Chapter 9 Financial Analysis

9.1 Presuppositions of the Financial Analysis

9.1.1 Scope of the Financial Analysis

1. The viability of the project can be analyzed based on the revenues and expenses related to the project. In this short-term development plan, there are four routes and eight terminals. The project is analyzed independently by route to judge the financial viability of each route.

2. Financial conditions of the project vary according to the manner in which funds are raised. Figure A9.1.1 presents a framework to calculate financial conditions according to the respective roles of the port management body, shipping management body and the government.

3. In this analysis, port management bodies manage and operate only terminals. Terminal facilities are constructed by government subsidies and foreign funds. The project cost includes construction costs of port facilities, operating costs of ports, reinvestment costs and so on. Revenues from port operations are calculated based on the respective tariffs

4. On other hand, it is assumed that shipping management bodies manage and operate the ferry service while the procurement of ships is executed with soft foreign loans or government grants. Procurement of the ships will be done by the government, which in turn will give them to shipping management bodies. The project cost includes procurement costs of ships under the case of loans, operation costs of shipping and so on. Revenues from shipping operations are calculated based on the respective tariffs.

5. A separate financial analysis of each port management body and each shipping body will be conducted. For port management bodies, the financial analysis will be conducted on both terminals of the four routes: Surabaya - Banjarmasin, Selayar - Labuhan Bajo, Manokwari - Biak, and Wahai - Babang. And the financial condition of the shipping management body is also analyzed by each route.

9.1.2 Financial Conditions of Port Management Bodies

(1) Project life

6. Considering the conditions of the long-term loans and the service life of the port facilities, the project life for the financial analysis is determined as 34 years from the beginning of the project including four years for detailed design and construction of the port facilities and 30 years of operation.

(2) Base year

7. In principle, all costs and revenues are indicated in prices of 1998, even though the price survey was conducted in 1997 before the economic crisis. But in present times, it is impossible to forecast the price variance exactly in Indonesia. Therefore neither price inflation nor increases in nominal wages are considered during the project life.

(3) Number of passengers, vehicles and cargo volume

8. The traffic volume (passengers, vehicles and cargo volume) on each route is forecast as shown in Table A8.3.1 (1), (2).

(4) Revenues

9. The terminal charges now applied to PT. ASDP ferry boats are very low when compared with the equivalent charges to the national shipping line PT. PELNI under the control of DGSC. The terminal charges for the ferry boats under the Project must be raised at least to the same level now applied to PT. PELNI. This is based upon a concept that the competitive condition for both shipping lines should be equalized; at the same time, the revenue should be maximized under present circumstances in order to reduce the amount of the subsidy. The charges are determined as follows:

Port dues : Rp.40/GRT
Berth dues: Rp.32/GRT

10. Terminal charges now applied to passengers, vehicles and other cargoes are kept at a very low level. Although this tariff is very low, this is the direct charge to the users and it is difficult to raise drastically without proper adjustment with other public charges. And a slight increase would only have a marginal effect on revenue level.

11. As with existing ferry terminals and vessels, one-hundred per-cent Government subsidy is necessary for loan repayment including interest for both terminals and vessels as well as the depreciation or reinvestment because these expenses cannot be covered by the revenues. Normal administration costs including personnel expenses and others except maintenance shall be covered by the revenue. However, all or a part of the maintenance cost must also be subsidized by the government in most cases.

(5) Fund raising

12. Necessary funds for the implementation of the project will be raised as follows:

1) Foreign funds

13. Seventy-five per cent of the construction cost or total foreign currency cost for the construction, whichever is higher, is subject to the soft foreign loan. Conditions of the loan for this project are assumed to be as follows:

Loan period:	30 years, including a grace period of 10 years
Interest rate:	2.2% per annum (soft loans from foreign government)
Repayment:	fixed amount repayment of principal

2) Domestic (government) funds

14. The construction cost except the above foreign funds will be supplied by government funds. The government funds are assumed to be in the form of a grant.

15. In addition to the above funds necessary for the initial construction, the government is assumed to supply necessary funds continuously for reinvestment, repayment and interest on soft loans and operating expenses during the project life. This situation is the same as that of other port operation offices at present.

(6) Expenditures

1) Investments

16. The initial construction costs of the project are estimated in Chapter 4 of Part 3 (the short-term development plan). Required construction costs for investments are shown in Table A9.1.2 and A9.1.3.

17. The depreciable facilities and equipment will be renewed based on their service lives (See Table A9.1.4).

18. The funds required for reinvestment will be financed by the government.

2) Maintenance costs

19. Annual maintenance costs (including repairs) are calculated as 1% of initial depreciable assets excluding the maintenance free assets.

3) Personnel and administration costs

20. Annual personnel costs are estimated based on the present number of workers.

21. Annual administration costs are assumed as 50% of the annual personnel costs. This ratio is based on the actual situation of ferry port financial conditions.

4) Depreciation expenses

22. Annual depreciation expenses of port facilities and equipment are calculated by the straight-line method based on their service lives.

9.1.3 Financial Conditions of Shipping Management Bodies

(1) Project life

23. Considering the conditions of the long-term loans and the service life of the boats, the project life for the financial analysis is determined as 26 years from the beginning of the project including one year for the boat purchase and 25 years of operation (the same as the service life of a new boat).

(2) Base year and number of passengers, vehicles and cargo volume

24. Financial conditions for the base year and the number (of passengers, vehicle and cargo volume) are the same as port management bodies of paragraph 7 and 8.

(3) Revenues

25. The boarding tariff rates of passengers, vehicles and cargo are assumed based upon the present tariff rates (route distances of over 50 miles, ferry boat sizes of over 500 GRT).

(4) Fund raising

26. For the procurement of ships, two alternative fund raising cases are considered.

1) Case of long-term loans

27. The funds for the boat purchase are assumed to be raised by the long-term loans locally.

Loan period:	20 years (no grace period)
Interest rate:	9.0% per annum (local loans)
Repayment:	fixed amount repayment of principal

2) Case of governmental grant

28. The ships are procured by the government and supplied to the operator free of charge. Shipping management body is not burdened with repayment of loan or interest.

(5) Expenditures

1) Procurement of ships in the case of long-term loans

29. In the event that long-term loans are used for financing, the procurement cost of ships must be determined. Current prices of new 1,000GRT and 5,000GRT ferry boats are confirmed. The service life of new boats is generally defined as 25 years.

30. An alternative case is to procure used ferry boats, which come at a 60% price reduction but have a remaining service life of only 15 years. When the service life of the ferry boat expires during the project life, it is assumed that the replacement cost of the used boat is borne by the shipping management body.

2) Shipping operation expenses

31. The shipping operation expenses including personnel, administration, maintenance (docking and repairs), insurance and so on are assumed based on the present PT. ASDP operation.

9.2 Evaluation

9.2.1 Evaluation of Financial Soundness of Port Management Bodies

32. At the present stage, the Indonesian government does not consider ferry terminal facilities managed by MOC to be profitable. Therefore, the method of evaluation is intended to show the operating income shortage or the required subsidies for this project.

33. As with existing ferry terminals and vessels, one-hundred percent Government subsidy is necessary for loan repayment including interest for both terminals and vessels as well as the depreciation or reinvestment because these expenses cannot be covered by the revenues. Normal administration costs including personnel expenses and others except maintenance shall be covered by the revenue. However, all or a part of the maintenance cost must also be subsidized by the government in most cases.

34. The port management body cannot cover operating costs (personnel, administration and maintenance costs) by only its own operating revenues,. As maintenance costs occupy the largest share of operating costs, the percentage of the maintenance costs which cannot be covered by operating revenues is calculated. The results of these calculations are shown in Table 9.2.1 to 9.2.4.

35. Furthermore, the results of calculations of the government subsidies to the repayments and interests for the initial investments and reinvestments are shown in Table A9.2.1 to A9.2.4.

36. Financial statements, which conbine unified the aforementioned subsidies for operating costs and for investment relations as well as depreciation of fixed assets are shown in Table A9.2.5 to A9.2.8.

37. The percentage of maintenance costs which cannot be covered by operating revenues is calculated as follows.

1) Surabaya - Banjarmasin route:

The port management body cannot cover approximately 80% of the maintenance costs by the operating revenues.

2) Selayar - Labuhan Bajo and Manokwari - Biak routes:

The port management body cannot cover approximately 100% of the maintenance costs by the operating revenues.

3) Wahai - Babang route:

The port management body cannot cover approximately 110% of maintenance costs by the operating revenues.

Table 9.2.1 Required Operating Income in Surabaya - Banjarmasin Route

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Required Inc	Sub total	Personnel	Mainte	Admi	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	781	3,752	4,533	301	4,081	151	4,533	0
2005	805	3,728	4,533	301	4,081	151	4,533	0
2006	831	3,702	4,533	301	4,081	151	4,533	0
2007	1,097	3,518	4,615	356	4,081	178	4,615	0
2008	1,128	3,487	4,615	356	4,081	178	4,615	0
2009	1,162	3,453	4,615	356	4,081	178	4,615	0
2010	1,199	3,416	4,615	356	4,081	178	4,615	0
2011	1,239	3,376	4,615	356	4,081	178	4,615	0
2012	1,520	3,274	4,794	475	4,081	238	4,794	0
2013	1,567	3,227	4,794	475	4,081	238	4,794	0
2014	1,619	3,175	4,794	475	4,081	238	4,794	0
2015	1,631	3,163	4,794	475	4,081	238	4,794	0
2016	1,631	3,163	4,794	475	4,081	238	4,794	0
2017	1,631	3,163	4,794	475	4,081	238	4,794	0
2018	1,631	3,163	4,794	475	4,081	238	4,794	0
2019	1,631	3,163	4,794	475	4,081	238	4,794	0
2020	1,631	3,163	4,794	475	4,081	238	4,794	0
2021	1,631	3,163	4,794	475	4,081	238	4,794	0
2022	1,631	3,163	4,794	475	4,081	238	4,794	0
2023	1,631	3,163	4,794	475	4,081	238	4,794	0
2024	1,631	3,163	4,794	475	4,081	238	4,794	0
2025	1,631	3,163	4,794	475	4,081	238	4,794	0
2026	1,631	3,163	4,794	475	4,081	238	4,794	0
2027	1,631	3,163	4,794	475	4,081	238	4,794	0
2028	1,631	3,163	4,794	475	4,081	238	4,794	0
2029	1,631	3,163	4,794	475	4,081	238	4,794	0
2030	1,631	3,163	4,794	475	4,081	238	4,794	0
2031	1,631	3,163	4,794	475	4,081	238	4,794	0
2032	1,631	3,163	4,794	475	4,081	238	4,794	0
2033	1,631	3,163	4,794	475	4,081	238	4,794	0
Total	43,937	98,199	142,136	13,138	122,430	6,569	142,136	0

Table 9.2.2 Subsidy for Operating Cost in Serayar - Labuhan Bajo Route

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Subsidy	Sub total	Personnel	Mainte	Admi	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	81	447	528	128	336	64	528	0
2005	85	443	528	128	336	64	528	0
2006	89	439	528	128	336	64	528	0
2007	117	411	528	128	336	64	528	0
2008	121	407	528	128	336	64	528	0
2009	126	402	528	128	336	64	528	0
2010	132	396	528	128	336	64	528	0
2011	138	390	528	128	336	64	528	0
2012	145	383	528	128	336	64	528	0
2013	152	376	528	128	336	64	528	0
2014	160	368	528	128	336	64	528	0
2015	217	379	596	174	336	87	596	0
2016	226	370	596	174	336	87	596	0
2017	237	359	596	174	336	87	596	0
2018	249	347	596	174	336	87	596	0
2019	261	335	596	174	336	87	596	0
2020	274	322	596	174	336	87	596	0
2021	286	310	596	174	336	87	596	0
2022	299	297	596	174	336	87	596	0
2023	303	293	596	174	336	87	596	0
2024	303	293	596	174	336	87	596	0
2025	303	293	596	174	336	87	596	0
2026	303	293	596	174	336	87	596	0
2027	303	293	596	174	336	87	596	0
2028	303	293	596	174	336	87	596	0
2029	303	293	596	174	336	87	596	0
2030	303	293	596	174	336	87	596	0
2031	303	293	596	174	336	87	596	0
2032	303	293	596	174	336	87	596	0
2033	303	293	596	174	336	87	596	0
Total	6,728	10,410	17,138	4,705	10,080	2,353	17,138	0

Table 9.2.3 Subsidy for Operating Cost in Manokwari - Biak

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Subsidy	Sub total	Personnel	Mainte.	Admi.	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	76	489	565	119	387	59	565	0
2005	79	486	565	119	387	59	565	0
2006	82	483	565	119	387	59	565	0
2007	85	480	565	119	387	59	565	0
2008	88	476	565	119	387	59	565	0
2009	117	448	565	119	387	59	565	0
2010	122	443	565	119	387	59	565	0
2011	127	438	565	119	387	59	565	0
2012	132	433	565	119	387	59	565	0
2013	138	427	565	119	387	59	565	0
2014	144	421	565	119	387	59	565	0
2015	151	414	565	119	387	59	565	0
2016	159	406	565	119	387	59	565	0
2017	215	432	647	174	387	87	647	0
2018	224	423	647	174	387	87	647	0
2019	234	413	647	174	387	87	647	0
2020	244	403	647	174	387	87	647	0
2021	254	393	647	174	387	87	647	0
2022	264	383	647	174	387	87	647	0
2023	274	373	647	174	387	87	647	0
2024	284	363	647	174	387	87	647	0
2025	294	353	647	174	387	87	647	0
2026	302	345	647	174	387	87	647	0
2027	305	342	647	174	387	87	647	0
2028	305	342	647	174	387	87	647	0
2029	305	342	647	174	387	87	647	0
2030	305	342	647	174	387	87	647	0
2031	305	342	647	174	387	87	647	0
2032	305	342	647	174	387	87	647	0
2033	305	342	647	174	387	87	647	0
Total	6,225	12,127	18,352	4,495	11,610	2,247	18,352	0

Table 9.2.4 Subsidy for Operating Cost in Wahai - Babang Route

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Subsidy	Sub total	Personnel	Mainte.	Admi.	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	50	492	542	110	378	55	542	0
2005	53	489	542	110	378	55	542	0
2006	55	487	542	110	378	55	542	0
2007	68	474	542	110	378	55	542	0
2008	72	470	542	110	378	55	542	0
2009	75	467	542	110	378	55	542	0
2010	79	463	542	110	378	55	542	0
2011	84	458	542	110	378	55	542	0
2012	112	472	584	137	378	69	584	0
2013	118	466	584	137	378	69	584	0
2014	124	460	584	137	378	69	584	0
2015	131	453	584	137	378	69	584	0
2016	139	445	584	137	378	69	584	0
2017	147	437	584	137	378	69	584	0
2018	156	428	584	137	378	69	584	0
2019	214	424	638	174	378	87	638	0
2020	225	413	638	174	378	87	638	0
2021	235	403	638	174	378	87	638	0
2022	246	392	638	174	378	87	638	0
2023	256	382	638	174	378	87	638	0
2024	267	371	638	174	378	87	638	0
2025	278	360	638	174	378	87	638	0
2026	288	350	638	174	378	87	638	0
2027	299	339	638	174	378	87	638	0
2028	357	391	748	247	378	123	748	0
2029	368	380	748	247	378	123	748	0
2030	379	369	748	247	378	123	748	0
2031	390	358	748	247	378	123	748	0
2032	401	347	748	247	378	123	748	0
2033	412	336	748	247	378	123	748	0
Total	6,078	12,580	18,658	4,879	11,340	2,439	18,658	0

9.2.2 Evaluation of Financial Soundness of Shipping Management Bodies

38. The financial soundness of shipping management body is appraised by the following four cases:

Case 1: The procurement of new ferry boats with long-term loans
Case 2: The procurement of new ferry boats by government grant
Case 3: The procurement of used ferry boats with long-term loans
Case 4: The procurement of used ferry boats by government grant

39. Based on the above, the profit and loss statements for each route are shown from Table A 9.2.9 to A9.2.24.

40. Financial soundness of the shipping management body is evaluated as follows:

Cases 1 and 3: Financial soundness cannot be ensured on any of the four routes.
Cases 2 and 4: All four routes are viable.

41. The financial soundness assessment for each route is summarized in Table 9.2.5.

Table 9.2.5 The Assessment of the Financial Soundness to Each Route

Route	Case 1	Case 2	Case 3	Case 4
	New Boat	New Boat	Used Boat	Used Boat
	Loans	Grants	Loans	Grants
Surabaya-Banjarmasin	×	○	×	◎
Selayar-Labuhan Bajo	×	○	×	○
Manokwari-Biak	×	○	×	○
Wahai-Babang	×	○	×	○

Assessment
◎ : Very Viable
○ : Viable
△ : Repeat to Deficit and Profit
× : Not Ensure

9.3 *Sensitivity Analysis*

9.3.1 Sensitivity Analysis for Port Management Bodies

42. Sensitivity Analysis is conducted to examine the impact of unexpected future changes. For example, during the recent economic crisis in Indonesia, the rupiah has depreciated more than 1/5 against the US dollar in the last six months. Although the Indonesian market seems now to have recovered stability, it is very difficult to forecast the price variance exactly. Therefore the following two cases are envisaged:

a) Required subsidy to cover operating costs when revenue decreases by 50%.
b) Required subsidy to cover initial investments and reinvestments when construction cost increases by 40%.

43. The results of calculations of the above a) are shown in Table 9.3.1 to 9.3.4.

44. The results of calculations of the above b) are shown in Table A9.3.1 to A9.3.4.

45 In this case, the percentage of maintenance costs which cannot be covered by operating revenues is calculated as follows.

1) Surabaya - Banjarmasin route:
   The port management body cannot cover approximately 100% of the maintenance costs by the operating revenues.
2) Other three routes:
   The port management body cannot cover approximately 130% to 140% of maintenance costs by the operating revenues.

Table 9.3.1 Required Operating Income on Sensitivity Analysis in Surabaya - Banjarmasin Route

Income decreases by 50%

(Unit : Million Rp.)

Year	Revenues			Expenses				Revenue - Expenses
	Income	Required Inc	Sub total	Personnel	Mainte	Admi	Sub total	
2000								
2001								
2002								
2003								
2004	391	4,143	4,533	301	4,081	151	4,533	0
2005	403	4,131	4,533	301	4,081	151	4,533	0
2006	416	4,118	4,533	301	4,081	151	4,533	0
2007	549	4,067	4,615	356	4,081	178	4,615	0
2008	564	4,051	4,615	356	4,081	178	4,615	0
2009	581	4,034	4,615	356	4,081	178	4,615	0
2010	600	4,016	4,615	356	4,081	178	4,615	0
2011	620	3,996	4,615	356	4,081	178	4,615	0
2012	760	4,034	4,794	475	4,081	238	4,794	0
2013	784	4,010	4,794	475	4,081	238	4,794	0
2014	810	3,984	4,794	475	4,081	238	4,794	0
2015	816	3,978	4,794	475	4,081	238	4,794	0
2016	816	3,978	4,794	475	4,081	238	4,794	0
2017	816	3,978	4,794	475	4,081	238	4,794	0
2018	816	3,978	4,794	475	4,081	238	4,794	0
2019	816	3,978	4,794	475	4,081	238	4,794	0
2020	816	3,978	4,794	475	4,081	238	4,794	0
2021	816	3,978	4,794	475	4,081	238	4,794	0
2022	816	3,978	4,794	475	4,081	238	4,794	0
2023	816	3,978	4,794	475	4,081	238	4,794	0
2024	816	3,978	4,794	475	4,081	238	4,794	0
2025	816	3,978	4,794	475	4,081	238	4,794	0
2026	816	3,978	4,794	475	4,081	238	4,794	0
2027	816	3,978	4,794	475	4,081	238	4,794	0
2028	816	3,978	4,794	475	4,081	238	4,794	0
2029	816	3,978	4,794	475	4,081	238	4,794	0
2030	816	3,978	4,794	475	4,081	238	4,794	0
2031	816	3,978	4,794	475	4,081	238	4,794	0
2032	816	3,978	4,794	475	4,081	238	4,794	0
2033	816	3,978	4,794	475	4,081	238	4,794	0
Total	21,969	120,168	142,136	13,138	122,430	6,569	142,136	0

Table 9.3.2 Subsidy for Operating Cost on Sensitivity Analysis in Serayar - Labuhan Bajo Route

Income decreases by 50%

(Unit : Million Rp.)

