15.1002	15.4595
Zn	1.3455	1.4952	1.5039	2.5439
Cu	0.6242	0.7416	0.5156	0.9501
As	0.7377	0.5672	0.6371	0.5672

Source : SEATEC / BEST, 1997

Unit =  $\mu\text{g/g}$  dry weight

Table A4.32 Density (x 1,000,000 cells/cum.) of Phytoplankton in Phuket Bay

Family	Genus	November, 1996															
		September, 1996								Station							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Melocraceae	Melosira	.	.	.	.	.	.	0.0051	.	.	.	.	.	.	.	.	.
Leptocylindraceae	Guinardia	.	.	.	.	0.0168	.	0.0147	.	0.0302	.	0.0110	0.0472	0.1051	0.0356		
Thalassiosiraceae	Lauderia	.	.	.	0.0075	0.0119	0.0156	.	.	0.0229	0.0441	0.0387	0.0157	0.0498			
Coscinodiscaceae	Coscinodiscus	0.1291	0.0720	0.0295	0.0117	.	0.0062	0.0447	.	0.0229	.	0.0371	.	0.0277	0.0226		
Rhizosoleniaceae	Hemidiscus	.	.	.	.	.	0.0009	0.0201	.	.	.	.	.	0.0053			
Bacteriastreae	Rhizosolenia	0.0272	0.0308	0.0256	0.0156	0.0075	0.0486	0.0727	0.0526	0.2417	0.2905	0.0551	0.1011	0.0940	0.3208	0.0372	
Chaetocereaceae	Bacteriastrea	0.0102	.	0.0256	0.0312	0.0505	0.0216	0.0372	0.0473	0.0806	0.0382	0.0220	0.4716	0.0537	0.1217	0.0243	
Biddulphiaceae	Chaetoceros	0.0616	0.0288	0.0728	0.2837	0.1291	0.1174	0.0987	0.2471	0.9869	0.8638	0.0717	0.4177	0.2665	0.6360	0.1762	
Hemiaulaceae	Biddulphia	0.0272	0.0021	0.0118	0.0039	0.0112	0.0055	0.0147	0.0158	0.0302	0.0229	0.0165	0.0522	0.0713	0.0719	0.0162	
Thalassioceae	Hemiaulus	.	.	0.0059	0.0039	0.0131	0.0211	0.0035	0.0053	0.0806	0.0229	0.0110	0.0051	.	.	0.0065	
Thalassioceae	Thalassioceema	.	.	.	.	.	0.0037	.	.	.	.	.	.	.	.	.	

Table A4.32 (cont'd)

Family	Genus	September								November							
		Station								Station							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Nitzschia- ceae	Nitzschia	-	-	0.0039	0.0009	0.0009	-	-	-	0.0867	0.1410	0.0764	0.0165	0.0472	0.0381	0.0664	0.0905
	Bacillaria	-	-	-	-	-	-	-	-	0.0079	0.0201	0.0688	-	0.0792	0.0425	0.1051	0.0404
Eucampia- ceae	Eucampia	-	-	-	-	0.0167	0.0022	0.0028	0.0104	0.0605	0.0806	0.0229	-	0.0219	-	0.1051	0.0162
	Climaco- dium	-	-	-	-	-	-	-	-	-	-	-	-	0.0017	-	-	-
Pennales	Thalassio- thrix	-	0.0021	0.0020	-	-	0.0009	-	0.0035	-	0.0806	0.0306	0.0220	0.0067	0.0224	0.0221	0.0032
Dinoflagel- late	Ceratium	0.0442	0.0206	0.0256	0.0076	0.0046	0.0009	0.0294	0.0095	0.0315	0.0503	-	0.0110	0.0017	0.0022	0.0055	0.0039
	Dinophysis	0.0034	0.0062	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016

Source : SEATEC / BEST, 1997

Table A4.33 Zooplankton (individual/cu.m.) in Phuket Bay

Group	September, 1996								November, 1996							
	Station								Station							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Barnacle larvae	-	-	9.16	5.43	-	28.58	6.11	11.64	8.40	0.57	-	-	37.08	-	9.79	-
Bivalve larvae	-	-	-	-	-	-	-	7.76	2.10	-	-	-	3.37	-	0.89	-
Copepod	10.18	2.54	9.16	3.05	51.96	203.01	70.21	-	18.89	2.29	5.34	4.07	293.26	563.24	43.63	448.76
Fish egg	-	-	-	-	2.73	4.83	3.05	7.76	6.30	-	-	-	3.37	-	-	-
Gastropod larvae	-	-	-	-	-	-	9.16	3.88	-	-	-	-	-	41.72	3.56	-
Lucifer	-	-	-	-	-	-	-	3.88	-	-	-	-	23.60	-	-	-
Lucifer larvae	-	-	2.04	-	13.67	19.33	3.05	-	-	-	-	0.51	80.90	62.56	2.67	-
Medusae	-	-	-	-	19.14	19.34	-	-	4.20	-	-	-	53.93	10.43	4.45	32.05
Nauplius	-	-	-	0.76	16.41	9.67	30.53	-	-	-	-	-	84.27	73.01	-	1282.18
Oikopleura	-	-	1.02	3.82	68.37	29.00	36.63	96.89	2.10	-	-	-	10.11	10.43	2.67	16.03
Ophiopluteus	-	-	-	0.76	-	-	-	-	-	-	-	-	-	-	-	-
Polychaete larvae	-	-	1.02	-	13.67	36.25	-	3.88	4.20	-	-	-	6.74	41.72	4.45	32.05
Sagitta (1)	-	-	-	-	16.41	-	-	-	2.10	-	-	1.02	20.22	20.86	1.78	-
Sagitta (2)	-	-	-	-	-	9.67	-	11.64	-	-	-	-	-	-	-	16.03
Sagitta (3)	-	-	-	-	-	-	-	-	-	-	-	-	3.37	31.29	-	-
Shrimp larvae	-	-	-	-	-	14.50	3.05	-	-	-	-	-	13.48	114.73	0.83	32.05
Zoea	-	-	-	-	5.47	9.67	-	15.52	-	-	-	-	-	10.43	-	-
Stomatopod larvae	-	-	-	-	-	-	-	-	-	-	-	-	6.74	41.72	0.89	16.03

Source : SEATEC/BEST, 1997

Table A4.34 Total Genus, Average and Density (x 1,000,000 cells/cum.) of Phytoplankton in Phuket Bay

	November, 1996															
	September, 1996						November, 1996									
Total	Station															
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Density	0.3228	0.1624	0.2028	0.3077	0.2619	0.1896	0.2647	0.2927	0.5993	1.8428	1.4829	0.2811	1.3230	0.6136	0.6136	0.4753
Genus	7	7	9	7	10	9	11	13	10	12	11	10	14	10	13	13

Table A4.35 Summarized of Zooplankton (individual/cum.m) in Phuket

	November, 1996															
	September, 1996						November, 1996									
Total	Station															
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Density	10.176	2.544	22.39	13.74	207.8448	383.8599	161.8	162.8437	48.2724	2.862	5.342	5.597	640.452	1,022.18	1,022.18	1,875.18
Group	1	1	5	5	9	11	8	9	8	2	1	3	14	12	11	8

Table A4.36 Benthos Group Density and Biomass (gm/sq.m) in Phuket Bay

	November, 1996															
	September, 1996						November, 1996									
Total	Station															
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Number/sq.m	0.2	2.6	7.1	673.9	4.2	2.9	0.3	8.0	0.1	-	0.1	230.3	15.7	36.3	-	4.9
Weight/sq.m	32.3	64.5	193.6	4854.0	32.3	48.4	16.1	96.8	16.1	-	16.1	2112.9	16.1	96.8	96.8	96.8

Source : SEATEC/BEST, 1997



**Table A4.56 Provincial Administration**

Amphoe	Area (km <sup>2</sup> )	Tambon	Village	Local Government Organizations
Muang Phuket	224.00	8	44	Muang Municipal Karon Sanitary District
Ka Thu	67.034	3	18	Phatong Municipal Ka Thu Sanitary District
Thalang	252.000	6	45	Thap Krasatri Sanitary District Cheung Thafae Sanitary District
Total	543.034	17	107	2 Municipals 4 Sanitary districts 12 Tambon administrative organizations 1 Tambon council

Source : Provincial Office

**Table A4.57 Population and Density of Tambon Ratsada**

Village Name	Population		Area		Population Density ( person/ km <sup>2</sup> )
	No.	%	No. (km <sup>2</sup> )	%	
1. Ban Koh Si Rae	1,363	10.25	7.50	21.00	182
2. Ban Bang Selou	1,531	11.52	5.71	16.00	286
3. Bari Khoo Khu	2,119	15.94	4.08	11.43	519
4. Ban Laem Tukkae	1,233	9.27	0.48	1.34	2,569
5. Ban Thung Kha Phaneang Tak	1,847	13.89	10.20	28.57	181
6. Ban Luk Kongsai	1,943	14.61	5.12	14.34	379
7. Ban Tha Reau Mai	3,259	24.51	2.62	7.33	1,246
Total	13,259	100.00	35.71	100.00	372
Study area (Villages No. 1,4 and 7)	5,845	44.00	10.60	29.70	551

**Table A4.58 Land Ownership**

Type	Village Number (%)			
	1	4	7	Total
1. Land Owner	42.6	2.5	26.3	26.5
2. No document	27.9	95.0	26.3	40.5
3. Land Rent	29.5	2.5	47.5	33.0
Total	100	100	100	100