Year	Revenues			Expenses				Revenue - Expenses
	Income	Subsidy	Sub total	Personnel	Mainte	Admi	Sub total	
2000								
2001								
2002								
2003								
2004	41	487	528	128	336	64	528	0
2005	43	485	528	128	336	64	528	0
2006	45	483	528	128	336	64	528	0
2007	59	469	528	128	336	64	528	0
2008	61	467	528	128	336	64	528	0
2009	63	465	528	128	336	64	528	0
2010	66	462	528	128	336	64	528	0
2011	69	459	528	128	336	64	528	0
2012	73	455	528	128	336	64	528	0
2013	76	452	528	128	336	64	528	0
2014	80	448	528	128	336	64	528	0
2015	109	488	596	174	336	87	596	0
2016	113	483	596	174	336	87	596	0
2017	119	478	596	174	336	87	596	0
2018	125	472	596	174	336	87	596	0
2019	131	466	596	174	336	87	596	0
2020	137	459	596	174	336	87	596	0
2021	143	453	596	174	336	87	596	0
2022	150	447	596	174	336	87	596	0
2023	152	445	596	174	336	87	596	0
2024	152	445	596	174	336	87	596	0
2025	152	445	596	174	336	87	596	0
2026	152	445	596	174	336	87	596	0
2027	152	445	596	174	336	87	596	0
2028	152	445	596	174	336	87	596	0
2029	152	445	596	174	336	87	596	0
2030	152	445	596	174	336	87	596	0
2031	152	445	596	174	336	87	596	0
2032	152	445	596	174	336	87	596	0
2033	152	445	596	174	336	87	596	0
Total	3,364	13,774	17,138	4,705	10,080	2,353	17,138	0

Table 9.3.3 Subsidy for Operating Cost on Sensitivity Analysis in Manokwari - Biak Route

Income decreases by 50%

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Subsidy	Sub total	Personnel	Mainte.	Admi.	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	38	527	565	119	387	59	565	0
2005	40	526	565	119	387	59	565	0
2006	41	524	565	119	387	59	565	0
2007	43	523	565	119	387	59	565	0
2008	45	521	565	119	387	59	565	0
2009	59	507	565	119	387	59	565	0
2010	61	504	565	119	387	59	565	0
2011	64	502	565	119	387	59	565	0
2012	66	499	565	119	387	59	565	0
2013	69	496	565	119	387	59	565	0
2014	72	493	565	119	387	59	565	0
2015	76	490	565	119	387	59	565	0
2016	80	486	565	119	387	59	565	0
2017	108	540	647	174	387	87	647	0
2018	112	535	647	174	387	87	647	0
2019	117	530	647	174	387	87	647	0
2020	122	525	647	174	387	87	647	0
2021	127	520	647	174	387	87	647	0
2022	132	515	647	174	387	87	647	0
2023	137	510	647	174	387	87	647	0
2024	142	505	647	174	387	87	647	0
2025	147	500	647	174	387	87	647	0
2026	151	496	647	174	387	87	647	0
2027	153	495	647	174	387	87	647	0
2028	153	495	647	174	387	87	647	0
2029	153	495	647	174	387	87	647	0
2030	153	495	647	174	387	87	647	0
2031	153	495	647	174	387	87	647	0
2032	153	495	647	174	387	87	647	0
2033	153	495	647	174	387	87	647	0
Total	3,113	15,240	18,352	4,495	11,610	2,247	18,352	0

Table 9.3.4 Subsidy for Operating Cost on Sensitivity Analysis in Wahai - Babang Route

Income decreases by 50%

(Unit : Million Rp.)

	Revenues			Expenses				Revenue -
Year	Income	Subsidy	Sub total	Personnel	Mainte.	Admi.	Sub total	Expenses
2000								
2001								
2002								
2003								
2004	25	517	542	110	378	55	542	0
2005	27	516	542	110	378	55	542	0
2006	28	515	542	110	378	55	542	0
2007	34	508	542	110	378	55	542	0
2008	36	506	542	110	378	55	542	0
2009	38	505	542	110	378	55	542	0
2010	40	503	542	110	378	55	542	0
2011	42	500	542	110	378	55	542	0
2012	56	528	584	137	378	69	584	0
2013	59	525	584	137	378	69	584	0
2014	62	522	584	137	378	69	584	0
2015	66	518	584	137	378	69	584	0
2016	70	514	584	137	378	69	584	0
2017	74	510	584	137	378	69	584	0
2018	78	506	584	137	378	69	584	0
2019	107	531	638	174	378	87	638	0
2020	113	526	638	174	378	87	638	0
2021	118	521	638	174	378	87	638	0
2022	123	515	638	174	378	87	638	0
2023	128	510	638	174	378	87	638	0
2024	134	505	638	174	378	87	638	0
2025	139	499	638	174	378	87	638	0
2026	144	494	638	174	378	87	638	0
2027	150	489	638	174	378	87	638	0
2028	179	570	748	247	378	123	748	0
2029	184	564	748	247	378	123	748	0
2030	190	559	748	247	378	123	748	0
2031	195	553	748	247	378	123	748	0
2032	201	548	748	247	378	123	748	0
2033	206	542	748	247	378	123	748	0
Total	3,039	15,619	18,658	4,879	11,340	2,439	18,658	0

9.3.2 Sensitivity Analysis for Shipping Management Bodies

46. It is also very difficult to set up the sensitivity analysis for the shipping operation. Due to the great degree of uncertainty in terms of price variance, for the sensitivity analysis of shipping management bodies, procurement costs of ferry boat are assumed to increase by 80%. The same four cases described in the paragraph 38 are employed here as well.

47. Based on the above, the profit and loss statements for each route are shown from Table A 9.3.5 to A9.3.20.

48. Financial soundness based on the sensitivity analysis is evaluated as follows:

Cases 1 and 3: Financial soundness cannot be ensured on any of the four routes.
Cases 2 and 4: Surabaya-Banjarmasin route is viable but the other three routes are not.

49. The financial soundness assessment for each route is summarized in Table 9.3.5.

Table 9.3.5 The Assessment of the Financial Soundness to Each Route on Sensitivity Analysis

Route	Case 1 New Boat Loans	Case 2 New Boat Grants	Case 3 Used Boat Loans	Case 4 Used Boat Grants
Surabaya-Banjarmasin	×	○	×	○
Selayar-Labuhan Bajo	×	△	×	△
Manokwari-Biak	×	△	×	△
Wahai-Babang	×	×	×	△

Assessment
◎ : Very Viable
○ : Viable
△ : Repeat to Deficit and Profit
× : Not Ensure

9.4 Conclusions

(1) Port management body

50. The port management body cannot cover approximately 80% of the maintenance costs by the operating revenues in Surabaya - Banjarmasin route, approximately 100% of the maintenance costs by the operating revenues in Selayar-labuhan Bajo and Manokwari - Biak routes. In Wahai - Babang route, the port management body cannot cover approximately 110% of maintenance costs by the operating revenues.

51. At present, the terminal charges of port management bodies are at a comparatively low level according to the government policy. To eliminate the gap between the present tariff for ferry boats and PT. PELNI and improve the financial conditions in this short-term development plan, government should set the port tariffs at the same level as applied to PT. PELNI and each terminal should try to cover operating costs using operating revenues.

52. The operating cost including maintenance cost cannot be covered even if the terminal charge for ferry boat is raised to the same level applied by PT. PELNI. It would be necessary to raise drastically the present terminal tariffs of passengers, vehicles, cargoes and so on. In the case of Surabaya - Banjarmasin route where a high demand forecast is expected, the charge would have to be raised three times the present level for the port management body to cover all operating costs including maintenance costs by itself.

53. However, as eastern Indonesian routes are selected due to the importance of middle and short distance routes as a life line for citizens and the necessity of urgent ferry route development considering the Indonesian Government's eastern region development plan, it is acceptable for the routes to be subsidized by the government. All or a part of the maintenance cost must also be subsidized by the government or be covered by raising the tariff.

(2) Shipping management body

54. The project can be regarded as financially viable if government grant is used to procure the ferry boats. But it is difficult for three routes except Surabaya - Banjarmasin route to be financially viable if price variance such as in the recent economic crisis occurs again.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations

Conclusions

- Long-term Ferry Development Plan -

(Relation between Present Economic Situation and Study)

1. In March 1997 when this Study began, the Indonesian economy was growing smoothly and the Second Twenty-five Years Development Plan estimated GRDP in 2019 at 2,036 billion Rupiah (1993 constant price). However, the problem of economic situation surfaced after currency crisis in December 1997 left the Indonesian economy in a state of confusion. It is very difficult to assess precisely the possible influence of the recent economic situation on this Study.

(Traffic Demand in Future)

2. The forecast (target year of 2019) was based on the Origin Destination data composed of twenty-seven provinces. The 1990 OD was modified so that the total volume of OD would be the same as the 1988 data.

3. Passenger volume was forecasted using the formula (Fratar Method) obtained from the relation between passenger and GRDP/capita excluding oil and gas. Cargo volume was forecasted using the formula obtained from the relation between cargo and GRDP including oil and gas.

4. The total passenger volume in Indonesia is forecasted as 409.8 million. This value is equal to 5.84 times the passenger volume in 1995 (70.23 million). On the other hand, the total cargo volume in Indonesia in 2019 is estimated at 1.094 billion tons. This value is equal to 6.94 times the cargo volume in 1995 (158 million tons).

(Future Nationwide Ferry Service Network)

5. The nationwide ferry service network in the target year should be developed according to the following requirements; 1) Distance of ferry routes is within 550NM (1,000km) or sailing time of 20 hours, 2) Passenger demands are more than 300,000 a year, 3) Both ports connected by the ferry route are not linked by road and 4) Ferry routes in Maluku and Irian Jaya should be given high priority. The following routes are selected as the nationwide ferry service routes network in 2019.

DKI (Jakarta) - West Kalimantan

East Java - South, Central and East Kalimantan

East Java - South Sulawesi
NTT & NTB - South Sulawesi
South Sulawesi - Maluku (through Southeast Sulawesi)
Maluku - Irian Jaya

6. In addition to the routes proposed as mentioned above, the following routes are also proposed from the viewpoint of completing the nationwide ferry service network after 2019.

Riau and Jambi - West Kalimantan
East Kalimantan - Central Sulawesi
East Timor - Maluku

(Selection of Ferry Routes for the Long-term Development Plan)

7. Under the condition that there be eight(8), nine(9) or ten(10) routes in the long-term development plan, the long distance routes and the middle and short distance routes are evaluated separately.

8. Concerning the long distance ferry routes, the four routes whose ferry passenger demands exceeded three hundred thousand (300,000) in 2019 and the Ambon - Sorong route whose ferry passenger demand was the largest in Maluku and Irian Jaya are proposed.

a) Surabaya - Banjarmasin
b) Jakarta - Pontianak
c) Surabaya – Ujung Pandang
d) Kendari - Ambon
e) Ambon - Sorong

9. With regard to the middle and short distance routes, the routes whose passenger demands are more than one hundred and fifty thousand (150,000) in 2019 are proposed, that is, one in Nusa Tenggara and the remaining three in Maluku and Irian Jaya.

a) Selayar - Labuhan Bajo
b) Manokwari - Biak
c) Wahai - Babang
d) Patani - Sorong

(Ferry Terminal Development Plan at Each Site)

10. The main items of evaluation for the terminal site selection are oceanographic and topographic conditions, accessibility from/to main city and road and land use

condition. The ferry development plan at the selected site is proposed according to the field survey based on the basic premises.

(Ferry Operation)

11. The Study Team set up three model types of ferry boat in the proposed routes, 1,000GRT, 3,000GRT and 5,000GRT according to the traffic demand in 2019. The principle dimensions and characteristics such as length over all, breadth and model speed were determined according to the existing ferry boats.

(Preliminary Design and Cost Estimates)

12. Conditions of design, standard dimensions of ferry boats, tidal level in each terminal site, subsoil conditions and elevation of bearing strata, and dimensions of ferry terminal and onshore facilities are assumed from the conditions applied to the offshore structures in the vicinity of the selected ferry terminal.

13. The basic facilities for ferry terminals such as mooring facilities, loading decks, trestle and causeway are considered in preliminary plans. The construction cost is estimated on the basis of the quantity of construction works for the planned facilities and the basic cost of the works including utilities.

- Feasibility Study -

(Selection of Ferry Routes for the Feasibility Study)

14. Five long distance and four middle and short distance routes are evaluated separately for selecting ferry routes for the short-term development plan. The proposed routes for the short-term development plan are as follows.

Long distance route:	Surabaya - Banjarmasin
Middle and short distance route:	Selayar - Labuhan Bajo
	Manokwari - Biak
	Wahai - Babang

(Natural Conditions)

15. The topographic and hydrographic survey was carried out for each terminal site (except Biak - Mokmer site which was surveyed in the previous study) from January to March 1998. The results of observations verify that maneuverability of vessels at all the terminal sites are not adversely affected by the current. In order to verify the subsoil conditions of proposed terminal sites, one boring for the onshore area and another boring for the offshore facility area were executed at each terminal site.

(Preliminary Design and Cost Estimate)

16. A large volume of reclamation works is required to secure the onshore area of the ferry terminals; Surabaya ferry terminal requires 95,000m^3, 45,000m^3 for Banjarmasin, 55,000m^3 for Selayar(Patunbukan), 25,500m^3 for Wahai, 7,500m^3 for Babang, 36,000m^3 for Biak(Mokmer) and 19,000m^3 for Manokwari.

17. Dredging of 99,200m3 is required for the turning basin and access channel area to obtain the designed depth of -4.5m for the Selayar (Patumbukan) ferry terminal.

18. The mooring facilities of the Surabaya ferry terminal which are constructed some 2,800m away from the coastal line are designed by steel pipe pile foundation to minimize the impacts by currents flows. The access way to connect the onshore facilities and offshore detached platform is designed with rock mound cause way of 800m in length from the land and thereafter 20m span each of pre-stress concrete beam type trestle for the remaining 2,000m. Required dredging volume is estimated at about 230,000m^3.

19. Unit price of each element was determined on the basis of the regional unit prices collected in the field survey in February - March 1998, which reflects to some extent price changes due to the currency crisis.

20. Price of imported products are based on the CIF Jakarta price and adjusted considering import tax and some mobilization fee to the construction site. The basic costs of imported products are converted to Indonesian Rupiah for the estimation of project cost based on the exchange rate of foreign currency as 1US$ = Rp.9,600 = ¥128.

21. The total construction cost for development of the proposed terminal site for the feasibility study is as follows,

(Unit in Million Rupiah)

Route	Construction Cost
Surabaya – Banjarmasin	472,974
Selayar - Labuhan Bajo	44,561
Manokwari – Biak	41,946
Wahai - Babang	45,058

22. The period of survey, engineering study and tender procedure is estimated to be about two years. The construction period of each terminal is estimated to be about two years except for Surabaya - Banjarmasin route which requires a period of two and half

years.

(Environmental Impact Assessment)

23. After conducting the Environmental Impact Assessment, no significant effect on the environmental aspect is expected. Therefore, the implementation of this project includes no difficulty.

(Economic Analysis)

24. The economic benefits are dirided from the implementation of the development of ferry terminals and ferry operation plans including the introduction of the proposed ferry boats. In this economic analysis, reduction of travel time costs, cargo handling costs and saving of transportation costs for the ferry users are treated as the quantified economic benefits.

25. The following table shows a summary of the economic analysis results (EIRR) for each route.

Route	EIRR	
	Pattern A (Procurement new ferry boats)	Pattern B (Procurement used ferry boats)
Surabaya-Banjarmasin	9.2%	14.3%
Selayar-Labuhan Bajo	11.7%	17.1%
Manokwari-Biak	7.9%	12.1%
Wahai-Babang	3.5%	7.8%

26. In the case of used boats (Pattern B) these results indicate that implementation of the three projects i.e. Surabaya-Banjarmasin, Selayar-Labuhan Bajo and Manokwari-Biak is economically feasible.

27. The economic analysis result of Wahai-Babang route in term of quantified benefits is unfavorable. However, this route will be expected to play an important role as a direct trunk line connecting "Ambon economic influence area" with "Ternate economic influence area" in the future.

28. Also, with the implementation of new ferry service, additional traffic demand generation by increase of punctuality, regularity and comfort in ferry operation, promotion of activation of passenger and commodities movement among regions, promotion of social/cultural communication among regions, promotion of educational

opportunities for people in the region and so on, will be expected. As a result, realization of "promotion of regional economic and industrial activity" and "improvement of regional economic disparity" will be expected. Taking the enormous unquantified effects for the related regions into consideration, we judge that these projects should be implemented to stimulate regional development.

29. Since the Indonesian economic situation is still unstable and the macroscopic economic prospects remain unclear, it is very difficult to assess precisely the possible influences of the recent economic situation on these projects. Therefore, a sensitivity analysis with broader range is carried out.

30. In the low case scenario, the four projects can not be evaluated highly. This is largely due to the decreased traffic demand. However, when the Indonesian economy recovers to the extent that the forecasted traffic demand can be ensured, the implementation of these projects will be feasible.

(Financial Analysis)

31. The port management bodies and the shipping management bodies are treated separately in the financial analysis. The port management body cannot cover operating costs (personnel, administration and maintenance costs) by only its own operating revenues. As maintenance costs occupy the largest share of operating costs, the percentage of the maintenance costs which cannot be covered by operating revenues is calculated.

1) Surabaya - Banjarmasin route: The port management body cannot cover about 80% of the maintenance costs by the operating revenues.
2) Selayar - labuhan rajo and Manokwari - Biak routes: The port management body cannot cover about 100% of the maintenance costs by the operating revenues.
3) Wahai - Babang route: The port management body cannot cover about 110% of maintenance costs by the operating revenues.

32. The financial soundness of shipping management body on any of the four routes can not be ensured if new ferry boats are procured with long-term loans. With used ferry boats by government grant, all four routes are viable.

33. Judging from the above analysis, the project can be regarded as financially viable if government grant is used to procure the ferryboats. But it is difficult for three

routes except Surabaya - Banjarmasin route to be financially viable if price variance such as in the recent economic crisis occurs again.

Recommendations

(Relation between Present Economic Situation and Study)

34. Given the current state of economic confusion, it is unlikely that development of all the four routes should be made immediately from 1999. Considering the possible influence of the recent economic situation, the target year of the short-term development plan would inevitably be delayed for few years. Nevertheless, routes which are expected to generate a relatively larger demand such as Surabaya - Banjarmasin and Selayar - Labuhan Bajo may be developed at earlier time.

(Ferry Terminal Development Plan)

35. In the implementation of the Surabaya terminal, it is necessary for the Indonesian government to coordinate with PELINDO III 's passenger terminal development plan including joint management of the trestle. For the Banjarmasin terminal, the Indonesian government must confirm the future port development plan and consider the land acquisition for the ferry terminal.

(Preliminary Design)

36. At the Surabaya ferry terminal, the access way is constructed by using the 20 m span of the pre-stress concrete beam type for some 2,000m. However, the sub soil conditions under the sea bed around this area are considered undulated and complicated. It is therefore recommended to conduct more detailed soil of the proposed ferry terminal areas to facilitate detailed design of such facilities.

(Environmental Monitoring and Management)

37. To effectiveness of environmental monitoring, it is advisable to have an responsible institution for environmental monitoring and management. This institution will coordinate for the implementation of the environmental monitoring and management.

(Ferry Operation Planning)

38. The specification of all vessels including carrying capacity of ferry boat is confirmed by DGSC. However, the actual loading capacity of boats for ferry service is specified by DGLT. Therefore the ferry boat size and capacity on each route should be precisely determined at the operational stage with the authorization of the competent

authorities according to the actual boats which will be introduced.

39. To encourage constant demand for ferry transportation, it is necessary to promote reliable, convenient, comfortable and safe operation. This requires adjusting the schedule during docking maintenance with the estimated demand fluctuation. Also, to operate efficiently with a small number of boats, it is necessary to increase cruising speed, decrease berthing/anchoring time and introduce nighttime operation.

40. Service should be reliable and punctual, with fewer cancellations and less short shipment (left-off). This entails proper frequency, fixed time arrival and departure, easy access to and from the ferry terminals, and so on. In addition, better accommodations including comfortable waiting lounge in passenger terminal and cabin with sufficient number of chairs, concessions on boats, and so on are needed.

41. The stability and strength of ships is the most important element of ship safety. Ship inspection is vital for the safety for ships. The Indonesian government has ratified the international conventions according to the classification of vessels as well as other conventions regarding ship safety. Therefore the inspection of ferry boats at shipyards should be performed in the same manner as other vessels.

42. In addition, life saving facilities, fire prevention and fire fighting equipment should be securely rigged on ferry boats in conformity to the regulations including life jackets and life boats corresponding to the maximum number of passengers.

43. Navigational aids which indicate the location near the entrance of ports (except Surabaya, Banjarmasin and Labhan Bajo) and en route navigational aids should be installed as the need arises.

44. For safe and smooth loading on and off of passengers and vehicles, a movable bridge and an access bridge for passengers to load on and off separately from vehicles at Surabaya and Banjarmasin, a stem/stern ramp type boat for smooth loading on and off without reversing and a lighting system on berth for nighttime operation should be introduced.

45. Concerning the safety ferry operation, it is recommendable to take possible certain steps as soon as possible such as the comprehensive operation supervision, the modernization of facilities concerned and the training of a capable task force including crews to ensure the highest degree of safety and create a promising ferry service.

46. Maintenance of ferry boats should be regularly conducted to keep boats in operational condition, to secure the safety of passengers and vehicles and to prevent damage and trouble. Operators of ferry boats should set up an annual maintenance scheme beforehand to avoid the stoppage of operation in high demand season, especially for the docking maintenance, which ordinarily takes at least one month.

(Ferry Management System)

47. As far as the subsidy system continues, it is recommended that the Government should not only require reports from PT. ASDP but establish a strict investigation system into the financial and accounting system of its branch offices.

48. As for the shipping tariff system in the future, it is recommended that a special tariff be prepared and a season commuter pass be given to people who use a specific route as a lifeline. In the future, shipping tariff, which is determined by the Government at this stage should be freely set up by ferry operating companies according to their own management policy

49. When a ferry network service covers a number of islands in the future, the system may require a computer network on a real-time basis to ensure that up-to-date information is always available.

50. In order for the terminal management to be profitable, efficient placement of staff should be conducted, since the personnel cost at most public terminals forms more than 40% of the annual expense.

51. Aiming at enhancement of profitability, it is necessary to set up a proper tariff of each route and terminal considering operational expense, volume of transportation demand and so on instead of uniform tariff setting. Also, for terminal management, a new system to generate more revenues such as collection of anchoring fee should be introduced.

52. In order to secure efficient management, PT. ASDP should pay attention to its financial soundness as with any other commercial business. It is especially important to let administrative staff obtain a sense of business management as well as to rationalize the staff and organization. This includes elimination of overlapping duties and allocation of multiple tasks to each staff member.

53. The current port and ferry terminal management system are rather complex.

Passenger only ships are being operated as a ferry service which is not different at all from PT. PELNI shipping service. Similar finds of ports and terminals are established and managed by several different bodies such as MOC/KANWIL, PT. ASDP, PT. PELNI, and PELINDO. Considering such a complex situation, it is advisable to review and simplify (or unify) the present administration system and installations in order to develop an effective and financially sound ferry transportation system in Indonesia.

(Financial Analysis)

54. At present, the terminal charges of port management bodies are at a comparatively low level according to the government policy. To eliminate the gap between the present tariff for ferry boats and PT. PELNI and improve the financial conditions in this short-term development plan, government should set the port tariffs at the same level as applied to PT. PELNI and each terminal should try to cover operating costs using operating revenues.

55. The operating cost including maintenance cost cannot be covered even if the terminal charge for ferry boat is raised to the same level applied by PT. PELNI. It would be necessary to raise drastically the present terminal tariffs of passengers, vehicles, cargoes and so on. In the case of Surabaya - Banjarmasin route where a high demand forecast is expected, the charge would have to be raised three times the present level for the port management body to cover all operating costs including maintenance costs by itself.

56. However, as eastern Indonesian routes are selected due to the importance of middle and short distance routes as a life line for citizens and the necessity of urgent ferry route development considering the Indonesian Government's eastern region development plan, it is acceptable for the routes to be subsidized by the government. All or a part of the maintenance cost must also be subsidized by the government or be covered by raising the tariff.

APPENDIX

Table A 1.1.1 Passenger OD in 2004

Province	Aceh	North Sumatra	West Sumatra	Riau	Jambi	South Sumatra	Bengkulu	Lampung	Jakarta	West Java	Central Java	Yogyakarta	East Java	Bali	West Nusa Tenggara	East Nusa Tenggara	East Timor	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Sulawesi	Central Sulawesi	Southeast Sulawesi	South Sulawesi	Maluku	Irian Jaya	TOTAL
Aceh	369,968	89,016	8,083	7,287	0	2,231	0	356	190,791	55,822	12,669	5,850	13,441	5,908	73	824	96	246	0	194	1,520	272	353	0	1,693	26	53	766,972
North Sumatra	88,615	689,540	102,987	121,390	616	51,287	5,420	16,004	733,199	249,416	91,919	44,771	55,632	158,070	14,121	315	1,408	12,780	989	5,659	40,992	11,208	706	4,768	13,077	3,752	10,686	2,538,928
West Sumatra	8,230	107,318	206,423	55,048	0	24,710	183	735	968,107	337,326	63,647	26,881	20,968	8,811	5,269	1,136	0	8,047	237	609	7,601	267	3,490	115	24,025	1,740	5,976	1,906,905
Riau	6,333	127,337	70,635	1,076,650	26,021	100,158	2,596	1,007	356,009	146,934	97,066	25,668	179,384	26,981	19,346	11,029	38	17,537	72	8,777	6,903	161	0	97	11,483	0	8,892	2,327,355
Jambi	0	10,204	7,982	18,334	0	41,829	315	273	139,705	39,028	104,181	34,311	38,545	313	0	398	206	19,980	0	304	6,770	88	0	395	10,048	0	0	476,219
South Sumatra	8,958	46,727	30,765	80,328	60,216	835,508	21,174	39,792	1,372,249	747,933	311,686	207,038	290,506	23,322	8,768	4,041	0	20,861	1,746	3,334	13,864	3,561	333	4,643	20,314	3,750	167	4,161,604
Bengkulu	0	2,057	2,611	196	1,695	25,715	0	252	84,527	52,613	19,535	6,814	14,398	195	0	0	0	53	0	60	95	20	0	0	195	0	0	211,021
Lampung	349	684	1,684	4,490	13,769	37,964	47,336	0	3,026,486	3,227,516	808,993	251,885	419,388	79,479	16,544	5,488	0	51,815	0	956	1,231	9,623	48	2,915	9,075	4,607	0	8,022,345
Jakarta	202,307	614,157	1,064,601	376,582	201,973	1,343,103	85,216	4,128,940	0	86,249	407,763	273,356	1,195,739	761,990	361,931	104,909	253,963	272,873	45,975	135,030	323,628	126,384	55,336	16,927	202,363	211,730	164,935	13,147,931
West Java	63,942	216,949	386,295	112,699	95,029	879,900	75,097	3,663,402	73,223	12,415	126,276	48,360	163,344	366,917	87,521	30,901	63,009	105,408	25,063	72,199	167,366	27,104	17,276	12,917	64,589	59,356	48,304	7,664,660
Central Java	25,578	57,790	136,098	75,417	113,312	397,166	53,042	710,402	423,910	191,807	252,584	391	167,737	795,111	46,273	23,826	4,808	24,922	49,392	86,840	76,658	9,561	4,508	2,624	44,017	7,002	33,300	3,816,086
Yogyakarta	9,352	12,183	33,221	18,501	9,718	223,884	17,036	371,584	245,686	21,490	1,445	0	86,168	519,066	27,484	23,022	11,768	89,913	7,538	18,235	56,029	2,850	3,335	167	18,263	5,942	16,174	1,850,074
East Java	5,195	82,706	22,490	81,974	83,972	244,418	43,538	546,145	799,039	99,484	190,259	9,092	28,154,906	5,278,089	463,571	92,655	25,987	32,983	92,709	368,070	380,099	62,239	63,975	22,695	221,167	103,559	64,200	37,637,244
Bali	250	10,055	24,181	20,238	298	15,347	171	33,035	508,316	300,056	737,346	404,893	5,527,978	23,031	1,073,694	99,162	29,484	1,388	2,189	19,815	16,273	19,353	29,982	11,039	152,290	21,459	12,659	9,095,095
West Nusa Tenggara	59	4,458	0	729	0	19,879	0	0	345,453	40,535	29,584	53,905	511,917	1,196,807	1,463,018	95,772	6,646	2,947	0	9,872	2,237	2,355	2,180	1,456	49,638	133	1,499	3,840,979
East Nusa Tenggara	198	4,007	0	12,675	0	17,123	0	0	520,626	51,024	18,359	27,927	144,381	135,548	102,358	960,967	55,331	892	975	1,703	22,098	398	487	911	42,161	1,543	7,667	2,129,359
East Timor	93	971	0	37	217	0	0	6,079	124,483	65,715	3,277	2,584	12,225	21,911	6,090	21,238	25,471	0	0	0	80	199	125	127	30,841	212	3,678	325,653
West Kalimantan	202	11,550	16,461	45,816	21,835	7,487	58	10,358	369,901	111,592	45,971	12,997	40,130	1,459	2,536	820	0	341,265	28,415	28,748	20,907	111	0	37	818	1,159	7,455	1,128,088
Central Kalimantan	52	687	305	664	0	91	0	2,057	52,533	26,927	36,673	8,766	145,183	4,129	241	1,531	0	15,348	263,226	176,187	13,711	2,221	1,786	73	5,908	0	16,876	775,175
South Kalimantan	2,264	565	5,844	8,618	331	7,748	121	917	155,079	59,800	47,347	29,699	290,651	28,251	10,271	1,078	0	7,125	153,599	434,940	232,604	2,448	2,595	26,194	7,579	56,847	35,567	1,608,082
East Kalimantan	1,772	32,316	1,944	14,187	449	58,629	60	372	268,537	116,158	68,820	36,279	393,020	21,609	10,658	18,203	0	34,913	10,963	170,650	1,553,280	36,393	49,327	5,674	376,344	708	5,419	3,285,681
North Sulawesi	194	5,350	190	62	82	4,348	16	4,383	102,022	38,169	6,576	2,240	71,422	85,056	1,080	94	143	5,870	0	2,321	39,533	751,735	124,535	777	78,949	207,281	33,770	1,586,191
Central Sulawesi	159	1,231	800	0	0	228	0	76	24,737	20,073	5,605	4,864	68,982	23,342	2,270	426	116	0	17,771	904	40,713	133,113	460,307	7,103	160,804	6,450	1,248	981,272
Southeast Sulawesi	0	558	86	205	296	3,508	0	4,112	53,328	5,258	8,134	236	21,248	17,961	2,037	189	1,990	718	89	195	3,007	456	10,396	185,907	619,033	50,441	6,954	996,545
South Sulawesi	2,270	25,366	3,311	7,212	6,411	38,836	1,636	24,461	241,371	63,034	31,389	29,613	210,925	152,036	48,716	25,773	32,537	810	1,977	22,265	426,673	94,648	159,817	648,925	471,450	147,510	90,510	3,009,481
Maluku	0	12,814	17,759	51	0	344	0	6,004	127,830	56,200	26,790	8,373	89,856	16,421	734	4,648	2,816	1,076	0	28,905	2,151	190,756	10,035	45,598	109,427	10,412,005	106,332	11,307,518
Irian Jaya	53	10,691	4,603	7,396	0	4,500	0	76	159,522	73,624	33,368	10,145	67,673	7,686	2,918	1,992	199	209	147	58	5,298	39,781	4,748	7,893	90,465	110,200	914,842	1,558,067
TOTAL	796,391	2,207,497	2,149,364	2,149,796	636,240	4,389,034	353,010	9,670,772	11,465,868	6,315,889	3,587,420	1,567,052	38,395,747	9,759,499	3,777,522	1,530,437	516,066	1,069,479	703,072	1,596,859	3,461,322	1,527,106	1,005,700	1,010,357	2,836,216	11,418,415	1,619,353	125,545,433

Source : Study Team

Table A 1.1.2 Cargo OD in 2004

Province	Aceh	North Sumatra	West Sumatra	Riau	Jambi	South Sumatra	Bengkulu	Lampung	Jakarta	West Java	Central Java	Yogyakarta	East Java	Bali	West Nusa Tenggara	East Nusa Tenggara	East Timor	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Sulawesi	Central Sulawesi	Southeast Sulawesi	South Sulawesi	Maluku	Irian Jaya	TOTAL
Aceh	43,084	171,508	22,581	21,034	347	426	0	0	239,618	0	5,245	0	429,959	0	8,133	0	0	0	0	0	0	0	0	0	0	0	0	941,935
North Sumatra	464,964	1,207,424	32,405	607,688	0	203,194	3,045	631,981	13,688,541	4,122,804	2,677,865	0	4,213,192	69	702	0	0	3,358	0	0	309,723	75,058	0	188	768,664	0	0	27,010,865
West Sumatra	32,241	4,266,964	15,265	410,942	0	29,086	69,329	362,075	2,304,128	91,578	2,439,567	0	11,710,889	27,133	19,992	0	0	0	0	7,795	43,474	0	0	0	0	0	0	21,835,448
Riau	45,191	1,832,873	544,586	20,957,608	192,834	103,936	14,201	1,335,751	3,942,682	423,018	216,761	0	1,159,362	7,613	768	0	0	8,366	0	138,026	58,338	0	1,091	670	8,427	0	0	31,012,102
Jambi	0	16,667	0	16,617	31,928	145,706	0	0	365,280	90,176	6,442	0	4,941	0	0	0	0	310,033	0	744	0	0	0	220	0	0	0	988,753
South Sumatra	5,692	269,225	2,608,558	82,688	91,663	9,159,881	187	2,925,067	6,484,241	2,049,085	6,316,620	0	3,140,437	3,090	0	28,832	0	674,215	32,271	730,123	345,228	0	0	130,490	309	428,353	0	35,506,165
Bengkulu	0	0	9,697	0	1,637	59	0	0	64,373	17,913	1,681	0	1,583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96,943
Lampung	0	361,236	2,468,913	10,988	0	335,064	1,824,651	9,438,093	4,923,373	1,783,383	141,380	4,216	2,286,835	5,597	0	0	0	9,574	0	0	0	2,386	0	642	1,300	0	0	23,597,631
Jakarta	137,018	4,229,532	1,221,137	1,537,540	215,483	1,506,785	140,734	2,959,544	0	426,367	25,261	1,965	204,172	553,038	21,204	21,770	788	401,302	15,990	172,946	450,630	380,229	79,603	16,808	803,204	113,031	535,739	16,171,810
West Java	445	41,716	41,195	63,223	2,323	2,841,580	6,950	813,724	6,462	15,709	400,710	0	1,377,427	169,109	125,158	16	0	73,995	1,386	92,270	408,046	109,797	542,699	6,018	1,804	123,995	0	7,266,757
Central Java	1,606	31,721	587,242	316,609	36,916	163,495	252,209	183,558	5,514,727	46,635	42,555	0	1,577,836	76,275	35,443	390	0	850,013	124,714	61,574	268,697	0	0	133	57,979	2,605	0	10,262,962
Yogyakarta	0	0	0	0	0	0	0	0	105	0	0	0	106	955	0	0	0	0	7	63	29	3	0	0	0	0	0	1,268
East Java	409,933	6,198,509	2,179,336	716,344	40,806	2,593,070	163,983	1,256,517	394,536	4,884,512	108,311	658	1,014,529	3,512,803	539,307	835,543	26,484	40,232	282,063	759,201	1,864,084	394,942	173,397	179,845	1,439,103	739,933	608,351	33,345,332
Bali	0	0	0	0	0	0	0	0	534,063	35,686	1,289,105	5,701	1,208,677	9,799	100,797	23,948	924	0	0	2,348	615	0	6,087	1,864	1,678	333	100	3,221,735
West Nusa Tenggara	0	0	28,391	46,240	0	11,740	0	5,343	51,153	64,655	26,165	1,879	929,360	154,837	79,233	155,358	23,623	4,665	0	19,816	3,859	0	7,391	22,681	9,779	8,823	0	1,654,990
East Nusa Tenggara	0	2,978	0	0	0	0	0	0	190	0	0	0	189,747	1,732	22,766	119,676	12,927	0	0	304	4	0	0	26	0	1,330	3,532	355,262
East Timor	0	0	0	0	0	0	0	0	67	0	0	0	13,131	140	0	527	4	0	0	0	0	0	0	0	390	0	0	14,259
West Kalimantan	0	5,669	0	7,294	11,347	2,834	0	4,573	1,843,347	164,924	423,653	0	13,413	0	0	0	0	50,531	13,716	2,430	443	1,201	0	0	1,932	7,990	0	2,553,300
Central Kalimantan	0	0	0	130,137	273,316	39,300	0	0	171,863	17,609	446,107	0	639,013	10,494	0	0	0	37,826	1,091,533	419,678	93,669	1,118	0	0	86,231	0	0	3,457,906
South Kalimantan	0	0	0	918	243	8,894	0	0	82,326	156,212	405,126	13	1,004,756	85,988	18,114	46,277	0	13,891	113,549	90,841	111,401	9	91,720	8	668,278	142,277	0	3,040,800
East Kalimantan	956,095	1,335,565	47,750	434,238	494,576	998,995	0	462,571	1,290,538	7,455,461	1,623,419	18	10,230,166	397,883	855,332	1,426,147	728	625,571	457,213	2,624,077	14,578,011	2,427,324	2,031,870	2,344	3,557,518	2,328,356	1,807,390	58,249,154
North Sulawesi	0	364	0	0	0	845	0	0	84,690	0	12,950	0	220,132	15	0	4,518	0	431	2,665	233	8,121	217,437	88,560	4,618	68,890	493,095	4,637	1,211,301
Central Sulawesi	3,321	531	0	13,591	0	0	0	563	29,055	2,765	0	0	315,161	43,514	494	12,313	0	11,032	6,807	655	1,619,484	50,267	90,071	1,150	280,625	7,384	3,769	2,492,549
Southeast Sulawesi	0	0	0	0	372	0	0	0	27,294	1,089	1,351	0	142,136	646	546	42,319	83	1,045	0	1,071	1,598	2,547	24,244	2,563,767	156,484	5,902	17,128	3,388,821
South Sulawesi	748	74,868	1,965	5,030	1,589	100,999	651	6,654	427,909	10,487	366,734	0	578,738	847,525	714,182	573,444	233,974	354,313	1,151	777,162	1,132,927	1,362,244	233,608	153,121	943,916	1,108,526	150,916	10,163,372
Maluku	0	0	0	518	0	502	0	0	5,183,873	0	0	0	368,983	1,049	601	14,445	0	7,670	0	679,971	1,980	936,407	13,040	6,635,988	293,148	1,513,346	45,331	15,687,052
Irian Jaya	4,567	0	0	742	0	1,440	0	1,474	99,893	0	562,174	0	363,028	32	21,127	10,773	0	0	0	564	256,689	1,700	6,118	1,050	58,688	1,784,884	1,561,550	4,735,490
TOTAL	2,104,905	19,837,350	9,809,021	25,379,589	1,395,380	18,247,822	2,475,940	20,407,488	45,784,377	21,861,058	17,533,281	14,449	43,336,711	5,909,334	2,563,889	3,316,496	299,534	3,478,063	2,143,054	6,581,892	21,552,060	5,952,669	3,368,499	10,120,541	9,208,307	8,810,110	4,738,643	316,265,962