**Table A4.59 Types of Residence**

Type	Village Number (%)			
	1	4	7	Total
1. Hut	1.6	82.5	3.0	18.5
2. Single Floor Wooden	21.3	0.0	18.2	15.5
3. Single Floor Concrete	27.9	2.5	44.4	31.0
4. Town House	0.0	2.5	4.0	2.5
5. Single House with Field	37.7	12.5	25.3	26.5
6. Two-Floor with Field	11.5	0.0	5.1	6.0
Total	100	100	100	100.0

**Table A4.60 Conditions of Residence**

Type	Village Number (%)			
	1	4	7	Total
1. New	62.3	12.5	76.8	59.5
2. Rather Old	32.8	70.0	21.2	34.5
3. Old	4.9	17.5	2.0	6.0
Total	100	100	100	100.0

**Table A4.61 Residence Ownership**

Type	Village Number (%)			
	1	4	7	Total
1. Owner	57.4	95.0	54.5	63.5
2. Relative Owner	3.3	2.5	4.0	3.5
3. Official Welfare	6.6	0.0	0.0	2.0
5. Rent	32.8	2.5	41.4	31.0
Total	100	100	100	100

**Table A4.62 Infrastructure Services**

Services	Village Number (%)			
	1	4	7	Total
<b>Drinking Water</b>				
1. Water Supply	9.8	0.0	75.3	40.5
2. Well/Ground Water	54.1	0.0	1.0	17.0
3. Rainy Water	1.6	0.0	0.0	0.5
4. Buying Water	23.0	100.0	15.2	34.5
5. Mixed	11.5	0.0	8.1	7.5
Total	100	100	100	100
<b>Use Water</b>				
1. Water Supply	9.8	0.0	56.6	31
2. Well/Ground Water	19.7	0.0	0.0	6.0
3. Rainy Water	3.3	0.0	0.0	1.0
4. Buying Water	65.6	100	40.4	60
5. Mixed	1.6	0.0	3.0	2.0
Total	100	100	100	100
<b>Electricity</b>				
1. Meter Owner	83.6	55.0	93.9	83.0
2. Connecting	16.4	45.0	6.1	17.0
Total	100	100	100	100
<b>Garbage Service</b>				
1. No	49.2	55.0	50.5	51.0
2. Yes	50.8	45.0	49.5	49.0
Total	100	100	100	100

**Table A4.63 Problems of Living**

Problems	Village Number (%)			
	1	4	7	Total
<b>Lack of Infrastructure</b>				
1. Access Road	39.3	32.5	55.6	46.0
2. Water Supply	24.6	95	55.6	54.0
3. Electricity	27.9	35	18.2	24.5
4. Telephone	24.6	47.5	14.1	24.2
5. Garbage	39.3	50	40.4	42
6. Wastewater	37.7	77.5	51.5	53.0
<b>Environment</b>				
1. Smell from Port	54.1	92.5	53.5	61.5
2. Smell from Factories	59	85	64.5	67.0
3. Wastewater	45.9	90.0	48.5	56.0
4. Garbage	34.4	92.5	46.5	52.5
5. Noise	32.8	45.0	53.5	45.5
<b>Social Problems</b>				
1. Drug addict	32.8	5.0	49.5	35.5
2. Unsecurity	44.6	7.5	53.5	41.4

**Table A4.64 Level of Overall Infrastructure Problems**

Level	Village Number (%)			
	1	4	7	Total
No Problem	10.1	0	0	11.5
Having Problem	89.9	100.0	100.0	88.5
Low	70.7	40.0	21.3	61.5
Medium	19.2	55.0	60.7	26.0
High	0	5.0	18.0	1.0
Total	100	100	100	100

**Table A4.65 Level of Overall Environmental Problems**

Level	Village Number (%)			
	1	4	7	Total
No Problem	16.2	0	22.9	15.0
Having Problem	83.8	100.0	77.1	85.0
Low	50.5	10	41.0	39.5
Medium	24.2	40	27.9	28.5
High	9.1	50	8.2	17.0
Total	100	100	100	100

**Table A4.66 Gross Provincial Product at 1988 Constants**

Year	GPP (x 1,000 Baht)	Growth Rate	GPP per Capita (Baht)	Growth Rate
1989	11,591,491	-	74,357	-
1990	12,825,534	10.65	85,498	14.98
1991	13,982,388	9.02	95,808	12.06
1992	13,553,866	3.06	96,593	0.82
1993	14,409,026	6.31	105,996	9.73
1994	14,439,260	0.21	108,652	2.51
Average	-	4.9	-	8.20

Source : NESDB

**Table A4.67 Sectorial Economic Performance, 1994**

Sector	Annual Growth Rate (1981-1988)	1994 GPP (%)	Annual Growth Rate
Total	1.40	-	4.91
Agriculture	7.60	17.71	9.16
Manufacturing	0.80	8.13	5.03
Mining and Quarring	2.70	0.43	-14.75
Services	10.30	20.56	1.81
Others	8.90	53.18	5.85

Source : NESDB

**Table A4.64 Level of Overall Infrastructure Problems**

Level	Village Number (%)			
	1	4	7	Total
No Problem	10.1	0	0	11.5
Having Problem	89.9	100.0	100.0	88.5
Low	70.7	40.0	21.3	61.5
Medium	19.2	55.0	60.7	26.0
High	0	5.0	18.0	1.0
Total	100	100	100	100

**Table A4.65 Level of Overall Environmental Problems**

Level	Village Number (%)			
	1	4	7	Total
No Problem	16.2	0	22.9	15.0
Having Problem	83.8	100.0	77.1	85.0
Low	50.5	10	41.0	39.5
Medium	24.2	40	27.9	28.5
High	9.1	50	8.2	17.0
Total	100	100	100	100

**Table A4.66 Gross Provincial Product at 1988 Constants**

Year	GPP (x 1,000 Baht)	Growth Rate	GPP per Capita (Baht)	Growth Rate
1989	11,591,491	-	74,357	-
1990	12,825,534	10.65	85,498	14.98
1991	13,982,388	9.02	95,808	12.06
1992	13,553,866	3.06	96,593	0.82
1993	14,409,026	6.31	105,996	9.73
1994	14,439,260	0.21	108,652	2.51
Average	-	4.9	-	8.20

Source : NESDB

**Table A4.67 Sectorial Economic Performance, 1994**

Sector	Annual Growth Rate (1981-1988)	1994 GPP (%)	Annual Growth Rate
Total	1.40	-	4.91
Agriculture	7.60	17.71	9.16
Manufacturing	-0.80	8.13	5.03
Mining and Quarring	2.70	0.43	-14.75
Services	10.30	20.56	1.81
Others	8.90	53.18	5.85

Source : NESDB

**Table A4.64 Level of Overall Infrastructure Problems**

Level	Village Number (%)			Total
	1	4	7	
No Problem	10.1	0	0	11.5
Having Problem	89.9	100.0	100.0	88.5
Low	70.7	40.0	21.3	61.5
Medium	19.2	55.0	60.7	26.0
High	0	5.0	18.0	1.0
Total	100	100	100	100

**Table A4.65 Level of Overall Environmental Problems**

Level	Village Number (%)			Total
	1	4	7	
No Problem	16.2	0	22.9	15.0
Having Problem	83.8	100.0	77.1	85.0
Low	50.5	10	41.0	39.5
Medium	24.2	40	27.9	28.5
High	9.1	50	8.2	17.0
Total	100	100	100	100

**Table A4.66 Gross Provincial Product at 1988 Constants**

Year	GPP (x 1,000 Baht)	Growth Rate	GPP per Capita (Baht)	Growth Rate
1989	11,591,491	-	74,357	-
1990	12,825,534	10.65	85,498	14.98
1991	13,982,388	9.02	95,808	12.06
1992	13,553,866	3.06	96,593	0.82
1993	14,409,026	6.31	105,996	9.73
1994	14,439,260	0.21	108,652	2.51
Average	-	4.9	-	8.20

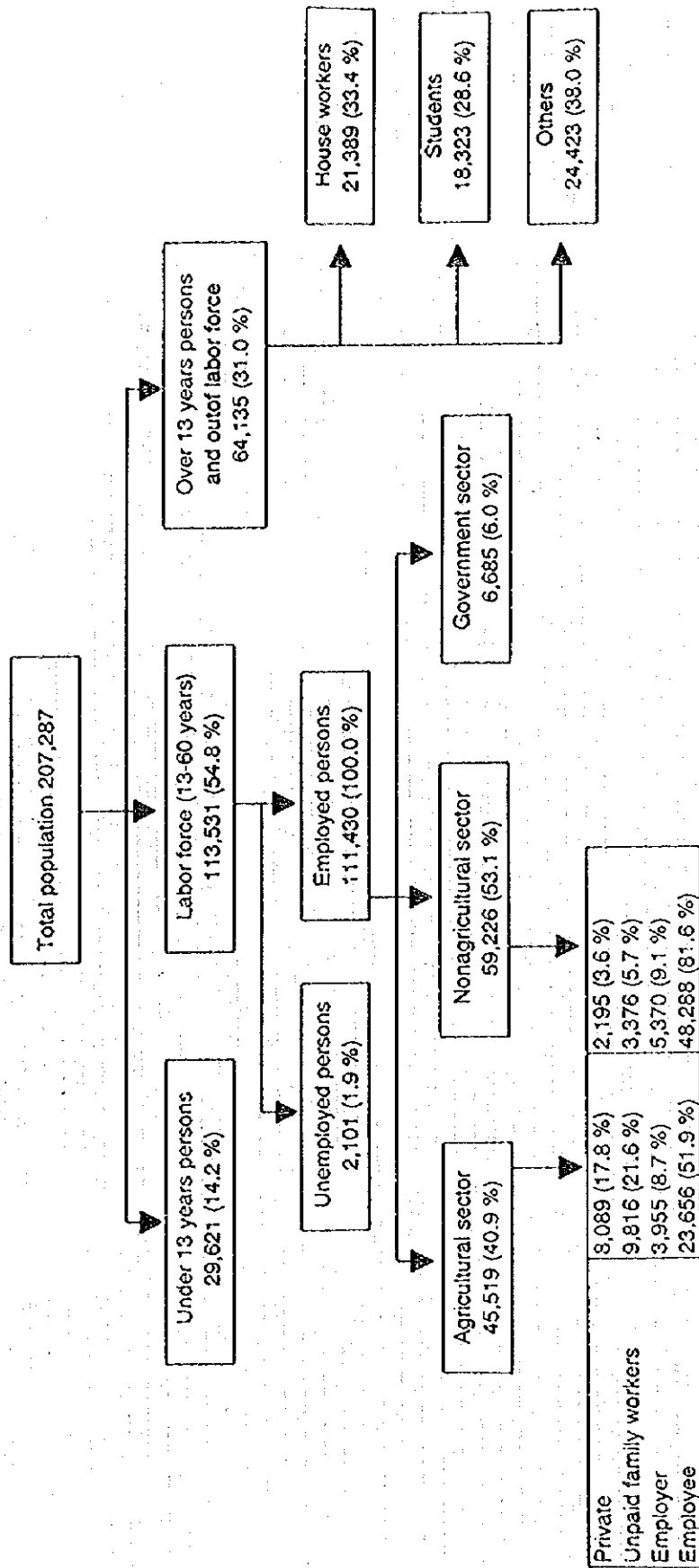
Source : NESDB

**Table A4.67 Sectorial Economic Performance, 1994**

Sector	Annual Growth Rate (1981-1988)	1994 GPP (%)	Annual Growth Rate
Total	1.40	-	4.91
Agriculture	7.60	17.71	9.16
Manufacturing	-0.80	8.13	5.03
Mining and Quarring	2.70	0.43	-14.75
Services	10.30	20.56	1.81
Others	8.90	53.18	5.85

Source : NESDB

Table A4.68 Labor Force and Employment Estimation, 1994



Source : Provincial Commercial Office

**Table A4.69 Employed Person by Type of Work, 1995**

Type	Number	%
Total employed persons	111,430	100.00
Draftmen and production workers	23,635	21.21
Sales workers	22,074	19.81
Service workers	21,172	19.00
Agriculture workers	16,792	15.07
Clerical and related worker	11,934	10.71
Transport and related worker	7,566	6.79
Professional and technical workers	5,650	5.07
Administrative and government officers	2,607	2.34

Source : NSO

**Table A4.70 Labor Demand and Supply**

	1992	1993	1994
Demand	1,814	1,768	4,188
Increasing rate	-	-2.50%	136.9%
Applier	906	889	1,427
Increasing rate	-	-1.90%	60.50%
Placement	387	383	749
Percentage of demand	21.3	21.7	19.1

Source : Employment Service Office



**Table A4.71 Main Occupation of Respondents**

Type	Village Number (%)			
	1	4	7	Total
1. Agriculture	3.3	0.0	0.0	1.0
2. Fishery	11.5	85.0	13.1	27.0
3. Trade	31.1	5.0	32.3	26.5
4. Government Services	9.8	0.0	6.1	6.0
5. Wage Earning	40.9	10.0	40.4	33.5
6. Service	3.3	0.0	8.1	5.0
Total	100	100	100	100

**Table A4.72 Secondary Occupation of Respondents**

Type	Village Number (%)			
	1	4	7	Total
1. No	85.2	85.0	62.6	74.0
2. Yes	14.8	15.0	37.4	26.0
2.1 Agriculture	(0.0)	(0.0)	(1.0)	(0.5)
2.2 Fishery	(3.3)	(2.5)	(5.1)	(4.0)
2.3 Trade	(3.3)	(7.5)	(15.2)	(10.0)
2.4 Wage Earning	(8.2)	(5.0)	(11.1)	(9.0)
2.5 Service	(0.0)	(0.0)	(5.1)	(2.5)
Total	100	100	100	100

**Table A4.73 Household Member Working Concern to Fishery**

Fishery Working	Village Number (%)			
	1	4	7	Total
1. NO	91.8	35.0	82.8	76.0
2. Yes	8.2	65.0	17.2	24.0
2.1 Fishing	(8.2)	(57.5)	11.1	(19.5)
2.2 Working in the Fish	(0.0)	(0.0)	1.0	(0.5)
2.3 Marketing Organization	(0.0)	(2.5)	2.0	(1.0)
Total	100	100	100	100

**Table A4.74 Place of Working**

Place	Village Number (%)			
	1	4	7	Total
1. In this Village	54.1	50.0	39.4	46.0
2. In this Tambon	8.2	10.0	38.4	23.5
3. In Phuket	29.5	5.0	22.2	21.0
4. Other Provinces	8.2	35.0	0.0	9.5
Total	100	100	100	100

**Table A4.75 Household Economic Status of Respondents**

Status	Village Number (%)			
	1	4	7	Total
1. Income Over Expenditure with Saving	13.1	0.0	15.2	11.5
2. Income Over Expenditure without Saving	6.6	0.0	3.0	3.5
3. Income Equal to Expenditure	45.9	22.5	61.6	49.0
4. Expenditure Over Income	34.4	77.5	20.2	36.0
Total	100	100	100	100

**Table A4.76 Household Debt of Respondents**

Debt	Village Number (%)			
	1	4	7	Total
1. No	55.7	60.0	62.6	60
2. Yes	44.3	40.0	37.4	40
2.1 Investment	(24.6)	(10.0)	(29.3)	(24)
2.2 Consumption	(14.8)	(15.0)	(8.1)	(11.5)
2.3 Investment and Consumption	(4.9)	(15.0)	(0.0)	(4.5)
Total	100	100	100	100

**Table A4.77 Education Facilities and Students**

Level	School / Institution	Teacher	Student
<b>Before Primary</b>	74	300	7,868
Governmental	58	185	3,971
Private	11	85	2,847
Municipal	5	30	1,050
<b>Primary</b>	69	892	21,086
Governmental	56	574	13,001
Private	8	132	3,582
Municipal	5	186	4,493
<b>Lower Secondary</b>	10	378	7,376
Governmental	6	310	5,852
Private	4	68	1,524
<b>Higher Secondary</b>	10	559	7,383
Governmental	8	315	6,787
Private	2	44	576
<b>Occupational</b>	4	73	2,578
Governmental	2	48	1,566
Private	2	25	1,012
<b>Graduate</b>	1	137	403
Governmental	1	137	403

**Table A4.78 Number of Household Member in School**

Number of Member	Village Number (%)			
	1	4	7	Total
1. None	47.8	25.0	47.5	37.0
2. 1 person	21.7	35.0	20.2	26.5
3. 2 persons	17.4	27.5	18.2	24.5
4. 3 persons	7.6	10.0	8.1	8.5
5. 4 persons	3.3	2.5	3.0	2.0
6. 5 persons	2.2	0.0	3.0	1.5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table A4.79 Location of School**

Location	Village Number (%)			
	1	4	7	Total
<b>Primary Level</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
1. Wat Koh Siral	78.8	92.6	11.1	38.9
2. Project Area	12.1	7.4	13.9	13.7
3. Other District	9.1	0.0	75	47.4
<b>Secondary Level</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
1. Project Area	9.1	100	11.5	20.0
2. Other District	90.9	0.0	88.5	80.0
<b>Vocational Level</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
1. Project Area	4.9	2.4	8.3	25.0
2. Other District	95.1	97.6	91.6	75.0

**Table A4.80 Education of Respondents**

Level	Village Number (%)			
	1	4	7	Total
1. Non Schooling	4.9	15.0	6.1	7.5
2. Primary (1-4)	31.1	70.0	39.4	43.0
3. Primary (5-6)	27.9	12.5	15.2	18.5
4. Secondary	14.8	2.5	17.2	13.5
5. Primary Occupation	9.8	0.0	18.2	12.0
7. Secondary Occupation	3.3	0.0	2.0	2.0
8. Graduate	8.2	0.0	2.0	3.5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table A4.81 Religion of Respondents**

Religion	Village Number (%)			
	1	4	7	Total
1. Buddhist	96.7	90.0	99.0	96.5
2. Christ	0.0	10.0	1.0	2.5
3. Islam	3.3	0.0	0.0	1.0
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table A4.82 Health Facilities, 1995**

Type	Amphoe			Total
	Muang	Ka Thu	Thalang	
<b>Government Sector</b>				
Provincial hospital	1 (386)	-	-	1 (386)
Community hospital	-	1(10)	1(30)	2 (40)
Municipal health center	2	-	-	2
Rural health center	9	2	10	21
<b>Private Sector</b>				
Hospital	5 (239)	-	-	5 (239)
Clinic	75	8	3	86
Drug store	43	8	9	60