Source : Study Team

Table A 1.1.3 Ferry Passenger OD in 2004

Province	Aceh	North Sumatra	West Sumatra	Riau	Jambi	South Sumatra	Bengkulu	Lampung	Jakarta	West Java	Central Java	Yogyakarta	East Java	Bali	West Nusa Tenggara	East Nusa Tenggara	East Timor	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Sulawesi	Central Sulawesi	Southeast Sulawesi	South Sulawesi	Maluku	Irian Jaya	TOTAL
Aceh	345,920	0	2,764	2,405	0	0	0	0	12,401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	363,491
North Sumatra	0	388,211	44,284	56,811	220	15,917	1,789	0	329,940	112,237	41,361	0	25,034	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,015,807
West Sumatra	2,815	46,147	124,886	0	0	0	97	285	658,313	242,982	43,280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,118,804
Riau	2,090	39,687	0	583,544	13,739	43,869	0	366	160,204	66,120	43,653	11,551	80,723	0	0	0	0	7,195	0	0	0	0	0	0	0	0	0	1,072,741
Jambi	0	3,650	0	9,680	0	27,973	0	129	100,588	28,100	35,010	24,711	27,752	0	0	0	0	6,983	0	0	0	0	0	0	0	0	0	304,578
South Sumatra	0	14,474	0	35,184	37,575	547,258	12,244	23,010	988,019	538,512	224,414	149,067	209,164	0	0	0	0	6,915	758	0	0	0	0	0	0	0	0	2,786,504
Bengkulu	0	679	1,347	0	0	14,870	0	130	71,848	44,721	16,595	5,792	12,238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168,221
Lampung	0	0	653	1,633	6,316	21,953	24,420	0	2,950,824	3,146,828	788,768	245,588	408,903	77,492	0	0	0	19,120	0	297	0	0	0	0	0	0	0	7,692,995
Jakarta	13,150	289,875	723,929	169,462	145,421	957,034	72,434	4,123,247	0	62,740	201,231	133,455	478,893	422,904	86,859	0	0	160,690	15,517	44,560	0	0	0	0	0	0	0	8,051,380
West Java	0	97,627	262,681	50,715	68,421	633,528	63,832	3,571,817	53,270	12,115	88,393	26,932	71,545	284,361	28,685	0	0	0	8,647	24,692	0	0	0	0	0	0	0	5,347,259
Central Java	0	0	0	33,942	81,585	285,960	45,086	692,642	206,974	134,265	252,490	0	101,397	735,478	37,018	0	0	8,991	19,781	35,343	23,850	0	0	0	0	0	0	2,695,810
Yogyakarta	0	0	0	8,325	6,997	161,196	14,481	362,294	119,956	11,943	0	0	0	238,770	18,554	0	0	0	0	0	0	0	0	0	0	0	0	942,927
East Java	0	37,218	0	38,238	60,460	175,981	37,007	532,491	319,614	43,574	115,029	0	27,988,920	5,319,746	391,717	0	0	11,132	39,842	165,632	128,283	0	0	0	79,785	0	0	35,284,671
Bali	0	0	0	0	0	0	0	32,209	282,113	232,543	682,230	186,251	5,388,556	0	842,850	32,203	0	0	841	8,445	5,407	0	9,467	3,585	62,020	0	0	7,768,722
West Nusa Tenggara	0	0	0	0	0	0	0	0	82,909	13,285	23,667	37,194	432,570	939,493	1,316,716	35,915	2,069	0	0	4,131	748	0	714	502	21,741	0	0	2,911,656
East Nusa Tenggara	0	0	0	0	0	0	0	0	0	0	0	0	0	44,019	38,384	672,677	32,950	0	0	0	0	0	0	350	15,937	516	0	804,833
East Timor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,896	12,647	0	0	0	0	0	0	0	52	11,311	83	0	25,999
West Kalimantan	0	0	0	15,565	8,745	3,133	0	3,822	135,493	0	16,581	0	13,541	0	0	0	0	170,633	12,318	11,233	0	0	0	0	0	0	0	392,074
Central Kalimantan	0	0	0	0	0	29	0	645	17,965	9,290	14,688	0	62,392	1,586	90	0	0	6,653	0	125,269	6,838	0	698	24	2,291	0	0	249,458
South Kalimantan	0	0	0	0	0	0	0	276	51,176	20,452	19,815	0	130,793	12,035	4,298	0	0	2,784	109,209	0	138,399	0	1,049	8,958	3,285	0	0	502,530
East Kalimantan	0	0	0	0	0	0	0	0	0	0	21,317	0	132,644	7,180	3,565	0	0	0	5,468	101,537	455,984	12,283	25,711	2,162	160,323	0	0	939,172
North Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,342	387,895	50,717	304	25,876	80,373	0	558,507
Central Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,370	744	0	0	6,914	365	22,045	54,210	29,920	3,393	76,824	2,080	0	203,898
Southeast Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	5,752	703	73	810	0	29	67	1,204	178	4,957	112,474	560,225	20,203	0	706,684
South Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	76,091	61,917	28,338	9,742	11,933	0	767	9,652	181,763	31,021	76,353	587,277	388,854	47,240	0	1,503,946
Maluku	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,555	1,128	0	0	0	73,966	3,236	18,418	35,044	8,307,962	50,416	0	8,491,725
Irian Jaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52,152	320,195	372,347	
TOTAL	363,975	937,568	1,160,544	1,005,505	429,678	2,898,703	274,389	9,343,333	6,542,611	4,719,707	2,668,529	820,552	35,641,162	7,958,103	2,793,828	764,811	48,889	344,095	220,119	532,222	987,875	559,553	203,831	737,499	1,443,516	8,510,611	370,611	92,275,818

Source : Study Team

Table A 1.1.4 Ferry Cargo OD in 2004

Unit : ton

Province	Aceh	North Sumatra	West Sumatra	Riau	Jambi	South Sumatra	Bengkulu	Lampung	Jakarta	West Java	Central Java	Yogyakarta	East Java	Bali	West Nusa Tenggara	East Nusa Tenggara	East Timor	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Sulawesi	Central Sulawesi	Southeast Sulawesi	South Sulawesi	Maluku	Irian Jaya	TOTAL
Aceh	102,738	0	821	714	0	0	0	0	3,683	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107,957
North Sumatra	0	115,299	13,152	16,873	65	4,727	531	0	5,072,827	1,789,297	1,071,146	0	7,435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,091,353
West Sumatra	836	13,706	37,098	0	0	0	29	85	1,255,750	72,166	85,385	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465,046
Riau	621	17,727	0	173,313	4,081	13,029	0	109	354,841	38,072	12,965	3,431	23,975	0	0	0	0	2,137	0	0	0	0	0	0	0	0	0	644,299
Jambi	0	1,084	0	2,875	0	8,308	0	38	312,314	77,100	22,278	7,339	8,242	0	0	0	0	2,074	0	0	0	0	0	0	0	0	0	441,654
South Sumatra	0	4,299	0	10,450	11,160	162,535	3,636	6,834	1,102,321	348,344	1,073,825	44,273	62,122	0	0	0	0	2,054	225	0	0	0	0	0	0	0	0	2,832,079
Bengkulu	0	201	400	0	0	4,416	0	39	45,349	13,282	4,929	1,720	3,635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74,971
Lampung	0	0	194	485	1,935	6,520	7,253	0	4,037,165	1,462,378	234,264	72,940	121,444	23,015	0	0	0	5,679	0	88	0	0	0	0	0	0	0	5,973,357
Jakarta	3,906	1,835,617	665,520	138,379	184,238	287,209	101,328	2,426,826	0	18,634	59,766	39,639	142,231	240,018	25,797	0	0	29,905	4,608	13,234	0	0	0	0	0	0	0	6,216,656
West Java	0	28,995	78,016	15,062	20,321	483,069	18,958	1,060,830	15,821	3,598	26,253	7,999	21,249	89,628	8,519	0	0	0	2,568	7,333	0	0	0	0	0	0	0	1,888,219
Central Java	0	12,688	20,553	10,081	24,231	84,930	181,599	205,715	61,471	39,877	74,999	0	623,241	218,437	18,785	0	0	2,670	5,875	10,794	7,086	0	0	0	0	0	0	1,603,014
Yogyakarta	0	0	0	2,473	2,078	47,875	4,301	107,601	35,627	3,547	0	0	103	70,915	5,632	0	0	0	0	0	0	0	0	0	0	0	0	280,153
East Java	0	11,054	0	11,357	17,957	52,266	10,991	158,150	94,925	12,941	42,783	642	8,312,709	3,354,727	361,336	0	0	3,306	11,833	49,193	38,100	0	0	0	23,696	0	0	12,567,966
Bali	0	0	0	0	0	0	0	9,566	231,783	69,065	670,335	55,316	1,600,401	0	250,326	9,564	0	0	250	2,508	1,606	0	2,812	1,065	18,420	0	0	2,923,018
West Nusa Tenggara	0	0	0	0	0	0	0	0	24,624	3,946	13,867	11,047	622,671	279,030	391,065	10,667	614	0	0	1,227	222	0	212	149	6,457	0	0	1,365,798
East Nusa Tenggara	0	0	0	0	0	0	0	0	0	0	0	0	0	13,074	11,400	199,785	9,786	0	0	0	0	0	0	104	4,733	153	0	239,035
East Timor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	563	3,756	0	0	0	0	0	0	0	15	3,359	25	0	7,719
West Kalimantan	0	0	0	4,623	2,597	931	0	1,135	30,539	0	4,925	0	4,023	0	0	0	0	50,678	3,658	3,336	0	0	0	0	0	0	0	116,445
Central Kalimantan	0	0	0	0	0	9	0	192	5,336	2,759	4,362	0	18,531	471	27	0	0	1,976	0	37,205	2,031	0	207	7	680	0	0	73,792
South Kalimantan	0	0	0	0	0	0	0	82	15,199	6,074	5,885	0	38,846	3,574	1,277	0	0	827	32,435	0	41,105	0	312	2,661	976	0	0	149,251
East Kalimantan	0	0	0	0	0	0	0	0	0	0	6,331	0	39,395	2,132	1,059	0	0	0	1,624	30,156	138,397	3,648	7,933	642	47,616	0	0	278,934
North Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,963	115,205	15,063	99	7,685	23,871	0	165,876
Central Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	2,189	221	0	0	0	2,062	109	6,548	16,100	8,886	1,008	22,817	618	0	60,558
Southeast Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	1,708	209	22	241	9	9	20	338	53	1,475	33,405	166,287	6,060	0	209,885
South Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	22,599	18,389	6,337	2,893	3,544	0	228	2,867	53,084	9,213	22,677	174,421	115,490	14,000	0	446,672
Maluku	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	462	335	0	0	0	0	21,968	961	5,470	10,408	2,467,465	14,974	2,522,043
Irian Jaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,489	14,944	30,433	
TOTAL	108,100	2,040,670	815,748	386,683	268,662	1,155,825	328,618	3,977,201	12,710,571	3,961,077	3,414,289	244,345	11,672,852	4,317,307	1,081,553	227,149	14,520	101,305	65,375	158,070	293,399	166,887	60,538	219,037	428,724	2,527,652	29,518	50,776,381

Source : Study Team

Table A 1.1.5 Four-wheel Vehicle OD carried by ferry in 2004

Province	Aceh	North Sumatra	West Sumatra	Riau	Jambi	South Sumatra	Bengkulu	Lampung	Jakarta	West Java	Central Java	Yogyakarta	East Java	Bali	West Nusa Tenggara	East Nusa Tenggara	East Timor	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Sulawesi	Central Sulawesi	Southeast Sulawesi	South Sulawesi	Maluku	Irian Jaya	TOTAL
Aceh	41,095	0	328	286	0	0	0	0	1,023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42,733
North Sumatra	0	46,119	5,761	6,749	26	1,891	212	0	1,409,119	497,027	297,541	0	2,065	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,266,011
West Sumatra	334	5,482	14,836	0	0	0	12	34	348,819	20,046	23,718	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	413,282
Riau	248	7,091	0	69,325	1,632	5,212	0	44	98,567	10,573	3,601	953	6,660	0	0	0	0	835	0	0	0	0	0	0	0	0	0	204,763
Jambi	0	438	0	1,150	0	3,323	0	15	86,754	21,417	6,188	2,039	2,290	0	0	0	0	830	0	0	0	0	0	0	0	0	0	124,439
South Sumatra	0	1,719	0	4,180	4,464	65,014	1,455	2,734	306,200	96,762	298,285	12,298	17,256	0	0	0	0	822	90	0	0	0	0	0	0	0	0	811,279
Bengkulu	0	81	160	0	0	1,767	0	15	12,875	3,689	1,369	478	1,010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21,443
Lampung	0	0	78	194	774	2,608	2,901	0	1,121,435	406,215	65,073	20,261	33,735	9,206	0	0	0	2,271	0	35	0	0	0	0	0	0	0	1,664,786
Jakarta	1,085	509,894	184,867	38,439	51,177	79,780	28,147	674,118	0	5,176	16,602	11,011	39,509	66,672	7,166	0	0	11,962	1,843	5,294	0	0	0	0	0	0	0	1,732,740
West Java	0	8,054	21,671	4,184	5,645	134,186	5,266	294,675	4,395	999	7,292	2,222	5,902	24,897	2,367	0	0	0	1,027	2,933	0	0	0	0	0	0	0	525,716
Central Java	0	3,525	5,709	2,800	6,731	23,592	50,442	57,143	17,075	11,077	20,830	0	173,123	60,677	5,218	0	0	1,068	2,350	4,317	2,835	0	0	0	0	0	0	448,512
Yogyakarta	0	0	0	687	577	13,299	1,195	29,889	9,896	985	0	0	29	19,699	1,565	0	0	0	0	0	0	0	0	0	0	0	0	77,820
East Java	0	3,070	0	3,155	4,988	14,518	3,053	43,931	26,368	3,595	11,884	178	2,886,586	931,869	100,371	0	0	1,322	4,733	19,677	15,240	0	0	0	0	9,479	0	4,084,017
Bali	0	0	0	0	0	0	0	2,657	64,381	19,185	186,204	15,366	414,556	0	69,535	3,826	0	0	100	1,003	642	0	1,125	426	7,368	0	0	816,377
West Nusa Tenggara	0	0	0	0	0	0	0	0	6,840	1,096	3,852	3,069	172,964	77,508	108,629	4,267	246	0	0	491	89	0	85	60	2,583	0	0	381,778
East Nusa Tenggara	0	0	0	0	0	0	0	0	0	0	0	0	0	5,229	4,560	79,914	3,914	0	0	0	0	0	0	42	1,893	61	0	95,614
East Timor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225	1,502	0	0	0	0	0	0	0	6	1,344	10	0	3,088
West Kalimantan	0	0	0	1,849	1,039	372	0	454	16,215	0	1,970	0	1,609	0	0	0	0	20,271	1,463	1,335	0	0	0	0	0	0	0	46,578
Central Kalimantan	0	0	0	0	0	3	0	77	2,134	1,104	1,745	0	7,412	188	11	0	0	790	0	14,882	812	0	83	3	272	0	0	29,517
South Kalimantan	0	0	0	0	0	0	0	33	6,080	2,430	2,354	0	15,538	1,430	511	0	0	331	12,974	0	16,442	0	125	1,064	390	0	0	59,701
East Kalimantan	0	0	0	0	0	0	0	0	0	0	2,532	0	15,758	853	424	0	0	0	650	12,063	55,359	1,459	3,173	257	19,046	0	0	111,574
North Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,585	46,082	6,025	36	3,074	9,548	0	66,351
Central Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	876	88	0	0	0	825	43	2,619	6,440	3,554	403	9,127	247	0	24,223
Southeast Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	0	683	83	9	96	0	3	8	143	21	590	13,352	65,555	2,400	0	83,954
South Sulawesi	0	0	0	0	0	0	0	0	0	0	0	0	9,040	7,356	2,535	1,157	1,418	0	91	1,147	21,593	3,685	9,071	69,769	46,196	5,612	0	178,669
Maluku	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185	134	0	0	0	0	8,787	384	2,188	4,163	155,386	5,989	177,217
Irian Jaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,196	5,978	12,173
TOTAL	1,668	585,469	232,582	132,711	77,053	345,565	92,682	1,105,818	3,537,157	1,101,379	951,042	67,874	3,833,040	1,207,142	303,287	90,860	5,808	40,522	26,150	63,228	117,360	66,475	24,215	87,615	171,490	179,461	11,967	14,461,620

Source : Study Team

Table A1.3.1 Selection of Ferry Routes for the Short-term Development Plan

		Demand Volume						Distance	Cost (Million Rp.)			Evaluation Items and Evaluation															Urgency of Ferry Development	Route Selection for Short-term Development Plan	
		2004			2019				Terminal Construction	Ferry boats Operation		Development Efficiency																	
												Tariff Income Potential ('000,000)						Ratio of Terminal ('000 Rp.)			Ratio of Ferry boats ('000 Rp.)								
												2004			2019						2004			2019					
		Passenger	Vehicle	Cargo	Passenger	Vehicle	Cargo	(NM)		2004	2019	Passeng.	Vehicle	Cargo	Passeng.	Vehicle	Cargo	/Pers.	/Car	/Ton	/Pers.	/Car	/Ton	/Pers.	/Car	/Ton		Steering Committee	Study Team
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)*(7)	(2)*(7)	(3)*(7)	(4)*(7)	(5)*(7)	(6)*(7)	(8)/(4)	(8)/(5)	(8)/(6)	(9)/(1)	(9)/(2)	(9)/(3)	(10)/(4)	(10)/(5)	(10)/(6)			
Long Distant Routes																												
Route A												①	①	①	①	①	①	①	①	①	②	②	②	①	①	①			
Surabaya	Banjarmasin	559,800	63,550	166,300	1,856,500	234,860	750,000	256	167,868	21,075	55,602	143	34.2	62.6	475	126	192	90.4	340	224	37.6	158	127	29.9	113	74.1		◎	◎
Route B												②	②	②	②	②	②	③	③	③	④	④	④	⑤	⑤	⑤			
Jakarta	Pontianak	254,000	28,830	75,400	754,700	95,480	304,900	417	90,633	14,979	44,284	106	25.3	31.4	315	84.1	127	120	449	297	59.0	247	199	58.7	220	145			
Route C												③	③	③	③	③	③	⑤	⑤	⑤	⑤	⑤	⑤	④	④	④			
Surabaya	Ujung Pandang	168,500	19,110	50,000	578,500	73,190	233,700	445	115,850	10,905	29,913	75.0	17.9	22.3	257	68.5	104	200	753	496	64.7	271	218	51.7	194	128			
Route D												④	④	④	④	④	④	②	②	②	③	③	③	③	③	③			
Kendari	Ambon	126,000	14,290	37,400	502,900	63,620	203,200	362	46,708	5,325	20,473	45.6	10.9	13.5	182	48.4	73.6	92.9	349	230	42.3	177	142	40.7	153	101			
Route E												⑤	⑤	⑤	⑤	⑤	⑤	④	④	④	①	①	①	②	②	②			
Ambon	Sorong	74,800	8,490	22,200	251,200	31,780	101,500	337	40,751	2,592	9,821	25.2	6.02	7.48	84.7	22.5	34.2	162	610	401	34.6	145	117	39.1	147	96.8			
Middle and Short Distant Routes																													
Route a												①	①	①	①	①	①	①	①	①	①	①	①	③	③	③			
Selayar	Labuhan Bajo	84,500	9,550	16,700	313,000	33,950	91,100	135	26,525	2,032	3,959	11.4	2.69	2.25	42.3	9.55	12.3	84.7	375	291	24.0	102	122	12.6	56.0	43.5		◎	◎
Route b												②	②	②	④	④	④	②	②	②	②	②	②	④	④	④			
Manokwari	Biak	72,600	8,230	14,400	255,200	27,670	74,300	144	26,846	2,060	3,997	10.5	2.47	2.07	36.7	8.31	10.7	105	465	361	28.4	120	143	15.7	69.3	53.8	◎	◎	◎
Route c												②	①	①	②	②	②	②	②	②	②	②	②	①	①	①			
Wahai	Babang	47,700	5,370	9,400	222,100	24,090	64,600	178	25,267	2,154	2,676	8.49	1.99	1.67	39.5	8.94	11.5	114	503	391	45.2	193	229	12.0	53.3	41.4	◎	◎	◎
Route d												④	④	④	⑤	⑤	⑤	④	⑤	④	④	④	④	②	②	②			
Patani	Sorong	44,600	5,030	8,800	217,500	23,580	63,300	173	27,836	2,145	2,657	7.72	1.81	1.52	37.6	8.50	11.0	128	566	440	48.1	204	244	12.2	54.1	42.0			

A1.3.1 Evaluation Ranks

1. Long Distant Routes

1) Demand Potential (2004)

	Passenger (1,000,000 Person * NM)	Vehicle (1,000,000 Cars *NM)	Cargo (1,000,000 Ton * NM)
◎ :	100 ～	30 ～	40 ～
○ :	50 ～ 100	20 ～ 30	20 ～ 40
△ :	Less than 50	Less than 20	Less than 20

2) Demand Potential (2019)

	Passenger (1,000,000 Person * NM)	Vehicle (1,000,000 Cars *NM)	Cargo (1,000,000 Ton * NM)
◎ :	400 ～	100 ～	100 ～
○ :	200 ～ 400	50 ～ 100	50 ～ 100
△ :	Less than 200	Less than 50	Less than 50

3) Ratio of Terminal

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 100	Less than 400	Less than 300
○ :	100 ～ 150	400 ～ 500	300 ～ 400
△ :	150 ～	500 ～	400 ～

4) Ratio of Ferry Boats (2004)

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 40	Less than 150	Less than 150
○ :	40 ～ 50	150 ～ 200	150 ～ 200
△ :	50 ～	200 ～	200 ～

5) Ratio of Ferry Boats (2019)

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 40	Less than 150	Less than 100
○ :	40 ～ 50	150 ～ 200	100 ～ 150
△ :	50 ～	200 ～	150 ～

2. Middle and Short Distant Routes

1) Demand Potential (2004)

	Passenger (1,000,000 Person * NM)	Vehicle (1,000,000 Cars *NM)	Cargo (1,000,000 Ton * NM)
◎ :	10 ～	2.5 ～	2.0 ～
○ :	8.0 ～ 10	2.0 ～ 2.5	1.5 ～ 2.0
△ :	Less than 8.0	Less than 2.0	Less than 1.5

2) Demand Potential (2019)

	Passenger (1,000,000 Person * NM)	Vehicle (1,000,000 Cars *NM)	Cargo (1,000,000 Ton * NM)
◎ :	40 ～	9 ～	12 ～
○ :	30 ～ 40	8 ～ 9	10 ～ 12
△ :	Less than 30	Less than 8	Less than 10

3) Ratio of Terminal

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 100	Less than 400	Less than 300
○ :	100 ～ 150	400 ～ 500	300 ～ 400
△ :	150 ～	500 ～	400 ～

4) Ratio of Ferry Boats (2004)

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 40	Less than 150	Less than 150
○ :	40 ～ 50	150 ～ 200	150 ～ 200
△ :	50 ～	200 ～	200 ～

5) Ratio of Ferry Boats (2019)

	Passenger (1,000Rp. / Person)	Vehicle (1,000Rp. / Car)	Cargo (1,000Rp. / Ton)
◎ :	Less than 15	Less than 60	Less than 50
○ :	15 ～ 20	60 ～ 70	50 ～ 60
△ :	20 ～	70 ～	60 ～

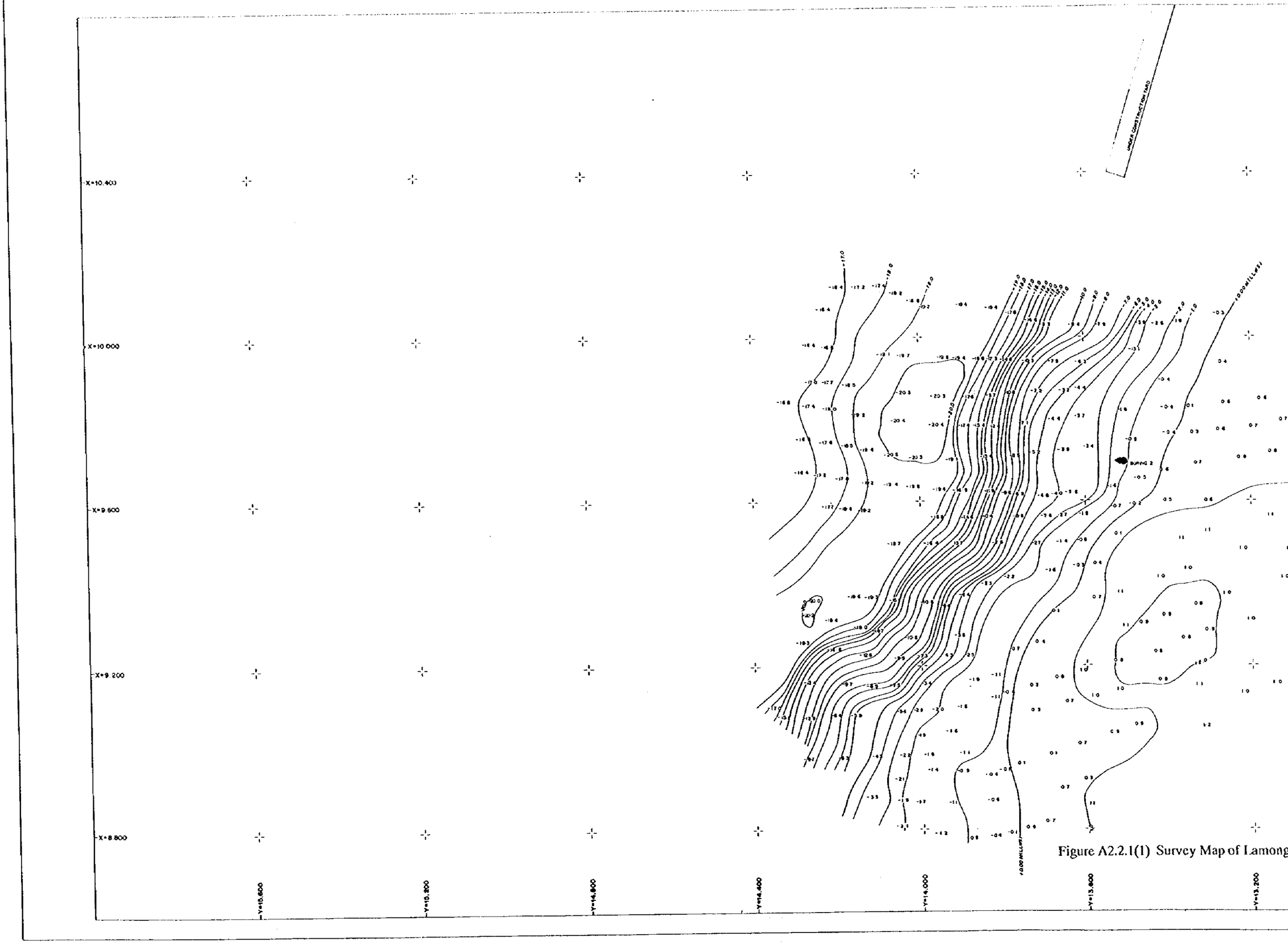


Figure A2.2.1(1) Survey Map of Lamong

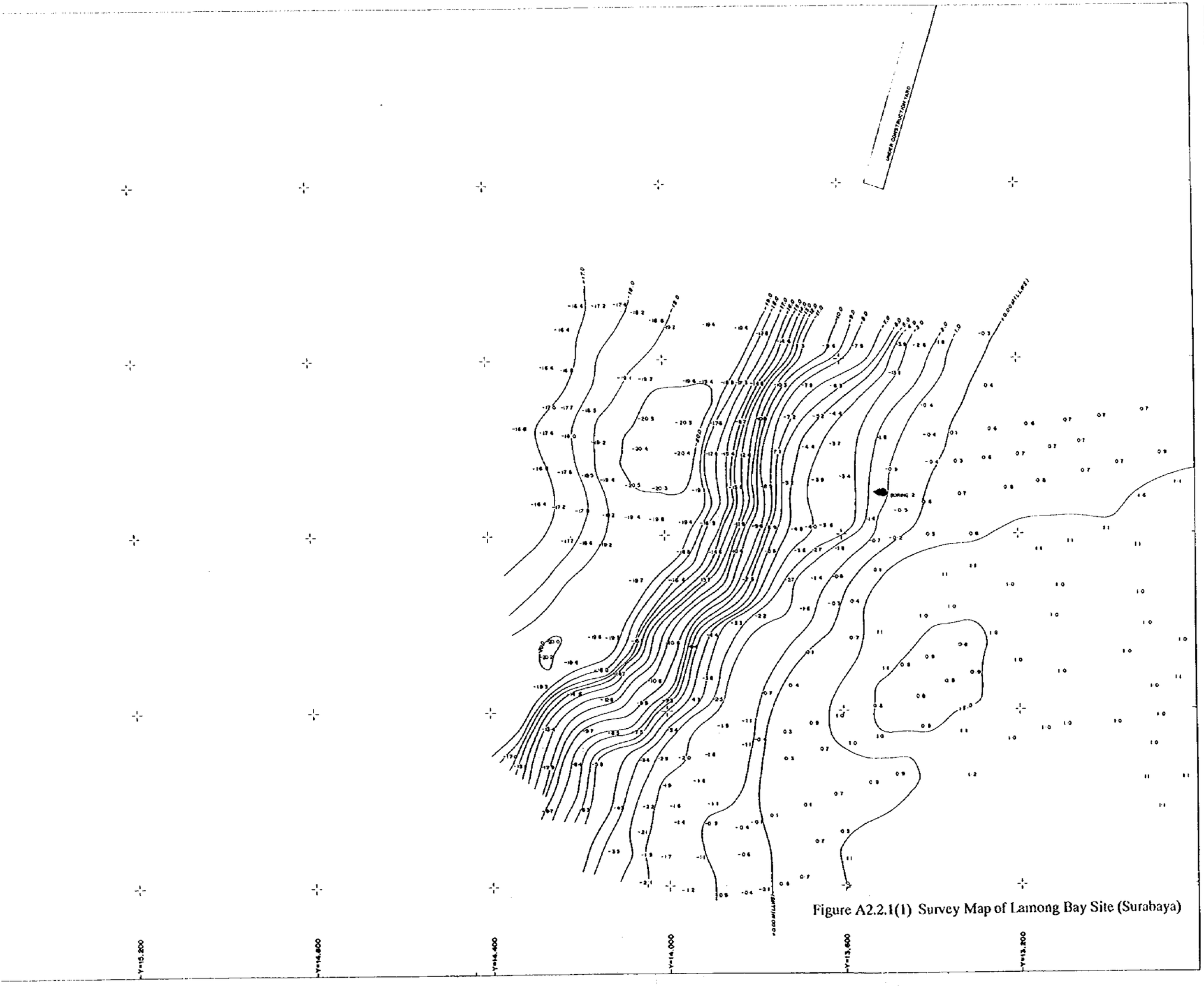


Figure A2.2.1(1) Survey Map of Lamong Bay Site (Surabaya)

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Surabaya – Banjarmasin
Location : Lamong Bay
Municipal : Surabaya
Province : East Java

LEGEND

Building
Road
Bridge
Trestal
Mangrove
Ponds
Polygon Line
Contour Line
Bench Mark
Current Observation
Boring Location

295 Ground Height
-35 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM. 1	10,000.000	10,000.000	4.270
BM. 2	9,973.548	10,185.222	4.238

NOTES : HHWS = 2.742 M
MSL = 1.371 M
LLWS = 0.000 M

INDEX

1 2

SCALE 1 : 4000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	DEDE LILI. N		March, 5, 1998
Checked by	Ir. WWW. W		March, 8, 1998
Approved by	T. WATANABE		March, 10, 1998
		Sheet No	

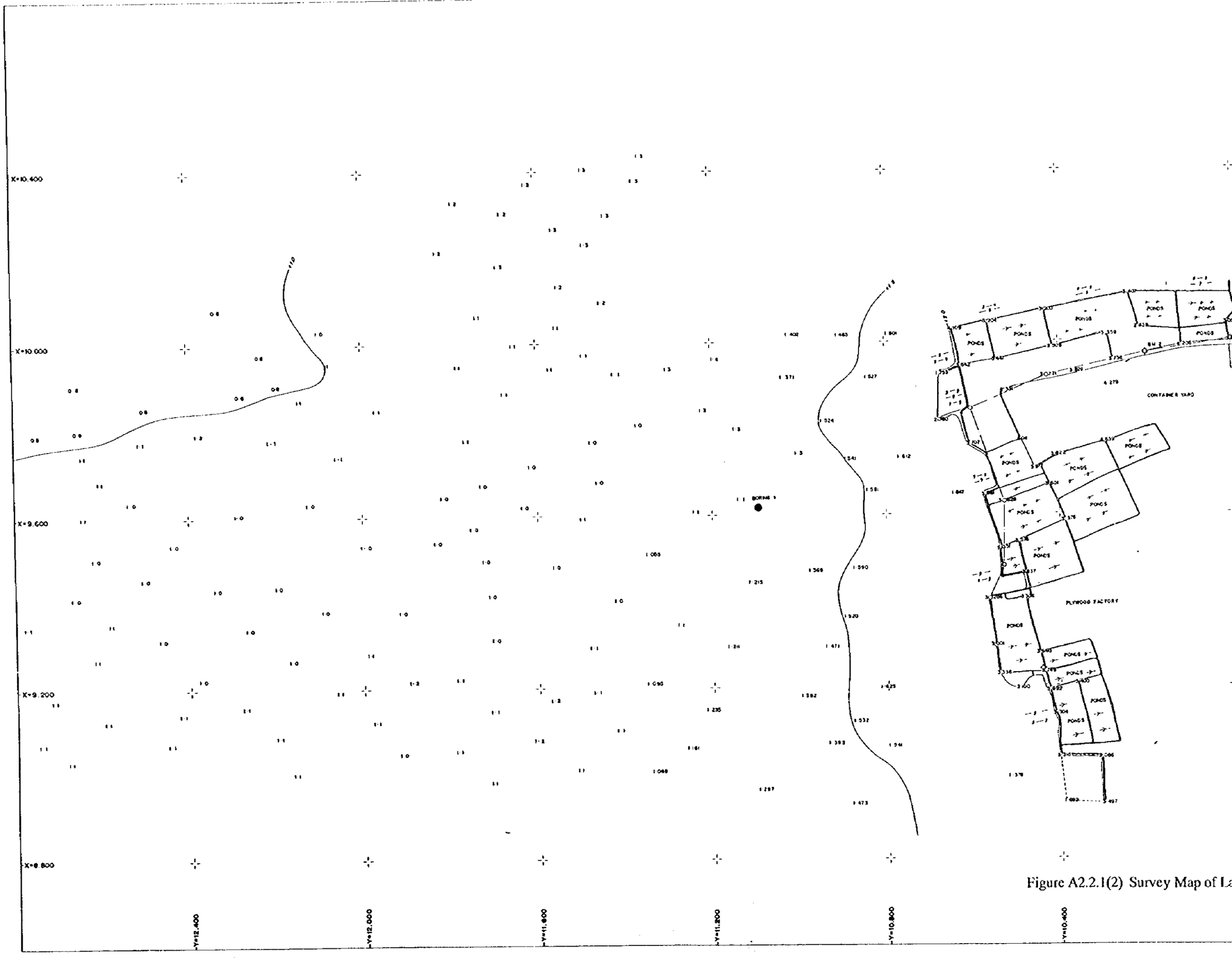


Figure A2.2.1(2) Survey Map of La

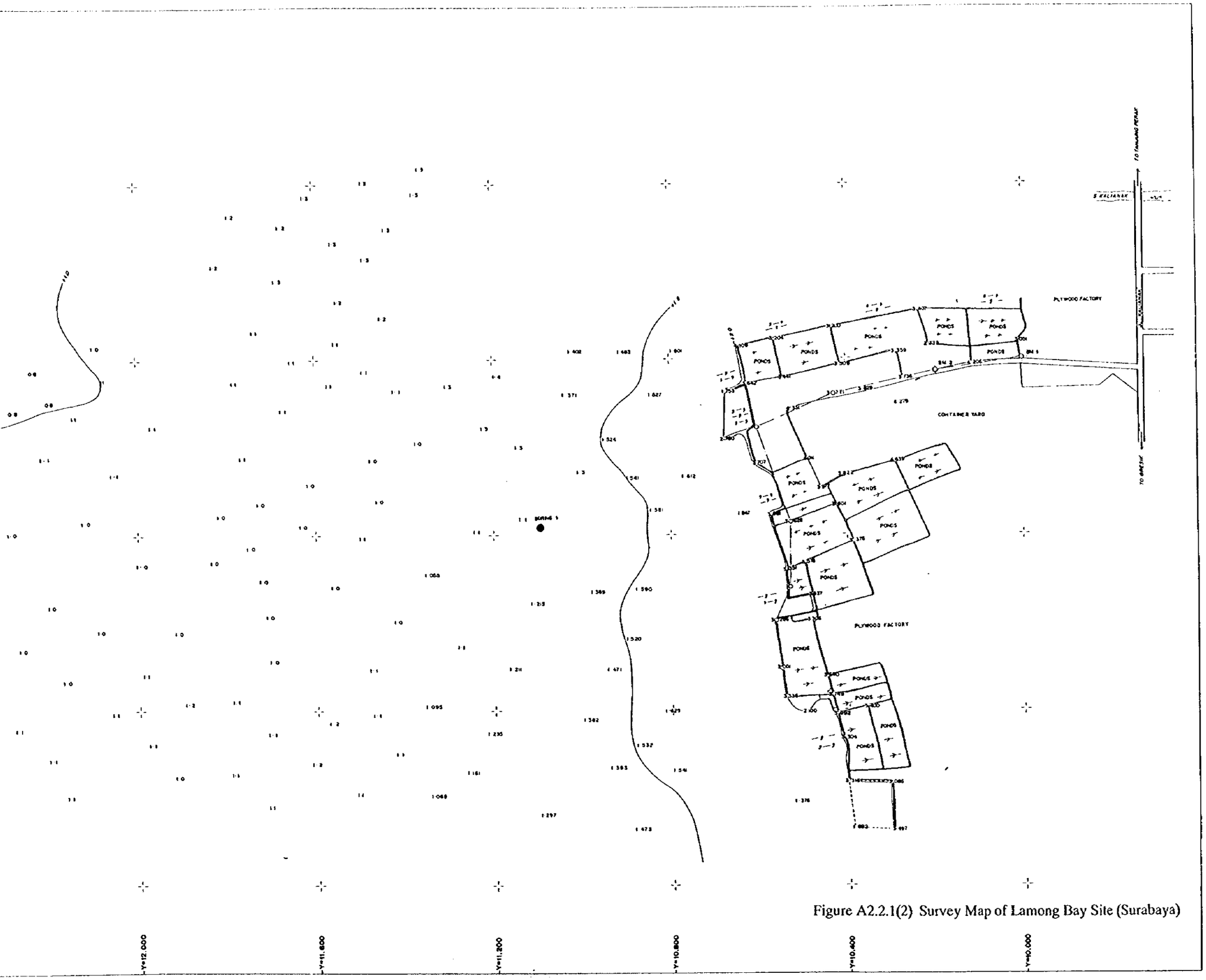
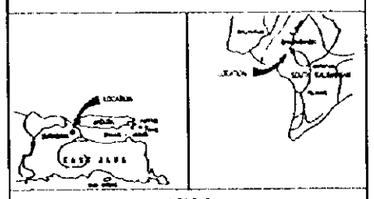