Source : Provincial Commercial Office

**Table A4.83 Types of Health Service**

Types of Service	Village Number (%)			
	1	4	7	Total
<b>Little Sickness</b>				
1. Do not use Service	3.3	0.0	1.0	1.5
2. Drug Store	37.7	12.5	21.3	23.5
3. Health Center	37.7	82.5	10.1	37.5
4. Hospital	14.7	5.0	46.4	26.5
5. Clinic	6.6	0.0	21.3	11.0
Total	100	100	100	100
<b>Severe Sickness</b>				
1. Do not use Service	3.3	0.0	2.0	2.0
2. health Center	13.1	0.0	1.0	4.0
3. Hospital	83.6	100.0	87.8	88.0
4. Clinic	0.0	0.0	9.1	6.0
Total	100	100	100	100

Table A4.84

## Geo-demographic Data of Study Sites in Phuket Province, 1995.

District	No. of Subdistrict	No. Village	No. Population		No. Household	Pop. Per. sq. Km.	Crude birth Rate /1,000	Crude death Rate /1,000	Natural Population growth (%)
			Male	Female					
Phuket Province	17	107	101,606	102,812	66,374	364	26.4	4.8	2.2
Muang Dist.	8	44	63,490	65,664	40,227	577	25.3	4.6	-
Phuket Municipal	2	NA	25,996	29,606	15,068	4,634	25.2	4.6	2.1
Phuket out of Municipal	6	44	37,494	36,058	25,159	347	26.9	4.6	2.2
Thafang	6	45	28,104	29,962	13,852	219	22.3	4.8	1.8
Kathu	3	18	11,080	10,987	12,295	273	29.3	5.7	2.4
Patong Municipal	1	5	4,323	4,302	6,265	NA	50.3	4.4	4.6
Patong out of Municipal	2	13	6,757	6,685	6,030	NA	29.2	5.67	2.3

Source : Phuket Provincial Health Office, Annual Reports 1995

\* Crude Birth Rate = The estimate proportion of the number of live births in a population over a given period

$$= \frac{\text{Number of live births to residents in a year}}{\text{Average number of population in a year}} \times 1000$$

Crude death rate = The estimate proportion of a population that dies during a given period

$$= \frac{\text{Number of deaths during a year}}{\text{No. of person at risk of dying during a year}} \times 1000$$

Table A4.85

**Population of Laem Tukkae Village, Ratsada Subdistrict by Age and Sex, 1995**

Age Group	Sex		Total
	Male	Female	
0-4	78	85	163
5-9	81	81	162
10-14	46	45	91
15-19	52	75	127
20-24	45	55	100
25-29	52	52	104
30-34	41	47	88
35-39	30	46	76
40-44	22	46	68
45-49	16	42	58
50-54	15	34	49
55-59	19	24	43
60-64	21	24	45
65-69	9	12	21
70-74	6	9	15
75+	12	11	23
Total	545	688	1,233

Total number of households = 220

Source: Ratsada Health Center, 1995

Table A4.86

**Population in 3 Communities of the Project Site, Phuket Province, 1995.**

Age group	Raum Poonpot 1	Raum Poonpot 2	Raum Nainjai
No. Households	266	161	108
No. population	230	161	105
0-1	47	16	29
1-5	79	58	42
5-10	89	44	33
10-15	77	62	44
15-20	90	55	38
20-30	186	122	104
30-40	161	99	87
40-60	149	86	69
60 and over	38	31	19
No. Male	448	300	244
No. Female	468	273	221
Total Population	916	573	465

Source: Phuket Municipal Health Center, 1995

Table A4.87

## Reported Cases and Deaths of Phuket Province by Years.

Disease	1995		1994		1993		1992	
	cases	deaths	cases	deaths*	cases	deaths	cases	deaths
Acute diarrhea	7,869	1	6,530		6,583	2	6,927	4
Food poisoning	207	-	189		251	-	226	-
Dysentery	-	-	209		228	-	176	-
Enteric fever	-	-	12		82	-	84	-
Typhoid	-	-	NA		22	-	30	-
Paratyphoid	-	-	NA		-	-	-	-
Hepatitis	-	-	81		222	-	212	-
Polio	-	-	-		-	-	-	-
Measles	-	-	22		194	-	36	-
Mumps	-	-	68		49	-	162	-
Chicken pox	657	-	NA		511	-	440	-
Rubella	-	-	4		6	-	10	-
Conjunctivitis, hemorrhage	484	-	486		606	-	1,074	-
Influenza	927	-	636		311	-	397	-
Pyrexia of Unknown Origin	965	-	NA		2,181	-	2,720	1
Dengue haemorrhagic fever	362	-	129		139	-	179	-
Encephalitis	4	-	4		2	-	3	1
Malaria	15	-	20		25	-	34	-
Diphtheria	-	-	-		-	-	-	-
Pertussis	-	-	1		-	-	-	-
Tetanus	-	-	-		3	1	5	1
Meningococcal meningitis	-	-	-		-	-	-	-
Pneumonia	795	2	595		899	9	641	9
Tuberculosis	-	-	83		99	-	119	-
Leptospirosis	-	-	-		-	-	-	-
Scrub typhus	-	-	-		2	-	-	-
Rabies	-	-	1		-	-	-	-
Trichinosis	-	-	-		-	-	-	-
Anthrax	-	-	-		-	-	-	-
Occupational hazards	-	-	3		5	-	5	-
Pesticide poisoning	-	-	-		5	-	5	-

\* Data are not available

Table A4.87 Reported Cases and Deaths of Phuket Province by Years.

Disease	1995		1994		1993		1992	
	cases	deaths	cases	deaths*	cases	deaths	cases	deaths
Acute diarrhea	7,869	1	6,530		6,583	2	6,927	4
Food poisoning	207	-	189		251	-	226	-
Dysentery	-	-	209		228	-	176	-
Enteric fever	-	-	12		82	-	84	-
Typhoid	-	-	NA		22	-	30	-
Paratyphoid	-	-	NA		-	-	-	-
Hepatitis	-	-	81		222	-	212	-
Polio	-	-	-		-	-	-	-
Measles	-	-	22		194	-	36	-
Mumps	-	-	68		49	-	162	-
Chicken pox	657	-	NA		511	-	440	-
Rubella	-	-	4		6	-	10	-
Conjunctivitis, hemorrhage	484	-	486		606	-	1,074	-
Influenza	927	-	636		311	-	397	-
Pyrexia of Unknown Origin	965	-	NA		2,181	-	2,720	1
Dengue haemorrhagic fever	362	-	129		139	-	179	-
Encephalitis	4	-	4		2	-	3	1
Malaria	15	-	20		25	-	34	-
Diphtheria	-	-	-		-	-	-	-
Pertussis	-	-	1		-	-	-	-
Tetanus	-	-	-		3	1	5	1
Meningococcal meningitis	-	-	-		-	-	-	-
Pneumonia	795	2	595		899	9	641	9
Tuberculosis	-	-	83		99	-	119	-
Leptospirosis	-	-	-		-	-	-	-
Scrub typhus	-	-	-		2	-	-	-
Rabies	-	-	1		-	-	-	-
Trichinosis	-	-	-		-	-	-	-
Anthrax	-	-	-		-	-	-	-
Occupational hazards	-	-	3		5	-	5	-
Pesticide poisoning	-	-	-		5	-	5	-

\* Data are not available



**Table A4.88 Cause of Death, Number and Rate of Phuket, 1995.**

No.	Disease	Number of Case	Rate per 100,000
1	Heart diseases	128	64.42
2	Traffic accidents	54	27.17
3	Cancer	51	25.66
4	Blood pressure and stroke	36	18.11
5	Other accident	30	15.09
6	Lower Respiratory disease	27	13.39
7	Vascular and Lymphatic Systems	22	11.07
8	Diabetes	21	10.56
9	Renal diseases	20	10.06
10	Gastro intestinal diseases	18	9.05

Source : Phuket Provincial Health Office, Annual Report, 1995.

**Table A4.89 Number and Rate of Morbidity of Top Ten Priority Diseases from Epidemiology Surveillance in Ratsada Subdistrict Health Center, Muang District , Phuket, 1995.**

No.	Disease	Morbidity	Rate per 100,000 population
1.	Diarrhea	780	4,006.78
2.	Influenza	95	488.01
3.	Pneumonia	89	457.18
4.	FUO*	87	446.91
5.	Chicken pox	44	226.02
6.	Gonorrhoea	22	113.01
7.	DHF	20	102.74
8.	Conjunctivitis	19	97.60
9.	Pseudo gonorrhoea	18	92.46
10.	Food Poisoning	17	87.33

FUO = Fever of Unknown Origin

DHF = Dengue Haemorrhagic Fever

Source : Phuket Provincial Health Office, Annual Report 1995

**Table A4.90 Prevalence of Helminthiasis in Phuket, 1991-1995**

Year	No. Examined	No. Total Positive No. (%)	Hookworm	Ascariasis	Trichuriasis	Opisthorchiasis
			No. (%)	No. (%)	No. (%)	No. (%)
1992	569	257 (45.2)	200 (35.1)	3 (0.52)	98 (17.2)	14 (2.5)
1994	6,557	904 (13.8)	723 (11.0)	113 (1.7)	258 (3.9)	-
1995	809	172 (21.3)	112 (13.8)	13 (1.6)	72 (8.9)	-

Source : Ministry of Public Health, Annual Report of the Diseases Surveillance, 1994  
 : Ministry of Industry, Office of Phuket Industry, Feasibility Study on Promotion of Non-Environmental Impact Industry, 1992  
 : Phuket Municipal Health Center Report, 1995

**Table A4.91 Sanitary Facilities of Phuket Province, 1995.**

Categories	%
Hygienic toilet	98.49
Sewage Disposal	98.16
Villages with 100 % hygienic toilet	66.67
Hygienic housing	93.48
Water drainage	76.20
Hygienic kitchen	66.66
Fly and disease vector control	74.62

Source : Phuket Provincial Health Office, 1995.