Figure A2.2.1(2) Survey Map of Lamong Bay Site (Surabaya)

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Surabaya - Banjarmasin
Location : Lamong Bay
Municipal : Surabaya
Province : East Java



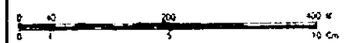
LEGEND

- Building
- Road
- Bridge
- Trestel
- Mangrove
- Ponds
- Polygon Line
- Contour Line
- Bench Mark
- Current Observation
- Boring Location

2.95 Ground Height
-3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM. 1	10,000.000	10,000.000	4.270
BM. 2	9,973.598	10,195.222	4.238

NOTES : HHWS = 2.742 M
MSL = 1.371 M
LLWS = 0.000 M



SCALE 1 : 4000

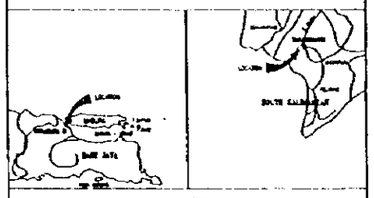
Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	DEDE LILI. N		March, 5, 1998
Checked by	Ir. WIWIN. W		March, 6, 1998
Approved by	T. WATANABE		March, 10, 1998
		Sheet No	

Figure A2.2.2 Survey M

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE
FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Surabaya - Banjarmasin
Location : Banjarmasin
Municipal : Banjarmasin
Province : South Kalimantan



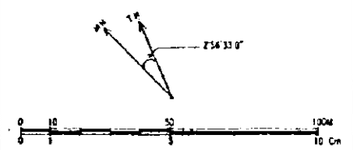
LEGEND

Building	Tower
Mosque	Polygon Line
Electric Pole	Contour Line
Road	Bench Mark
Canal	Tidal Observation
Bridge	Current Observation
Trestel	Boring Location
Fence	

2.95 Ground Height
-3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM. 1	228,837.000	9749,232.000	3.076
BM. 2	228,855.065	9749,237.458	3.904

NOTES : HHWS = 2.966 M
MSL = 1.483 M
LLWS = 0.000 M



SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

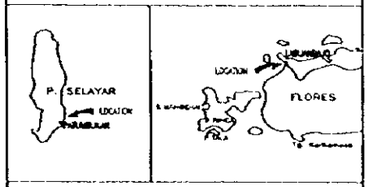
Items	Name	Signature	Date
Drawn by	PURWANTO		March, 5, 1998
Checked by	Ir. Ouri IRWANTO		March, 8, 1998
Approved by	T. WATANABE		March,10, 1998
		Sheet No	

Figure A2.2.2 Survey Map of Banjarmasin Site

Figure A2.2.3

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE
FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Labuanbajo - Palumbukan
Location : Labuanbajo
Regency : Manggarai
Province : East Nusa Tenggara



LEGEND

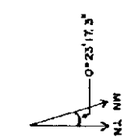
- Building
- Electric Pole
- Road
- Culvert
- Drainage
- Fence
- Tower
- Ex-Pontoon
- Trestel
- Polygon Line
- Contour Line
- Bench Mark
- Tidal Observation
- Current Observation
- Boring Location

255 Ground Height

-3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM. 1	818,525.813	9060,312.302	3.488
BM. 2	818,577.902	9060,248.645	3.194

NOTES : HWS = 2.702 M
MSL = 1.351 M
LWS = 0.000 M



SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	SALIKAN		March, 5 ,1998
Checked by	Ir WIWIN W		March, 6 ,1998
Approved by	T.WATANABE		March, 10,1998
	Sheet No		

Figure A2.2.3 Survey Map of Labuhan Bajo Site

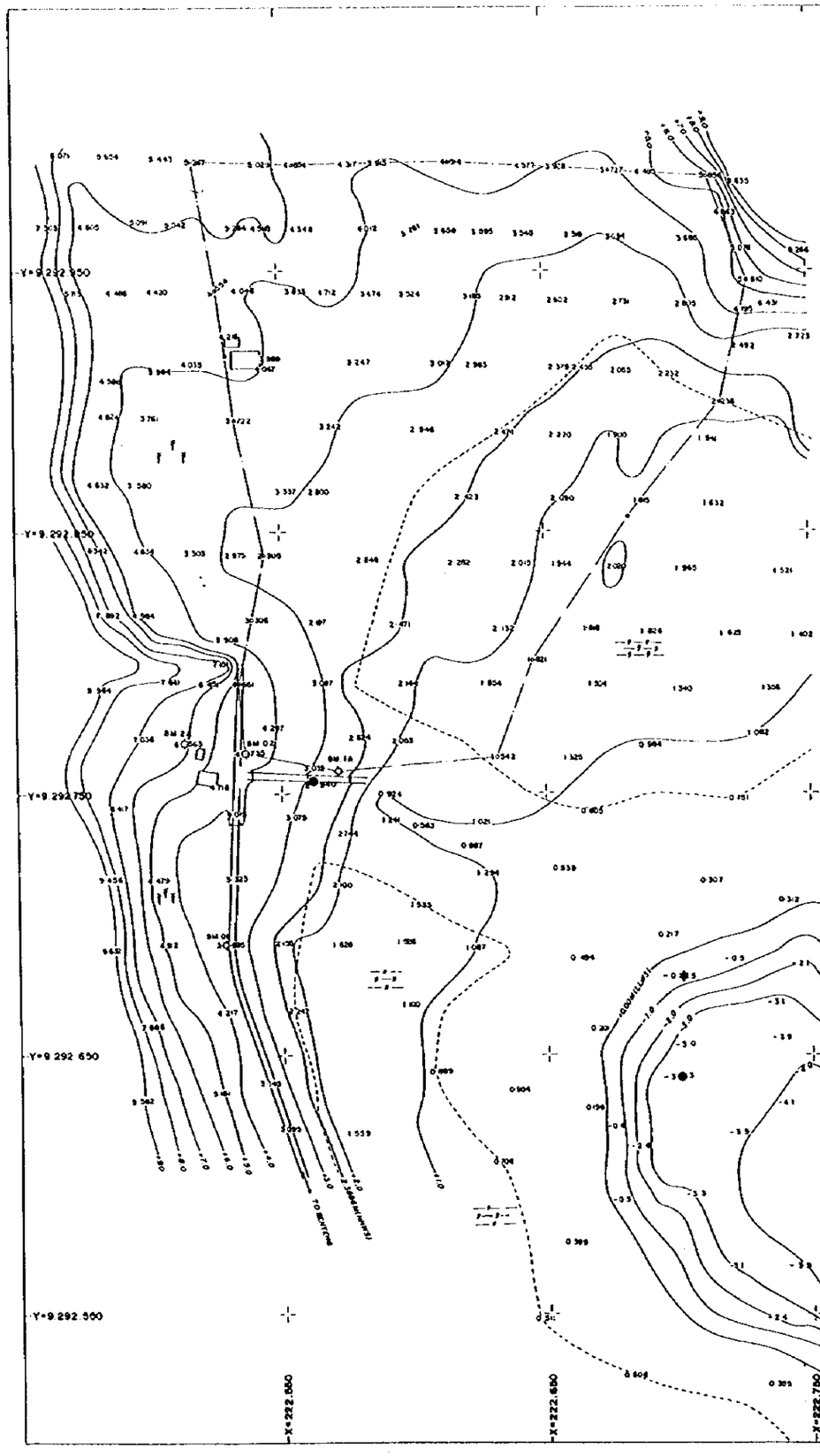
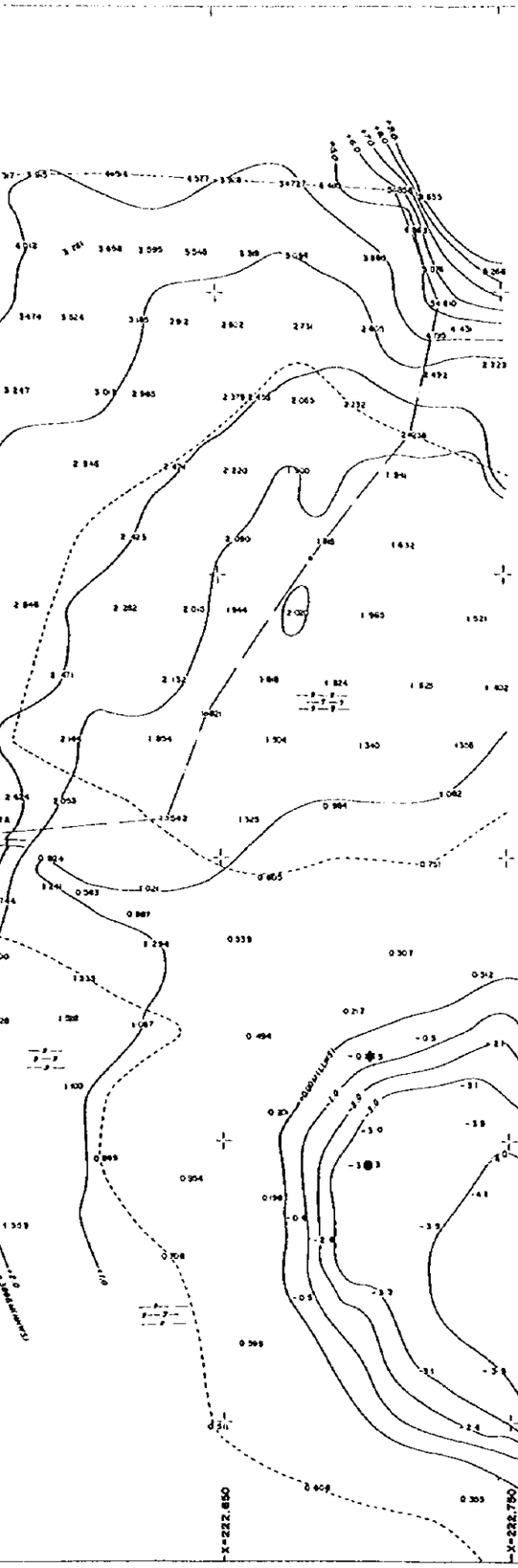
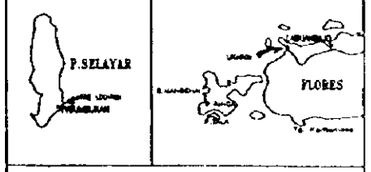


Figure A2.2.4(1) Survey Map of Patumb



TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Selayar - Labuanbajo
Location : Patumbukan
Regency : Selayar
Province : South Sulawesi



LEGEND

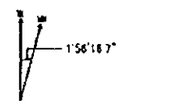
- Building
- Road
- River
- Coconut Tree
- Mangrove
- Mangrove Boundary
- Polygon Line
- Contour Line
- Bench Mark
- Tidal Observation
- Current Observation
- Boring Location

2.56 Ground Height
-3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM.1A	222,571.000	9292,756.000	2.704
BM.02	223,534.294	9292,763.294	4.735
BM.01	222,527.893	9292,899.781	3.885
BM.2A	222,513.087	9292,787.452	8.363

NOTES : HWS = 2.358 M
MSL = 1.194 M
LLWS = 0.000 M

INDEX



SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	MAMAT R.		March, 6, 1998
Checked by	Ir. UNANG AM.		March, 7, 1998
Approved by	T. WATANABE		March, 10, 1998
		Sheet No	1

Figure A2.2.4(1) Survey Map of Patumbukan Site (Selayar)

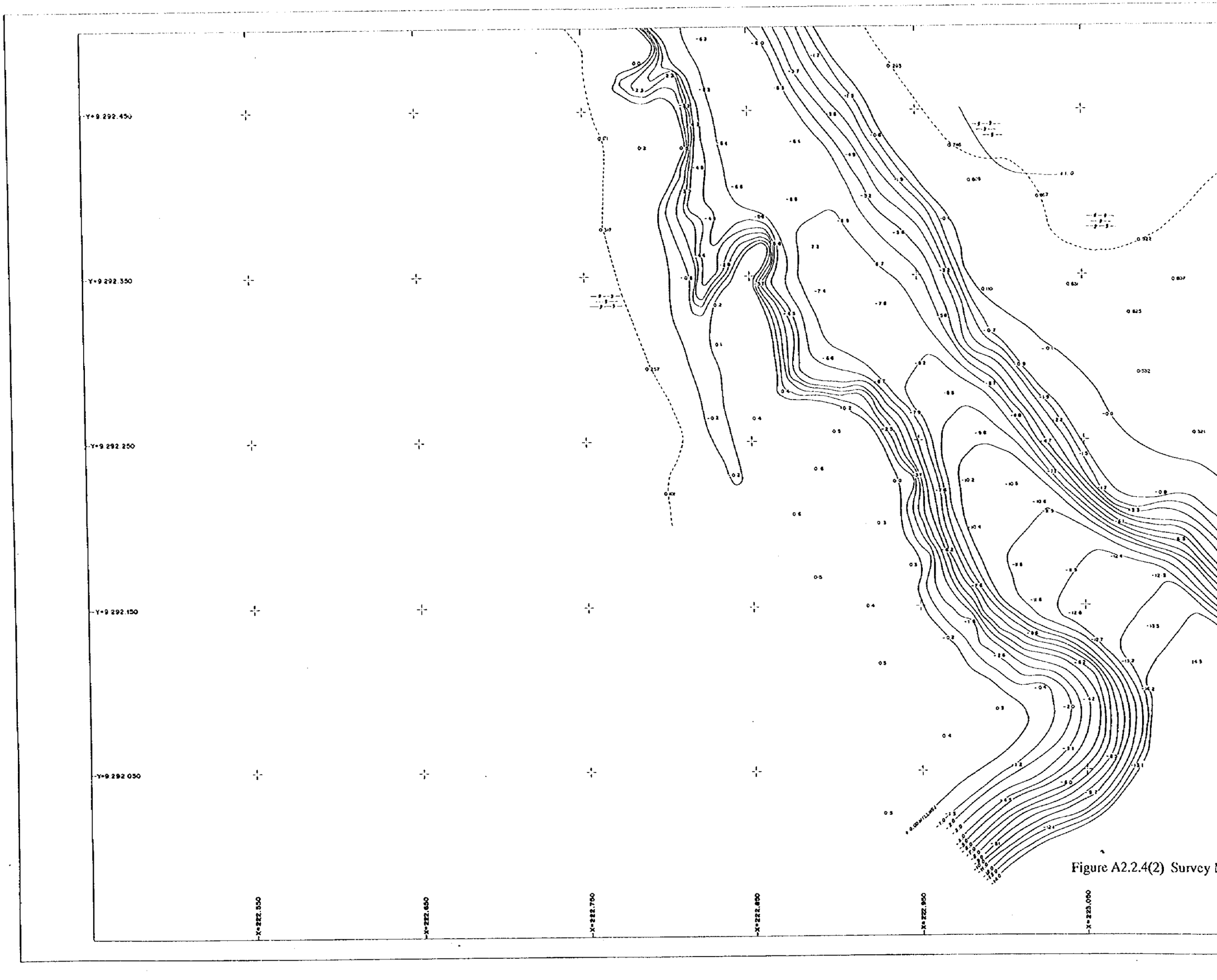
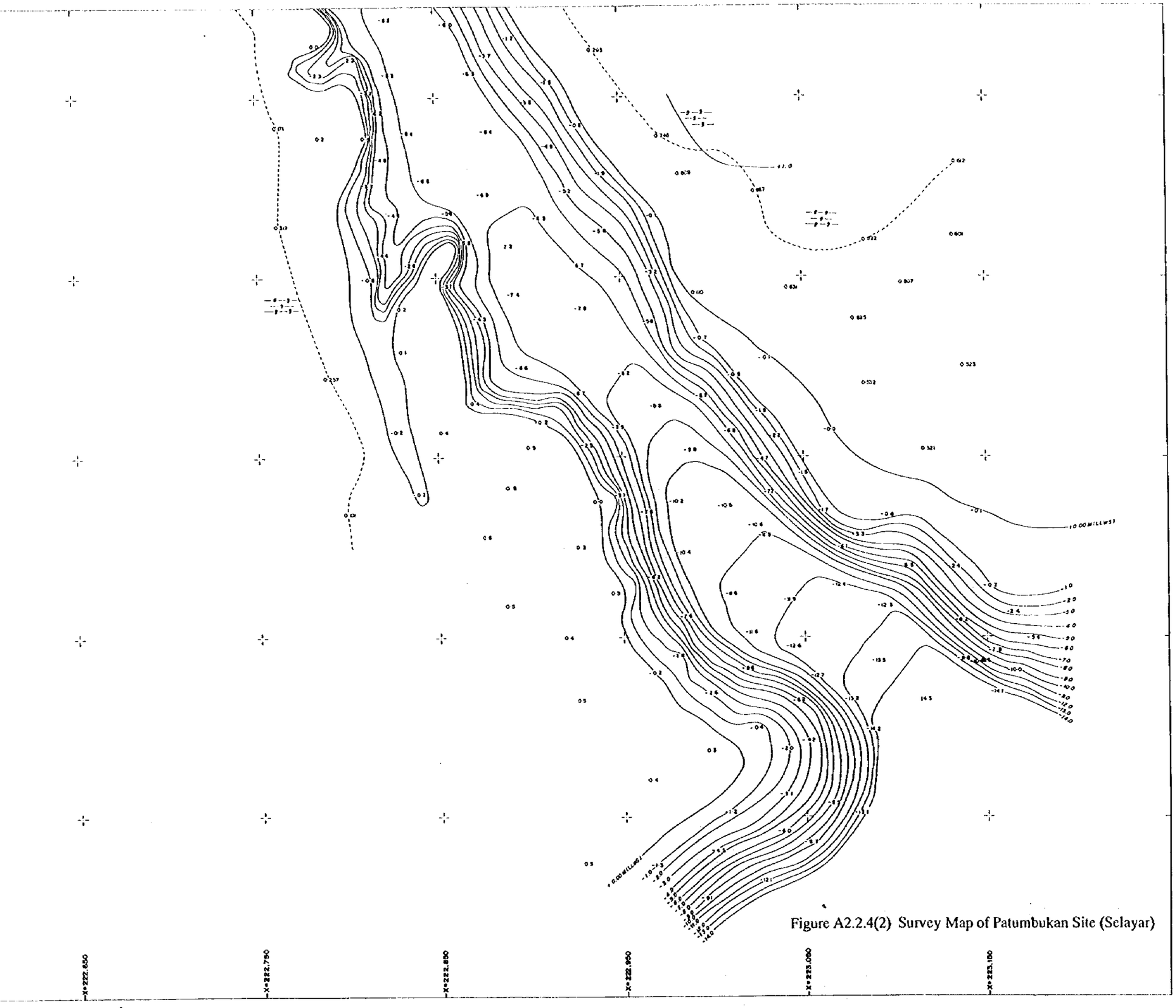
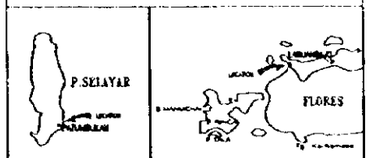