**Table A4.92 Government Institutions and Their Legal Authorities**

Laws and Regulations	Name of Responsible Agencies									
	Environment Policy and planning Office.	Pollution Control Dept.	Local Government	Harbour Department	Industry Works Dept.	Fishery Dept.	Forestry Dept.	City Planning Dept.	Local Administration Dept.	Labor Protection Dept.
1. National Environment Promotion and Preservation Law of B.E. 2535	X	X	X							
2. National Environment Committee's Announcement dated 7 August B.E. 2535 declaring Phuket Province as Pollution Control Area as well as protection measures.	X		X						X	
3. Ministry of Science, Technology and Environment's Announcement B.E. 2535 issued under National Environment Promotion and Preservation Law of B.E. 2535			X							
4. Ministry of Science, Technology and Environment's Announcement No 2 (B.E. 2538) declaring Phuket as Pollution Control Area as well as Protection measure.			X							
5. Civil and Commercial Code, Articles 1304, 1337-1355 (on public land, waterfront land, and other uses of land, which will not disturb environment)									X	
6. Criminal Law on encroachment, (articles 360-366) and on control of water pollution, (articles 375 and 380)									X	
7. Law on Shipping in Thai waters B.E. 2456				X						
8. Harbor Department's Announcement No. 177/2527 dated 3 August B.E. 2527 on control of smoke and noise from ship				X						
9. Factory Law of B.E. 2535 (articles 39-40, 48-50)					X					
10. Ministry of Industry's Regulation No 2 (B.E. 2535) of 24 September B.E. 2535 issued under Factory Act B.E. 2535					X					
11. Ministry of Industry's Announcement No 2 (B.E. 2539) on industry water emission standard.					X					
12. City Planning Law of B.E. 2535			X					X		
13. Building Control Law of B.E. 2522			X							
14. Forestry Law of B.E. 2439										
15. Public Health Law of B.E. 2454 (protection of public places from dirtiness)				X						
16. Law on Fishing B.E. 2490 (preservation of sea environment, articles 19-20, 32, 53-55)						X				
17. Ministry of the Interior's Order No. 890/2459 authorizing local government to lock after public land).			X						X	
18. Ministry of the Interior's Announcement dated 30 May B.E. 2520 on safety in working conditions.										X
19. Ministry of the Interior's Announcement of 30 May B.E. 2520 on working environment.										X
20. Municipality Law of B.E. 2456.			X							
21. Tambon Administrative Law of B.E. 2538.			X							
22. Ratsada Tambon Administrative organization's Regulation on Garbage Collection and Fees.			X							

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Table 5.1 Environmental Impact, Mitigation Measures and Monitoring Plan (EIMP)

Environmental Issues	Impacts	Mitigation Measures	Monitoring Programs	Implementary Organizations
Construction Period				
1. Air quality	1. Increasing of Total Suspended Particulates (TSP) due to transporting building materials, equipments and soil by lorries and grading of the area	1. Sprinkling the construction area with water at least twice a day, limit vehicle's speed and cover transporting materials in vehicles with canvases	1. Air samples for TSP, three times a year in the project site and nearby community	1. Contractor and DOF
2. Noise	2. Noise from construction activity may have short effect to resident nearby	2a) Avoid construction activity during the night 2b) Use equipment which create low noise level 2c) Regulate the speed of vehicles	2. Noise level, Leq (24) twice a year at the project site and community nearby	2. Contractor and DOF
3. Terrestrial forest and wildlife	3. Disturbing the terrestrial forest and wildlife habitat by cutting trees and hunting the animals	3. Place "no-trespassing" signs as required and prepare information leaflets for all workers	3. Site inspection by DOF within the first month of construction and every 4 months thereafter	3. Contractor DOF and RFD
4. Mangrove ecosystem	4. Mangrove forest clearance and destruction of mangrove ecology	4a) Do not permit cutting of mangroves or blockage of tidal flows into mangrove area which are located along the southern border of the project site. This area is to be protected and restored as a green belt and conserved as an example of the mangrove forest in the area 4b) Prepare a construction guideline to clearly identify the boundary of the mangrove to be protected and conserved within the project area. This guideline will consist of written information plus a precise map showing the extent of the total existing mangrove forest and the portion to be protected. Prior to the commencement of construction, the map will need to be approved.	4a) Review and approve mangrove protection map and reforestation plan. 4b) Inspect mangrove area every 2 months during construction and prepare field conservation report	4. RFD and DOF

Table 5.1 (Cont'd)

Environmental Issues	Impacts	Mitigation Measures	Monitoring Programs	Implementary Organizations
5. Seawater and sediment quality, marine ecology, fish ecology and fishing activity	5. High turbidity, BOD and coliform in water	<p>In writing, by the Phuket Royal Forestry Dept.</p> <p>4c) Initiate of mangrove forest reestablishment program on the upper mudflat area of the western shore of Ban Tha Chin. Using the general drawing provided in the EIA (Fig. 7.4 In Main Report) and with guidance from RFD experts, prepare and initiate a reforestation plan.</p> <p>5. Prepare special construction guidelines defining:</p> <ul style="list-style-type: none"> <li>- landfill operating procedures, focusing on handling of dredged materials, monitoring of dredged waste drainage water and dredge equipment operations</li> <li>- liquid and solid waste handling and treatment procedures including steps to be taken to prevent construction period pollution, and titrating.</li> </ul>	<p>4c) Confirm initiation of mangrove reforestation program and obtain reforestation program schedule from contractor</p> <p>5a) Review and sign construction guidelines before commencement of construction work</p>	5. Contractor/ HD and DOF
6. Wastewater management	6. Contamination of water in Klong Tha Chin due to discharge of organic and nutritional load, spread of contagious diseases and out break of epidemic and endemic	<p>6a) Undertake a sampling program to determine quality of treated effluent and wastewater draining into Klong Tha Chin. Sampling Program should be conducted even 6 months during construction period: collecting a minimum of 4 samples and analyzing for Faecal Coliform, Bacteria, BOD, COD, Turbidity and suspended solid</p> <p>6b) Obtain effluent analysis report and confirm that discharge quality is in compliance with the national effluent quality standards</p>	<p>5b) undertake monthly inspection and prepare inspection report</p> <p>6. Quality of treated effluent wastewater</p>	6. Contractor and PM

Table 5.1 (Cont'd)

Environmental Issues	Impacts	Mitigation Measures	Monitoring Programs	Implementary Organizations
7. Solid waste management	7. Increase in litter, including plastics and paper on land and in coastal waters at project site and vicinity	7. Provision of on-site collection bins and disposal of solid waste	7. Collection and disposal arrangements of solid waste shall be examined from time to time by senior officials of Ratsada TAO	7. Contractor and Ratsada TAO
8. Socio-economic	8. Inconvenience from project construction activities - Job creation, labor limitation - Public security from outside labors	8a) Prepare a construction period traffic management plan 8b) Prepare a local hiring policy and basic training program to encourage local hiring of construction labor force. 8c) Insure that adequate police service is available and prepare code of conduct for any workers brought on site from outside Phuket Province.	8a) Approve traffic management plan and conduct period inspection 8b) Obtain statistics from contractor on date and origin of all hires, and discuss discrepancies with contractor and DOF 8c) Have DOF and other authorities approve enhanced security and public service program confirming adequacy of proposed plan to address construction and operation period needs.	8. Labor and Welfare Office - FMO - Skilled Labor Development Dept.
9. Public health	9. Diarrheal diseases, dengue haemorrhagic fever and accidents from traffic and labor work	9. Sanitary improvement - Safety Come First Program - Raising public awareness	9. To detect and report an incidence of the potential diseases and other accidents and injury cases through the period	9. Ratsada Health Center - FMO and PCD
10.	10.	10.	10. An annual environmental audit report will be prepared by the contractor, addressing, at a minimum the 9 issues listed in this EIMP. The form on content will be agreed by the proponent/owner and the contractor. This report will be available for inspection by OEPP and the public at large.	10.