Figure A2.2.4(2) Survey



TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Selayar - Labuanbajo
Location : Patumbukan
Regency : Selayar
Province : South Sulawesi



LEGEND

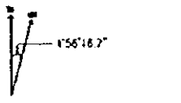
- Building
- Road
- River
- Coconut Tree
- Mangrove
- Mangrove Boundary
- Polygon Line
- Contour Line
- Bench Mark
- Tidal Observation
- Current Observation
- Boring Location

2.95 Ground Height
-3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM.1A	222.571.000	9292.756.000	2.754
BM.02	222.536.298	9292.763.294	4.735
BM.01	222.527.893	9292.889.781	3.895
BM.2A	222.513.087	9292.767.452	8.563

NOTES : HHWS = 2.388 M
MSL = 1.194 M
LLWS = 0.000 M

INDEX



0 10 50 100 M
0 5 10 Cm

SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	MAMAT R.		March, 6, 1998
Checked by	Ir. UNANG AM		March, 7, 1998
Approved by	T. WATANABE		March, 10, 1998
		Sheet No	2

Figure A2.2.4(2) Survey Map of Patumbukan Site (Selayar)

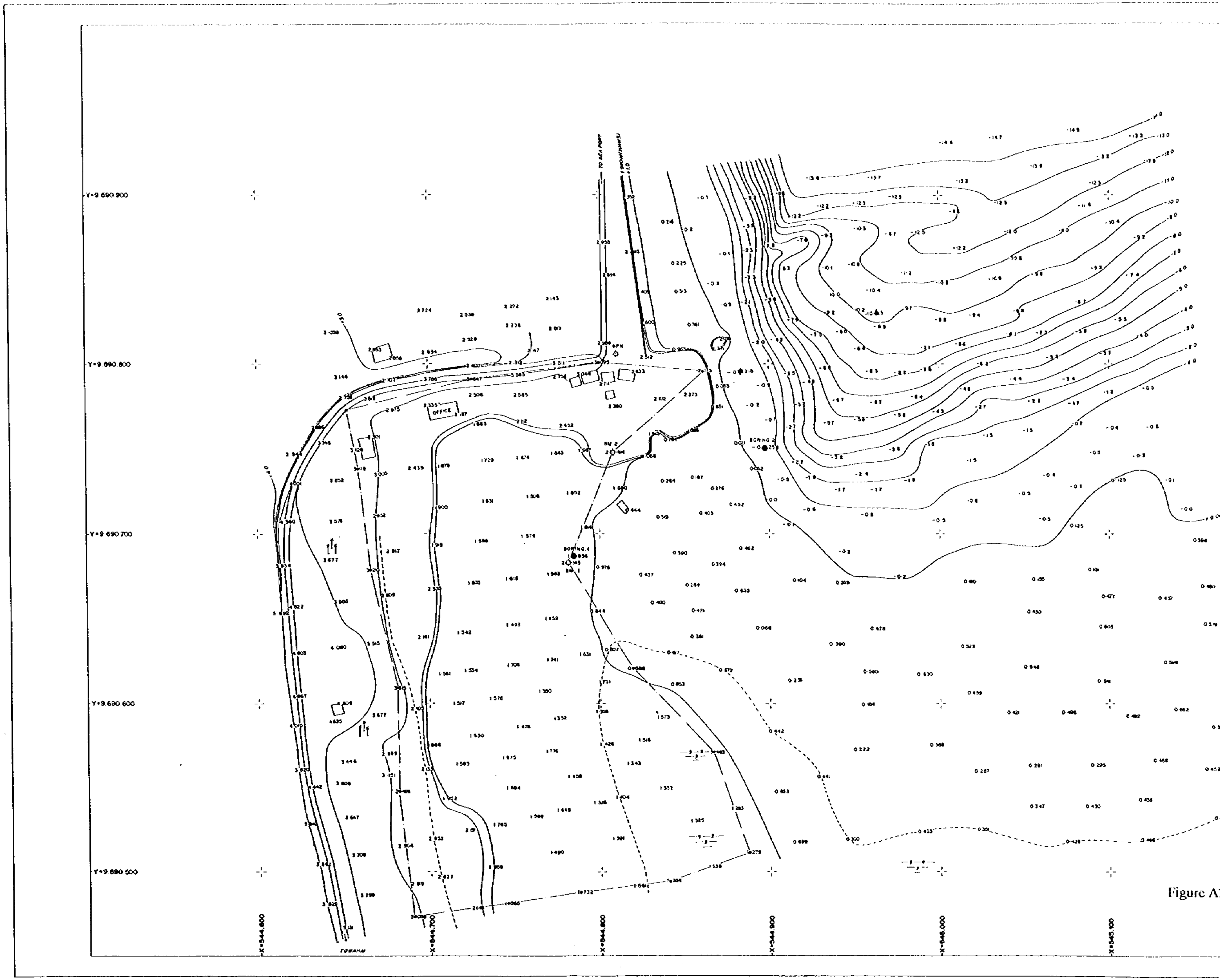

Y=9 690 900
Y=9 690 800
Y=9 690 700
Y=9 690 600
Y=9 690 500
X=544 600
X=544 700
X=544 800
X=544 900
X=545 000
X=545 100
OFFICE
BORING 1
BORING 2

Figure A

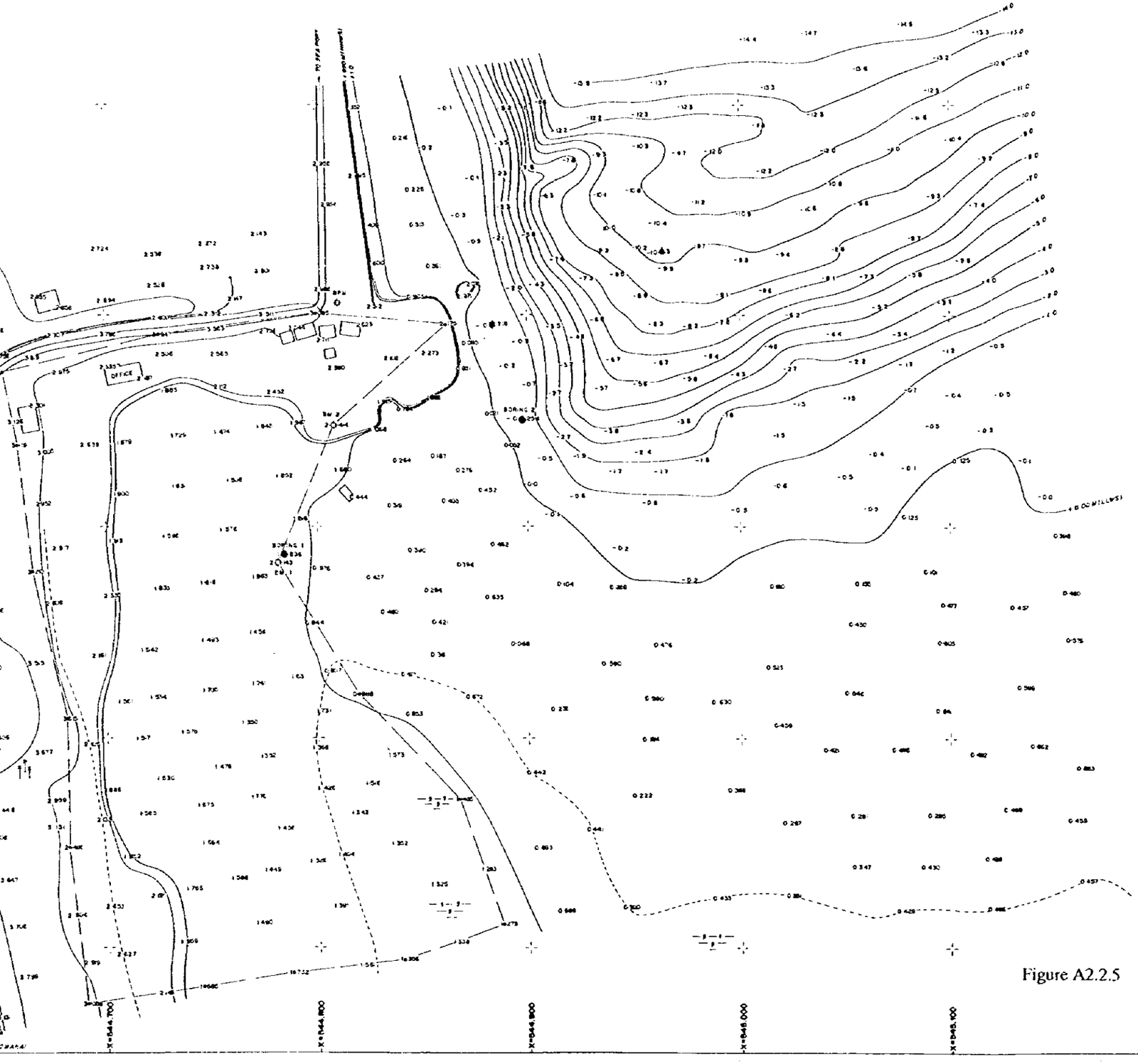


Figure A2.2.5 Survey Map of Wahai Site

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

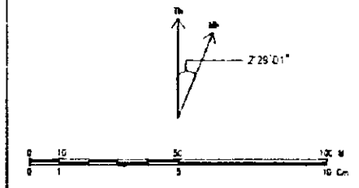
Routes : Wahai - Bobong
Location : Wahai
Regency : Central Maluku
Province : Maluku

LEGEND

- Building
- Electric Pole
- Road
- Culvert
- River
- Mangrove Boundary
- Coconut Tree
- Mangrove
- Polygon Line
- Contour Line
- Bench Mark
- Tidal Observation
- Current Observation
- Boring Location
- 2.95 Ground Height
- -3.5 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
Bk.1	554,782.000	9580,863.000	2.143
Bk.2	554,806.106	9580,747.958	2.414

NOTES : HHWS = 1.520 M
MSL = 0.960 M
LWS = 0.000 M



SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	TUBAGUS SOFYAN		March, 6, 1996
Checked by	" UHANG AM		March, 7, 1996
Approved by	T. WATANABE		March, 10, 1996
		Sheet No	

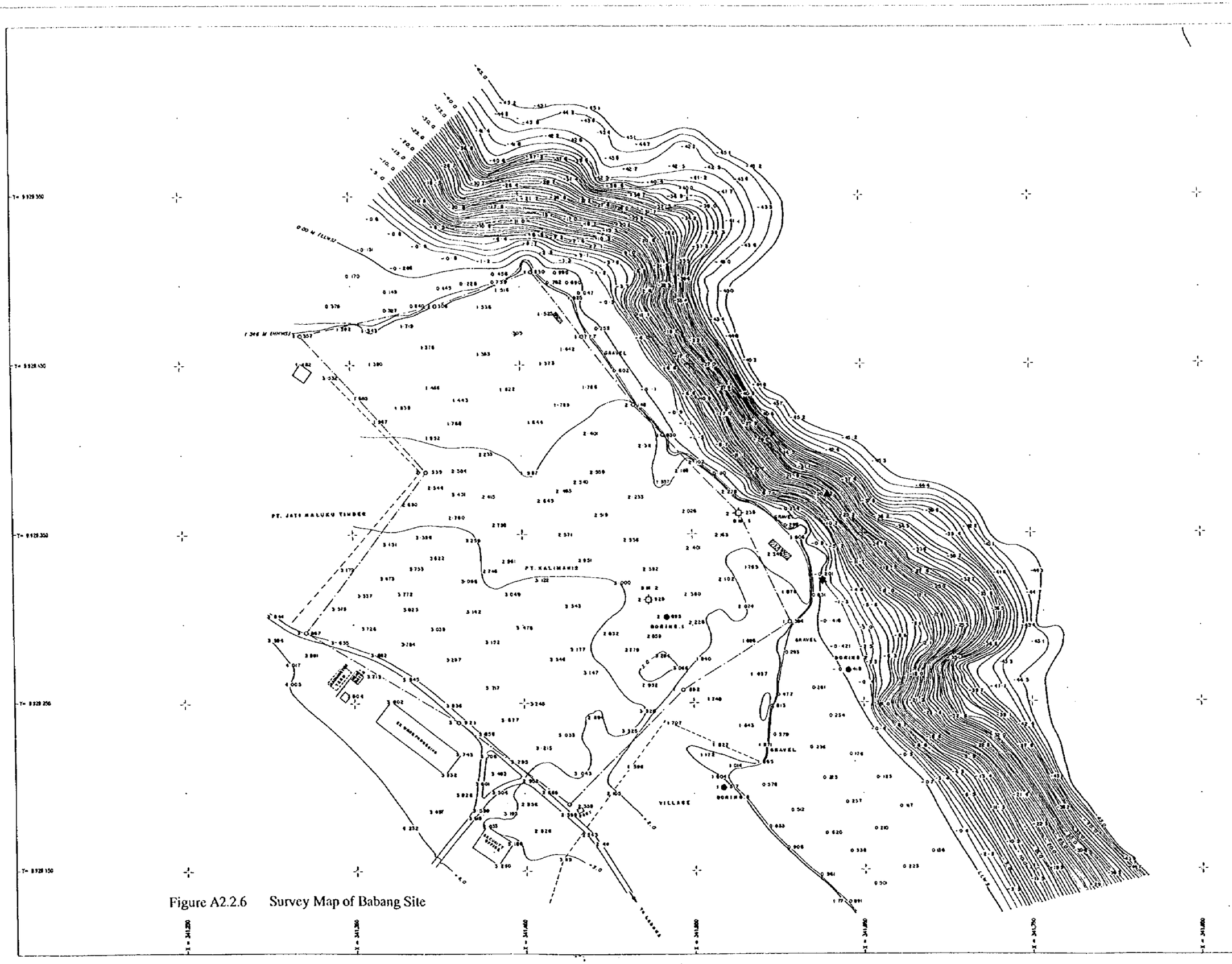
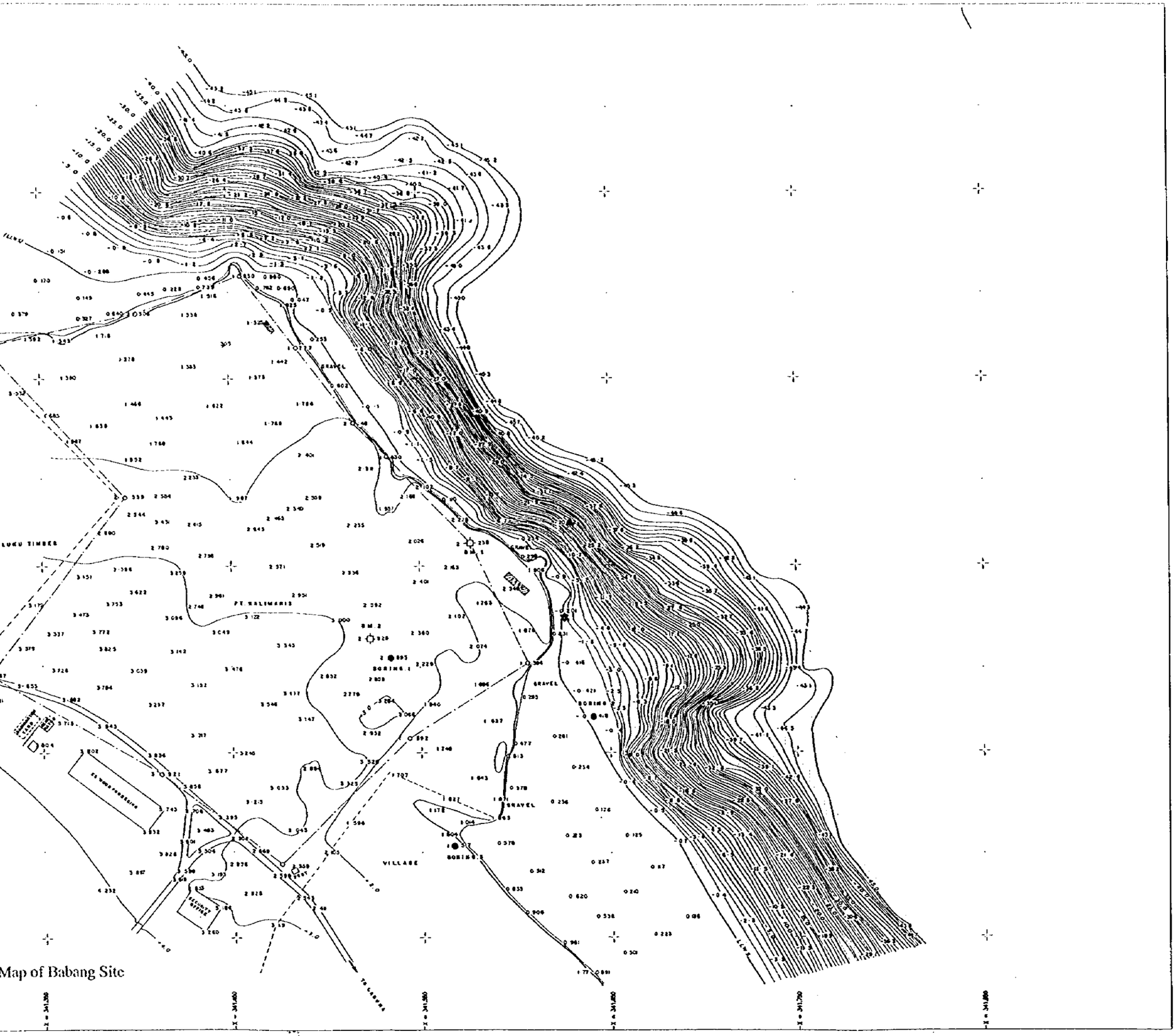


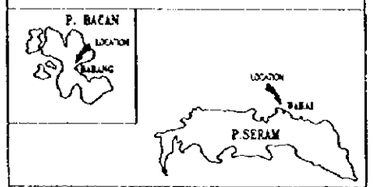
Figure A2.2.6 Survey Map of Babang Site



Map of Babang Site

TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Wahai - Babang
Location : Babang
Regency : North Maluku
Province : Maluku



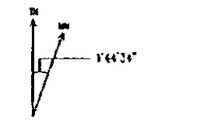
LEGEND

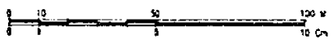
- Building
- Electric Pole
- Road
- River
- Water Tank
- Polygon Line
- Contour Line
- Bench Mark
- Tidal Observation
- Current Observation
- Boring Location

295 Ground Height
-35 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
BM. 1	341,877.000	9929,362.000	2.236
BM. 2	341,623.370	9929,311.758	2.929

NOTES : HHWS = 9.346 M
MSL = 0.673 M
LLWS = 0.000 M





SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	DEDY DARSONO		March, 6, 1988
Checked by	Ir. UMANG AM		March, 7, 1988
Approved by	T. WATANABE		March, 10, 1988
	Sheet No		