Table 5.1 (Cont'd)

Environmental Issues	Impacts	Mitigation Measures	Monitoring Programs	Implementary Organizations
Operation Period				
11 Noise	11. Transport vehicles may create noise and impact on the community nearby	11 Speed limits of vehicles should be enforced	11 Noise level, Log (24) twice a year at the project site and community nearby	11 Contractor and DOF
12. Odor	12 Air quality deterioration	12. Provision, operation and maintenance of state of art odor control technology as defined in EIA	12. Test quality of fume gases and annual environmental audit	12. Owner of each FPP to hire independent auditor
13 Terrestrial Forest and wildlife	13 Long-term effects due to the change of activities	13 Extensive public involvement in agro-forest planning emphasising community based management	13 Participation of local communities in the activities to resow and monitor the agro-forest	13 Office of Phuket Forest and St
14 Mangrove	14 Mangrove forest clearance and destruction of mangrove ecology	14. Continuation of mangrove reforestation program, including maintenance tending and protection, of new plantation.	14 inspection	Rae communities/RFD 14. RFD and DOF
15 Wastewater Management	15 Contamination of water in Klong Tha Chin due to discharge of organic and nutritional load, spread of contagious diseases and out break of epidemic and endemic	15 Provision, operation and maintenance of state of art pollution control technology	15 Test quality of treated wastewater at FPP and final discharge outlet and conduct annual environmental audit	15 - All FPP discharged point by owner of each plant; via independent auditor - All final discharged point by FMO - PM
16 Solidwaste management	16 Increase in litter, including plastics and paper on land and in coastal waters at project site and vicinity	16 Provision of waste collection and disposal to landfill	16 All solid waste collection, management and disposal arrangement shall be audited by an independent auditor	16 - In-house collection by FMO
17 Socio-economic	17 - Job creation, labor limitation - Public insecurity from outside labors - Increasing of expenditure occurring from shortage of infrastructure such as water supply - Hindrance of small fishing boats of Chao Lao Village	17a Prepare a traffic management plan 17b Prepare a local hiring policy and basic training program to encourage local hiring of labor force 17c Insure that adequate police service is available and prepare code of conduct for any workers brought on site from outside Phuket Province.	17a Obtain statistics from contractor on date and origin of all hires, and discuss discrepancies with contractor and DOF 17b Have DOF and other authorities approve enhanced security and Public service program confirming adequacy of proposed plans to address an operation period needs	- Disposal by Raitsada- TAO 17 - Labor and Welfare Office - FMO - Skilled Labor Development Dept.

Table S.1 (Cont'd)

Environmental Issues	Impacts	Mitigation Measures	Monitoring Programs	Implementary Organizations
18	18	18	18 Annual environmental audit report will be completed for every year of operation for 5 years	18



## **9. Soil Investigation**



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-1**

SHEET **1** OF **2**

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 436248 N

870718 E

Ground Elevation: 1.00 m


Max. Drilling Depth: 35.00 m


Water Level: - m

Starting Date: 13/12/96

Finishing Date: 15/12/96

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plasticity Chart (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)						
						Plastic Limit (X)	Natural Water Content (□)	Liquid Limit (—)								
1	[Dotted pattern]	SAND, pale yellowish brown, poorly graded, very loose, SP. (Fill material) 2.00 m.	SS	1					2							
2			SS	2					0							
3	[Diagonal lines pattern]	SAND with Silt, pale yellowish brown, poorly graded, very loose, SP-SM. 5.00 m.	UD	1												
4											UD	2				
5																
6		CLAYEY SAND, brownish gray, fine to medium sand, low to medium plastic, very loose, SC. 7.50 m.	UD	2												
7		SILT, with sand, light gray to grayish brown, fine sand, loose, M. 14.00 m.	UD	3												
8																
9																
10																
11	[Diagonal lines pattern]	SILT, dark yellowish brown, dense, M. 15.00 m.	SS	7												
12																
13																
14		SILT, with sand, grayish brown, fine sand, very dense, M.	SS	8												
15																
16																
17			SS	9												
18																
19																

 <b>SIAM TONE CO., LTD.</b>	<b>BORING LOG</b>	BORING NO. <b>BH-1</b>
		SHEET <b>2</b> OF <b>2</b>
PROJECT: <b>PHUKET FISHERY COMPLEX</b>	Coordinates : <b>436248 N</b> <b>870718 E</b>	Water Level: <b>-</b> m
LOCATION: <b>LAEM TUKHAE, PHUKET</b>	Ground Elevation: <b>1.00</b> m	Starting Date: <b>13/12/96</b>
CLIENT: <b>TETRA CO.,LTD.</b>	Max. Drilling Depth: <b>35.00</b> m	Finishing Date: <b>15/12/96</b>

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit (LL) (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)	
						X	•	□			
21		SILT, with sand, grayish brown, mostly fine sand, very dense, M.	SS	10						89	
22			SS	11						67	
23											
24					SS	12					100
25											
26					SS	13					100
27											
28					SS	14					86
29				29.50 m.	SS	15					100
30				SANDY SILT, moderately olive brown, fine to medium sand, very dense, M.	SS	16					100
31			SS		17					100	
32			SS		18					100	
33			SS		19					100	
34			SS		20					100	
35			35.00 m.								
36			END OF BOREHOLE AT DEPTH 35.00 M.								
37											
38											
39											



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-2**

SHEET **1** OF **2**

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 436420 N

870595 E

SEA BED Elevation: -1.50 m

Max.DrillingDepth: 35.00 m

Water Level: - m

Starting Date: 17/12/96

Finishing Date: 19/12/96

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit Natural Water Content (%) Liquid Limit				Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						X	—	—	□		
1		SILT with Sand, brownish gray, fine to medium sand, very loose, M. 2.50 m.	UD	1							
2											
3		SILTY CLAY, with sand, grayish brown, fine to medium sand, very soft to soft, low plastic, CL. 4.50 m.	UD	2							
4											
5		SILT with sand, very light gray, mostly fine sand, loose, M. 6.00 m.	UD	3							
6											
7		SILT with Sand, light brown, with some fine sand, medium dense, M. 8.00 m.	SS	1						13	
8			SS	2						13	
9		SILT, grayish brown, with some fine sand, dense, M. 11.50 m.	SS	3						31	
10			SS	4						31	
11			SS	5						24	
12		SILT, grayish brown, with some medium to fine sand, medium dense, M. 16.00 m.	SS	6						26	
13			SS	7						41	
14			SS	8						58	
15		SILT, pale brown/ grayish brown, dense to very dense, M.	SS								
16											
17											
18											
19											



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-2**

SHEET 2 OF 2

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 436420 N  
870595 E

SEA BED Elevation: -1.50 m  
Max. Drilling Depth: 35.00 m

Water Level: - m

Starting Date: 17/12/96

Finishing Date: 19/12/96

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit X Natural Water Content (%) Liquid Limit □	Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)													
								20	40	60	80	10	20	30	40	50					
21		SILT, pale brown/ grayish brown, very dense, M.	SS	9															100		
22			SS	10																100	
23			23.00 m.																		
24			SANDY SILT, grayish brown, mostly fine to medium sand, with a few gravel, very dense, M.	SS	11															100	
25		SS		12																100	
26																					
27					SS	13															100
28				28.50 m.																	
29				SANDY SILT, pale brown, fine to coarse sand, with a few gravel, very dense, M.	SS	14															100
30		SS			15																100
31					SS	16															100
32					SS	17															100
33					SS	18															100
34				SS	19															100	
35			35.00 m.																		
36			END OF BOREHOLE AT DEPTH 35.00 M.																		
37																					
38																					
39																					



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-3**

SHEET 1 OF 2

PROJECT: **PHUKET FISHERY COMPLEX**

LOCATION: **LAEM TUKHAE, PHUKET**

CLIENT: **TETRA CO.,LTD.**

Coordinates : **436088 N**

**869359 E**

SEA BED Elevation: **-0.15 m**

Max. Drilling Depth: **35.00 m**

Water Level: **\_\_\_\_\_ m**

Starting Date: **26/01/97**

Finishing Date: **28/01/97**

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit Natural Water Content Liquid Limit (%)	Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
1		SAND, drak gray, very fine, very loose. 0.50 m.	UD	1	-			
2								
3		SILTY CLAY, brownish gray, with fine sand, soft, CL.	UD	2	100			
4		4.50 m.						
5		SILTY CLAY, moderate olive brown, with fine sand, soft CL.	UD	3	85			
6		6.50 m.						
7		CLAY, grayish brown, trace of fine to coarse sand, non-plastic, firm, C.	UD	4	100			
8		8.50 m.						
9		SILT, grayish brown, trace of fine to coarse sand and gravel, very dense, M.	SS	1	35			30
10		10.00 m.						
11			SS	2	10			35
12			SS	3	25			35
13		SANDY SILT, brownish gray, trace of fine to coarse sand and gravel, dense, M.	SS	4	22			38
14			SS	5	27			40
15			SS	6	28			39
16			SS	7	30			45
17		17.00 m.	SS	8	22			50
18		SILT, pale brown, dense to very dense.	SS	9	18			52
19			SS	10	19			51



SIAM TONE CO., LTD.

BORING LOG

BORING NO. BH-3

SHEET 2 OF 2

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 436088 N  
869359 E

SEA BED Elevation: -0.15 m

Max. Drilling Depth: 35.00 m

Water Level: \_\_\_\_\_ m

Starting Date: 26/01/97

Finishing Date: 28/01/97

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Water Content (%)				Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)	
						X	+	-	□			
21		SILT, pale brown, dense to very dense.	SS	12	19						60	
22			SS	13	10						87	
23			SS	14	8						100	
24		SANDY SILT, grayish brown, mostly fine to medium sand, with a few gravel, very dense.	SS	15	12						100	
25			SS	16	15						96	
26			SS	17	18						93	
27			SS	18	16						97	
28			SS	19	17						102	
29			SS	20	10						104	
30			LIMESTONE, gray to dark gray, decomposed, with some calcite.									
31												
32												
33												
34												
35		END OF BOREHOLE AT DEPTH 35.00 M.										
36												
37												
38												
39												



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-4**

SHEET 1 OF 2

PROJECT: PHUKET FISHERY COMPLEX

Coordinates : 436136 N  
869070 E

Water Level: - m

LOCATION: LAEM TUKHAE, PHUKET

SEA BED Elevation: 0.40 m

Starting Date: 01/02/97

CLIENT: TETRA CO.,LTD.

Max. Drilling Depth: 40.00 m

Finishing Date: 04/02/97

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit Natural Water Content (%) Liquid Limit			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						X	+	□		
1		SANDY CLAY, moderate olive brown, some of fine sand, soft, C. 2.00 m.	UD	1	100					
2										
3		SILTY CLAY, light olive brown, and sand, with some gravel, soft, CL. 4.50 m.	UD	2	44					
4										
5		CLAYEY SAND, moderate olive brown, with some fine sand, trace of gravel, loose, SC. 6.00 m.	UD	3	65					
6										
7		SILTY CLAY, grayish olive green, with trace of fine sand, soft, CH. 8.00 m.	UD	4	100					
8										
9		SANDY SILT, moderate olive brown, with some sand, trace of gravel, loose, M. 10.00 m.	UD	5	55					
10										
11	CLAY, grayish brown, with some sand, trace of gravel, loose, C. 10.50 m.	SS	1	10				40		
12								35		
13								33		
14	SILTY SAND, moderate olive brown, with some medium to coarse sand, trace of gravel, SM. 15.00 m.	SS	3	30				33		
15								35		
16								38		
17								42		
18	SILT, pale brown, dense to very dense. 20.00 m.	SS	5	25				40		
19								40		
								42		





SIAM TONE CO., LTD.

**BORING LOG**

BORING NO. **BH-4**  
SHEET 2 OF 2

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO., LTD.

Coordinates : 436136 N  
869070 E  
SEA BED Elevation: 0.40 m  
Max. Drilling Depth: 40.00 m

Water Level: 27.40 m  
Starting Date: 01/02/97  
Finishing Date: 04/02/97

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit Natural Moisture Content (%)				Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)	
						X	Y	Z	W			
21		SANDY SILT, grayish brown, mostly fine to medium sand, with a few gravel, very dense.	SS	11	10						50	
22			SS	12	10						80	
23			SS	13	10						95	
24			SS	14	10						78	
25			SS	15	10						100	
26			SS	16	10						100	
27			SS	17	10						100	
27				27.00 m.								
28		LIMESTONE, gray, highly fracture, highly weathered, with some Calcite vein.	NQ DIAMOND BIT CORE DIA. 47.6 mm.									
29												
30												
31												
32												
33												
34												
35												
36												
37												
38												
39					40.00 m.							
		END OF BOREHOLE AT DEPTH 40.00 M.										



SIAM TONE CO., LTD.

**BORING LOG**

BORING NO. **BH-5**

SHEET 1 OF 1

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 435927 N

868656 E

SEA BED Elevation: -1.50 m

Max. Drilling Depth: 10.45 m

Water Level: \_\_\_\_\_ m

Starting Date: 06/02/97

Finishing Date: 06/02/97

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit (LL) (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						Plastic Limit (PL)	Natural Water Content (w)	Liquid Limit (LL)		
1	[Diagonal Hatching]	SILTY CLAY, moderate olive brown, and fine sand, very soft to soft, CH.	UD	1	100					
2		2.50 m.								
3	[Dotted Pattern]	SAND, moderate olive brown, with silt, poorly graded, loose, SP-SM.	UD	2	70					
4		4.00 m.								
5	[Diagonal Hatching]	CLAYEY SAND, moderate olive brown, fine to coarse sand, with gravel, loose, SC.	SS	1	25				2	
6		5.50 m.								
7	[Dotted Pattern]	SAND, moderate olive brown, with silt, poorly graded very loose to loose, SP-SM.	SS	2	30				4	
8		7.00 m.								
9	[Diagonal Hatching]	CLAYEY SAND, moderate olive brown, fine to coarse sand, trace of gravel, very loose, SC.	SS	3	45				0	
10		8.00 m.								
11	[Diagonal Hatching]	CLAYEY SAND, dark greenish gray, fine to coarse sand, trace of gravel, very loose, SC.	SS	4	15				1	
12		9.00 m.								
13	[Diagonal Hatching]	CLAYEY SAND, moderate olive brown, fine to coarse sand, trace of gravel, medium dense, SC.	SS	5	10				25	
14		10.00 m.								
15	[Diagonal Hatching]	CLAY, grayish brown, with some fine sand, dense, C.	SS	6	10				33	
16		10.45 m.								
17		END OF BOREHOLE AT DEPTH 10.45 M.								
18										
19										



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-6**

SHEET **1** OF **1**

PROJECT: **PHUKET FISHERY COMPLEX**

Coordinates : **436545** N  
**866540** E

Water Level: \_\_\_\_\_ m

LOCATION: **LAEM TUKHAE, PHUKET**

SEA BED Elevation: **-4.10** m

Starting Date: **08/02/97**

CLIENT: **TETRA CO.,LTD.**

Max.DrillingDepth: **8.00** m

Finishing Date: **08/02/97**

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Plastic Limit Natural Water Content (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						X	□	□		
1		CLAYEY SAND , dusky blue green, mostly fine sand, very loose to loose, SC.	UD	1	100					
2										
3				UD	2	100				
4		4.50 m.								
5		SANDY CLAY, olive gray, with some fine sand and trace of gravel, very soft to soft, C.	UD	3	55					
6		6.00 m.								
7		CLAYEY SAND, olive gray, fine to coarse sand with trace of gravel, loose, SC.	UD	4	45					
8		8.00 m.								
9		END OF BOREHOLE AT DEPTH 8.00 M.								
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-7**

SHEET **1** OF **2**

PROJECT: **PHUKET FISHERY COMPLEX**

Coordinates : **435956** N

Water Level: \_\_\_\_\_ m

LOCATION: **LAEM TUKHAE, PHUKET**

**869930** E

Starting Date: **22/01/97**

CLIENT: **TETRA CO.,LTD.**

SEA BED Elevation: **0.35** m

Max. Drilling Depth: **34.00** m

Finishing Date: **24/01/97**

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						Plastic Limit	Natural Water Content	Liquid Limit		
1		MARINE CLAY, dark gray, with some shell fragment, very soft.	UD	1	80					
2		SANDY SILT, moderately olive brown, mostly coarse sand, with some gravel, medium dense.	SS	1	45				15	
3		SILT with gravel, grayish brown, medium dense, M.	SS	2	25				13	
4		SILT, grayish brown, medium dense, M.	SS	3	30				12	
5		SILT with sand, grayish brown, medium dense.	SS	4	25				16	
6		SILT, grayish brown, with some medium to fine sand, medium dense, M.	SS	5	25				15	
7			SS	6	28				30	
8			SS	7	32				33	
9			SS	8	30				32	
10			SS	9	30				28	
11			SS	10	27				30	
12			SS	11	18				30	
13			SILT, pale brown, dense to very dense.	SS	12	15				42
14			SILT, pale brown, dense to very dense.	SS	13	15				55
15			SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.	SS	14	15				100
16			SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.	SS	15	15				100
17			SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.	SS	16	10				82
18			SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.	SS	17	10				92
19			SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.	SS	18	10				100



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-7**  
SHEET 2 OF 2

PROJECT: **PHUKET FISHERY COMPLEX**

Coordinates : **435956 N**  
**869930 E**

Water Level: \_\_\_\_\_ m

LOCATION: **LAEM TUKHAE, PHUKET**

SEA BED Elevation: **0.35 m**

Starting Date: **22/01/97**

CLIENT: **TETRA CO.,LTD.**

Max. Drilling Depth: **34.00 m**

Finishing Date: **24/01/97**

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit (X) Plastic Limit (●) Natural Water Content (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)	
						20	40	60			
21		SANDY SILT, grayish brown, mostly fine to medium sand with a few gravel, very dense.  23.00 m.	SS	19	15					100	
22			SS	20	10					100	
23			SS	21	10					80	
24			SS	22	10					85	
25		CLAY, brown, hard (decomposed Limestone?)  25.50 m.	SS	23	10					75	
26			SS	24	10					100	
27				LIMESTONE, yellowish brown, high weathered, with sign of fissile.  34.00 m.							
28											
29											
30											
31		END OF BOREHOLE AT DEPTH 34.00 M.	NQ DIAMOND BIT CORE DIA. 47.6 mm.								
32											
33											
34											
35											
36											
37											
38											
39											



**SIAM TONE CO., LTD.**

**BORING LOG**

BORING NO. **BH-8**

SHEET 1 OF 1

PROJECT: PHUKET FISHERY COMPLEX

LOCATION: LAEM TUKHAE, PHUKET

CLIENT: TETRA CO.,LTD.

Coordinates : 435987 N  
867850 E

SEA BED Elevation: 1.74 m

Max. Drilling Depth: 10.00 m

Water Level: \_\_\_\_\_ m

Starting Date: 07/02/97

Finishing Date: 07/02/97

Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit				Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						X	Y	Z	W		
1		SILTY SAND, dark gray, fine to coarse sand, trace of gravel, loose.	UD	1	100						
2											
3											
4		4.50 m.									
5		CLAY, very light gray, with fine sand, trace of gravel, soft, C.	UD	3	80						
6	6.50 m.										
7	SAND CLAY, very light gray, fine to coarse sand and trace of gravel, soft, C.	UD	4	60							
8	8.50 m.										
9	CLAY, pale brown, with fine sand, trace of gravel, soft, C.	UD	5	30							
10	10.00 m.										
11		END OF BOREHOLE AT DEPTH 10.00 M.									
12											
13											
14											
15											
16											
17											
18											
19											



SIAM TONE CO., LTD.

**BORING LOG**

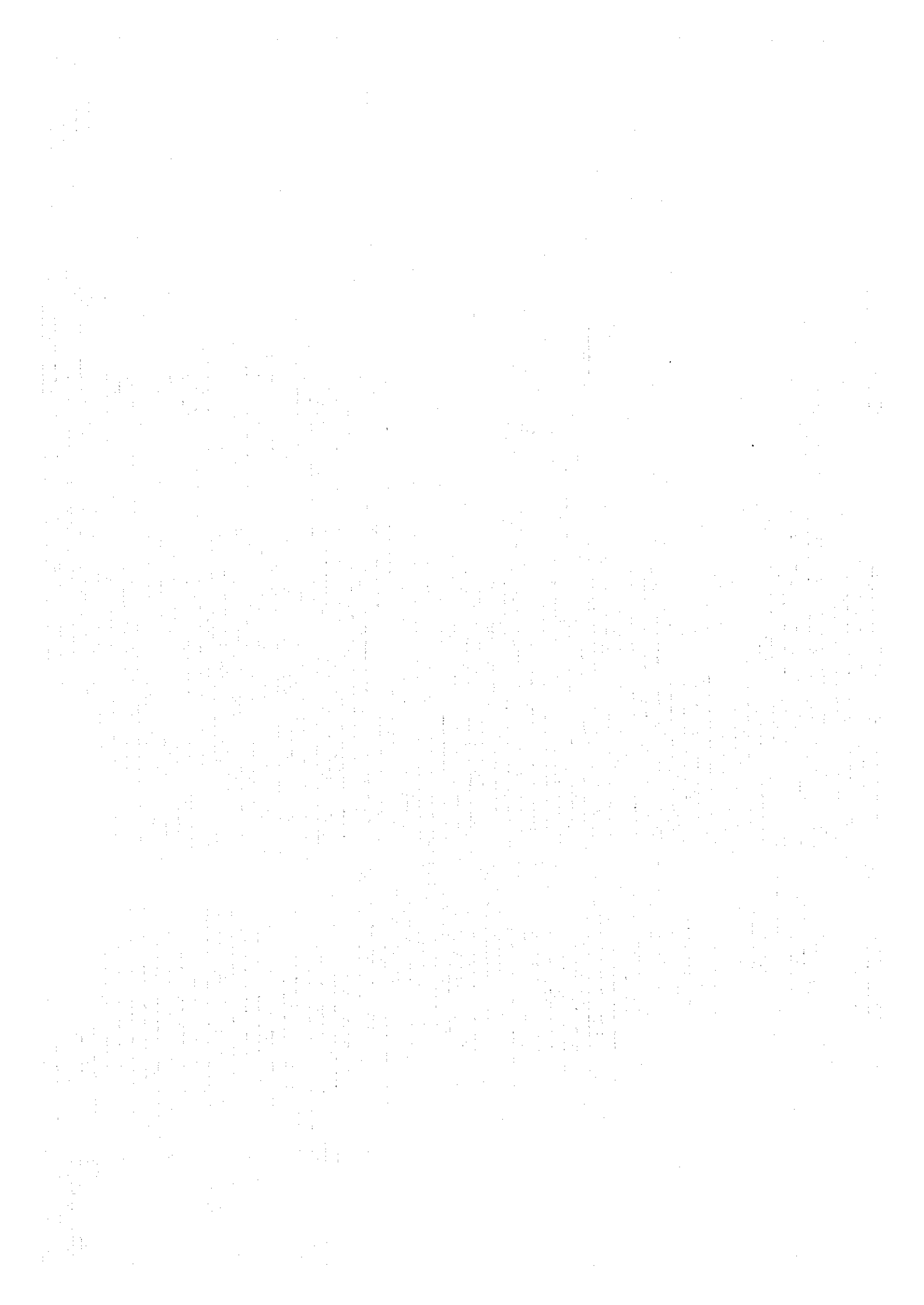
BORING NO. **BH-9**  
SHEET 1 OF 1

PROJECT: PHUKET FISHERY COMPLEX  
LOCATION: LAEM TUKHAE, PHUKET  
CLIENT: TETRA CO.,LTD.

Coordinates : 436962 N  
868477 E  
SEA BED Elevation: -1.80 m  
Max.DrillingDepth: 9.45 m

Water Level: \_\_\_\_\_ m  
Starting Date: 09/02/97  
Finishing Date: 09/02/97

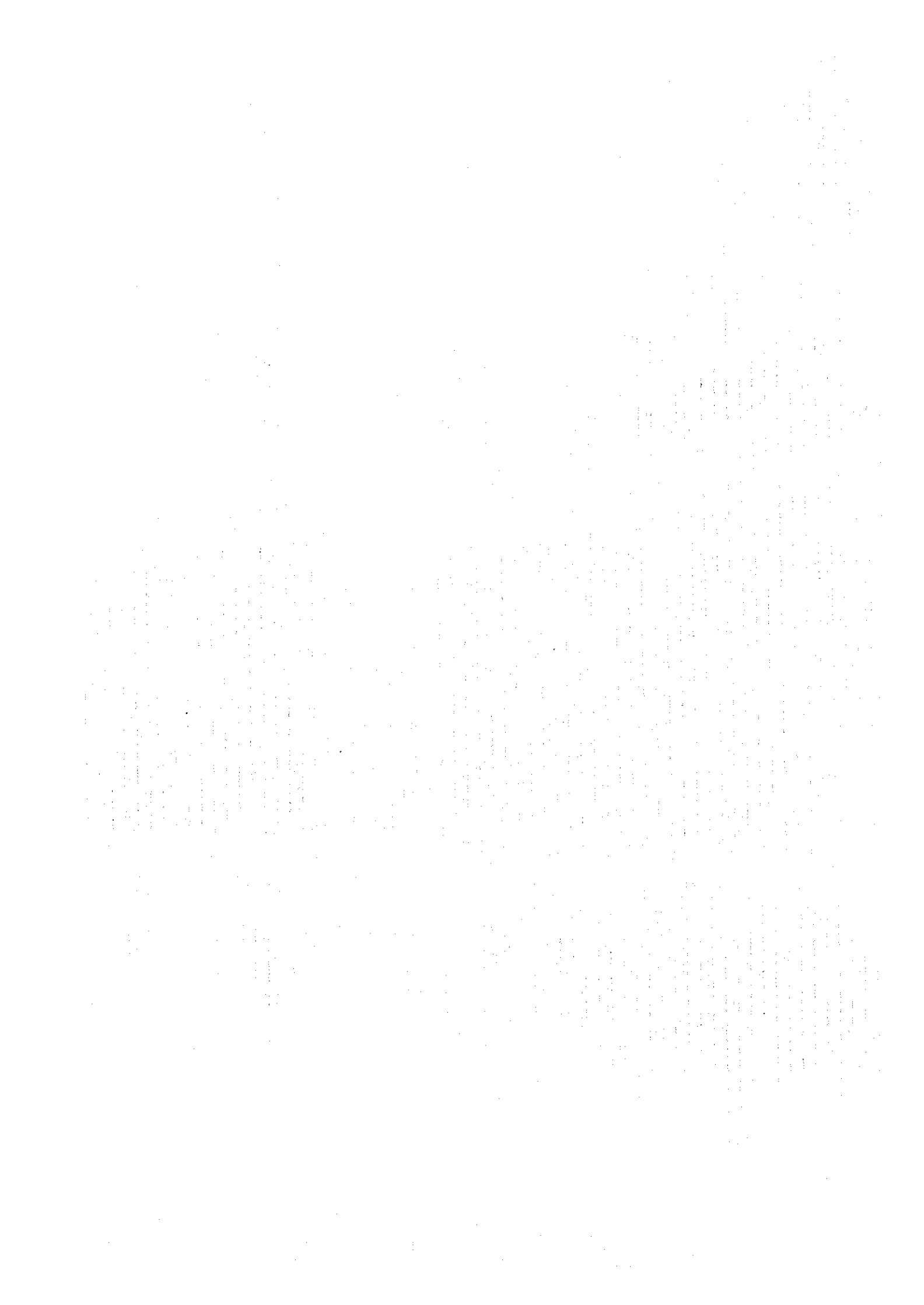
Depth (m)	Graphic Log	Soil Description	Sampling Method	Sample No.	Recovery (cm.)	Liquid Limit (%)			Total Unit Weight (Ton/m <sup>3</sup> )	SPT N Blow Count (Blow/ft)
						X Plastic Limit	• Natural Water Content	□ Liquid Limit		
1		CLAYEY SAND, light olive gray, mostly fine to medium sand, loose, SC.	UD	1	100					
2		2.50 m.								
3		SAND, light olive gray, well graded, with silt, loose, SW-SM.	UD	2	80					
4		4.50 m.								
5		CLAY, Grayish brown, with fine to medium sand, soft, C.	UD	3	78					
6		6.50 m.								
7		CLAY, moderate olive brown, with fine to coarse sand and gravel, soft, C.	UD	4	55					
8		9.45 m.								
9		END OF BOREHOLE AT DEPTH 9.45 M.	SS	1	45				2	
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										











JICA