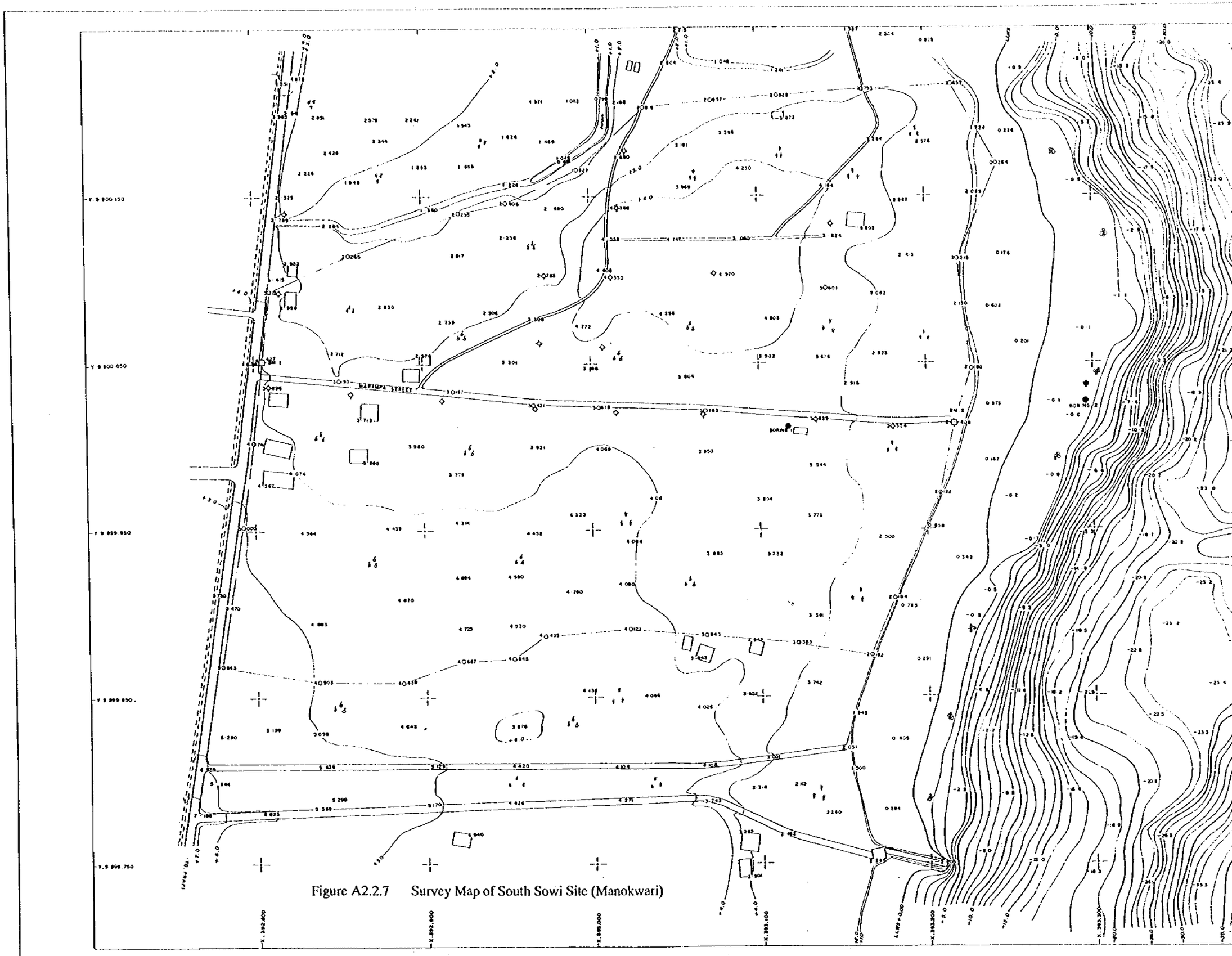
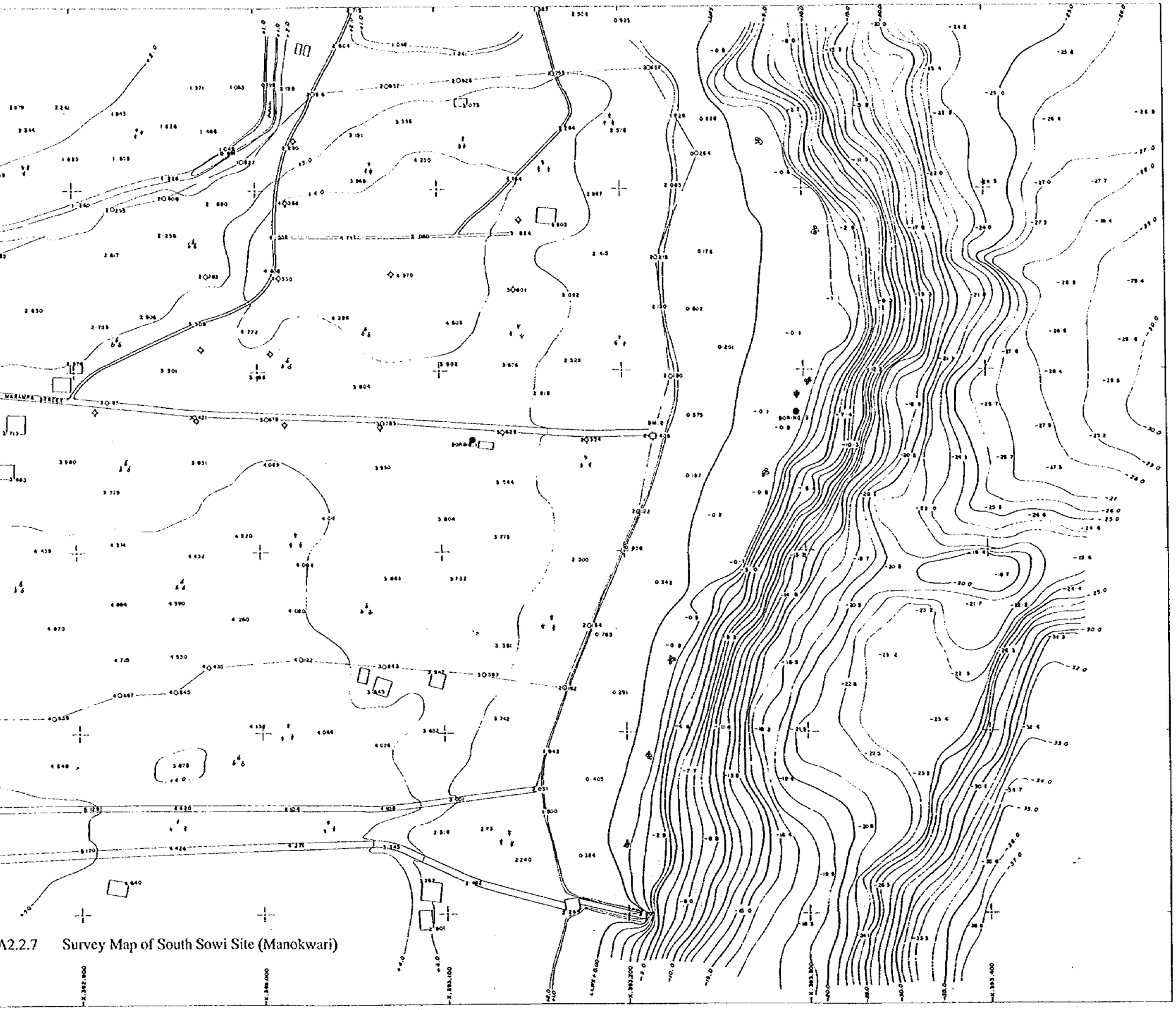


Figure A2.2.7 Survey Map of South Sowi Site (Manokwari)



TOPOGRAPHIC/HYDROGRAPHIC SURVEY
FOR
THE DEVELOPMENT STUDY ON THE NATIONWIDE
FERRY SERVICE ROUTES (STAGE-II)
IN
THE REPUBLIC OF INDONESIA

Routes : Manokwari - Biak
Location : Sowi (Manokwari)
Regency : Manokwari
Province : Irian Jaya

LEGEND

Building	Drainage
Electric Pole	Pier
Telephone Pole	Polygon Line
Road	Contour Line
Culvert	Bench Mark
River	Tidal Observation
Plantation	Current Observation
Bush	Boring Location
Coral	Cemetery

295 Ground Height
-35 Seabed

POINT NO	EASTING (M)	NORTHING (M)	HEIGHT (M)
Bm. 1	382805.376	9900051.965	4.427
Bm. 2	383217.000	9900014.000	2.809

NOTES : HHWS = 2.200 M
MSL = 1.100 M
LLWS = 0.000 M

MN TN 3°42'30.5"

0 10 50 100 M
0 1 5 10 Cm

SCALE 1 : 1000

Title
TOPOGRAPHIC/HYDROGRAPHIC

Items	Name	Signature	Date
Drawn by	U. SUPRIATNA		March, 6, 1998
Checked by	Ir. UNANG AM.		March, 7, 1998
Approved by	T. WATANABE		March, 10, 1998
		Sheet No	

A2.2.7 Survey Map of South Sowi Site (Manokwari)

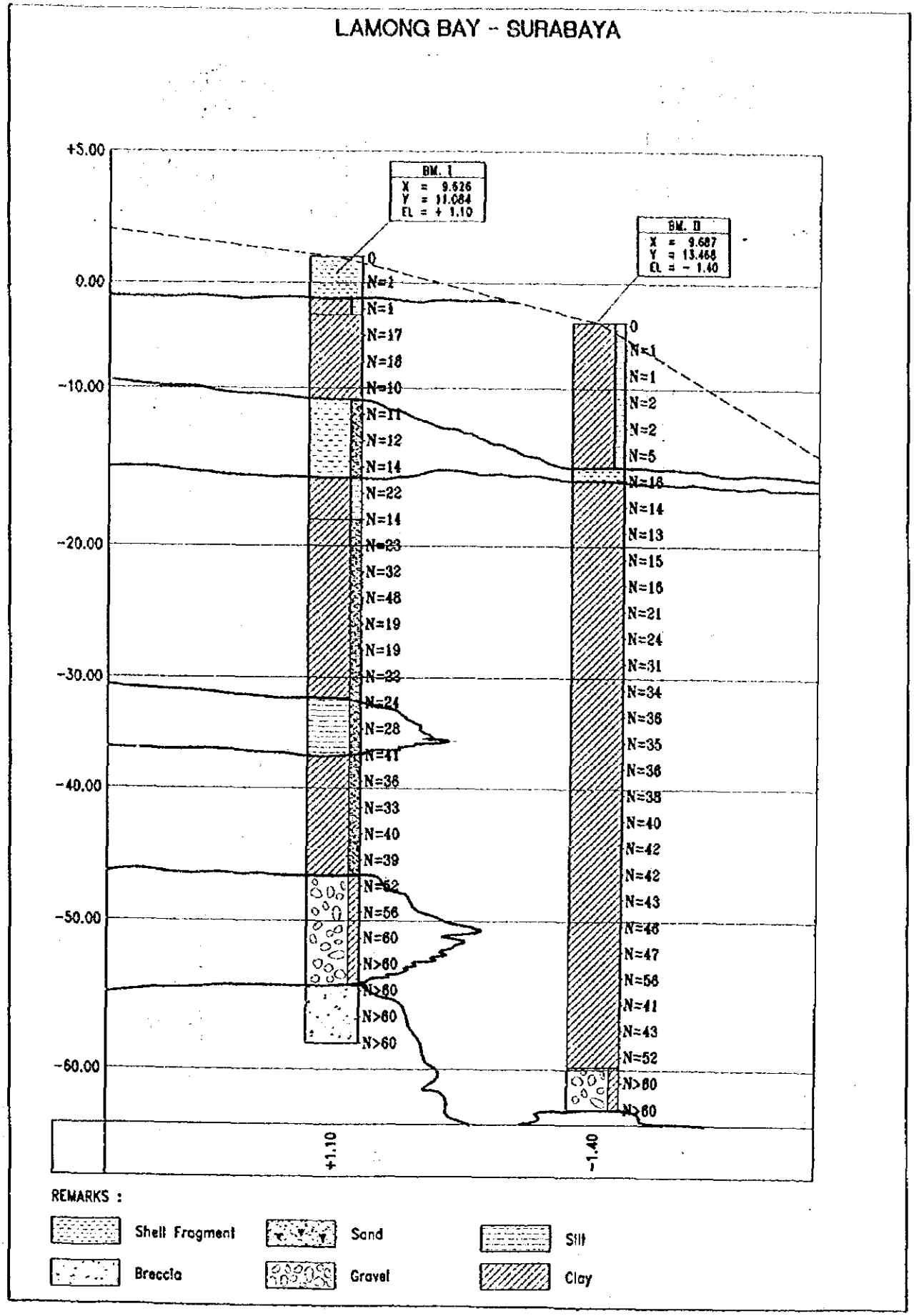


Figure A2.6.1 Soil Profile of Lamong Bay Site (Surabaya)

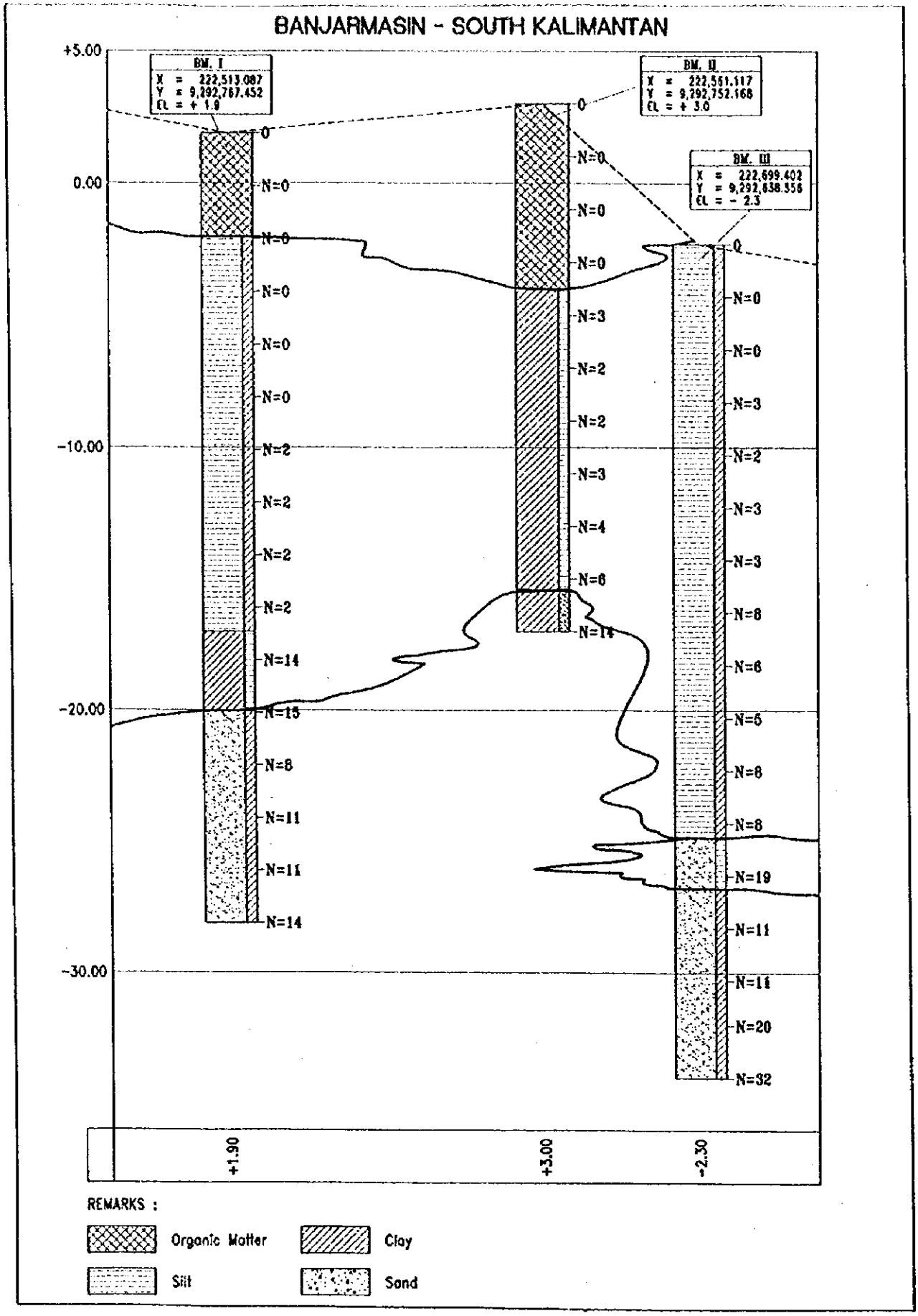


Figure A2.6.2 Soil Profile of Banjarmasin Bay Site

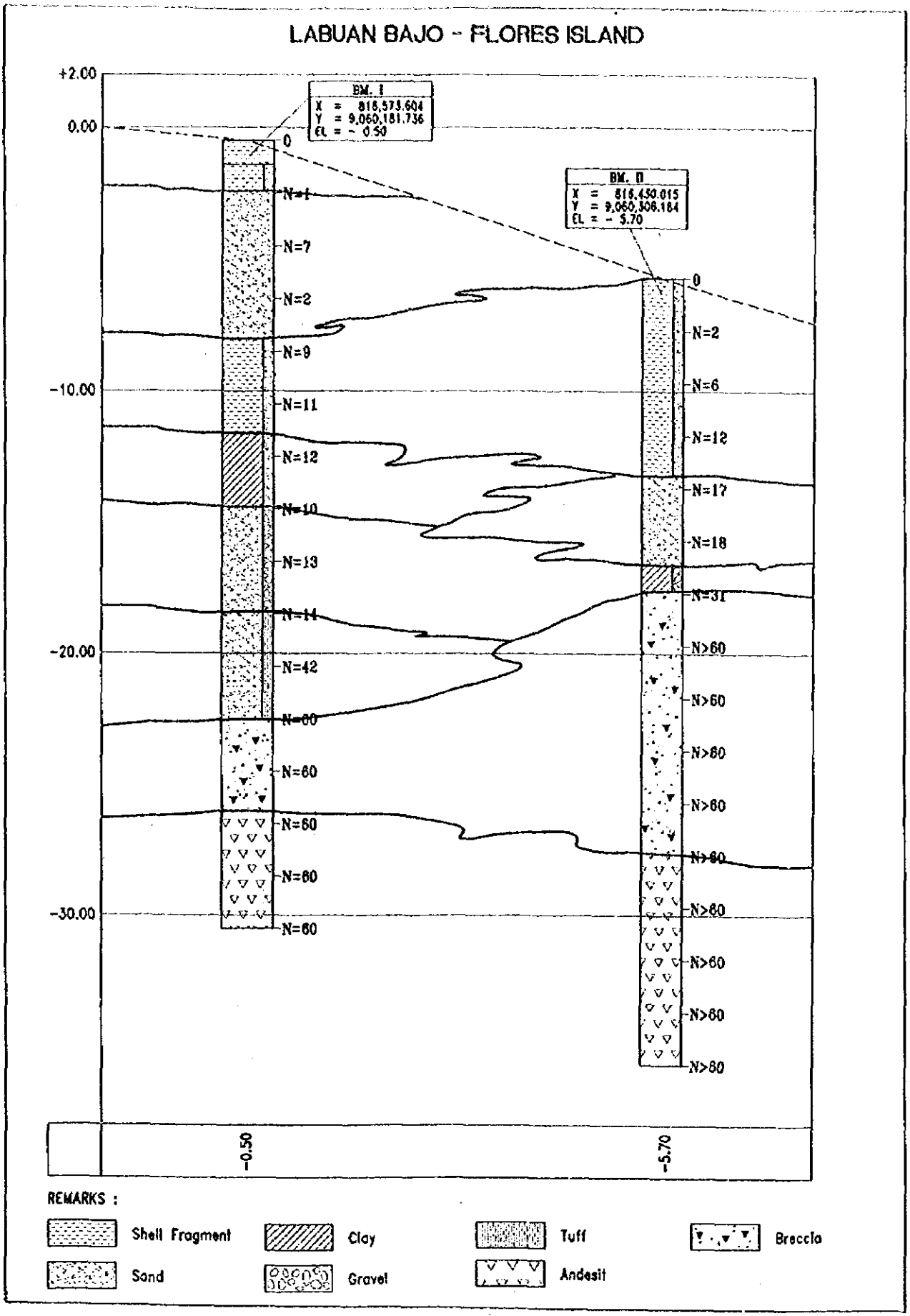


Figure A2.6.3 Soil Profile of Labuhan Bajo Site

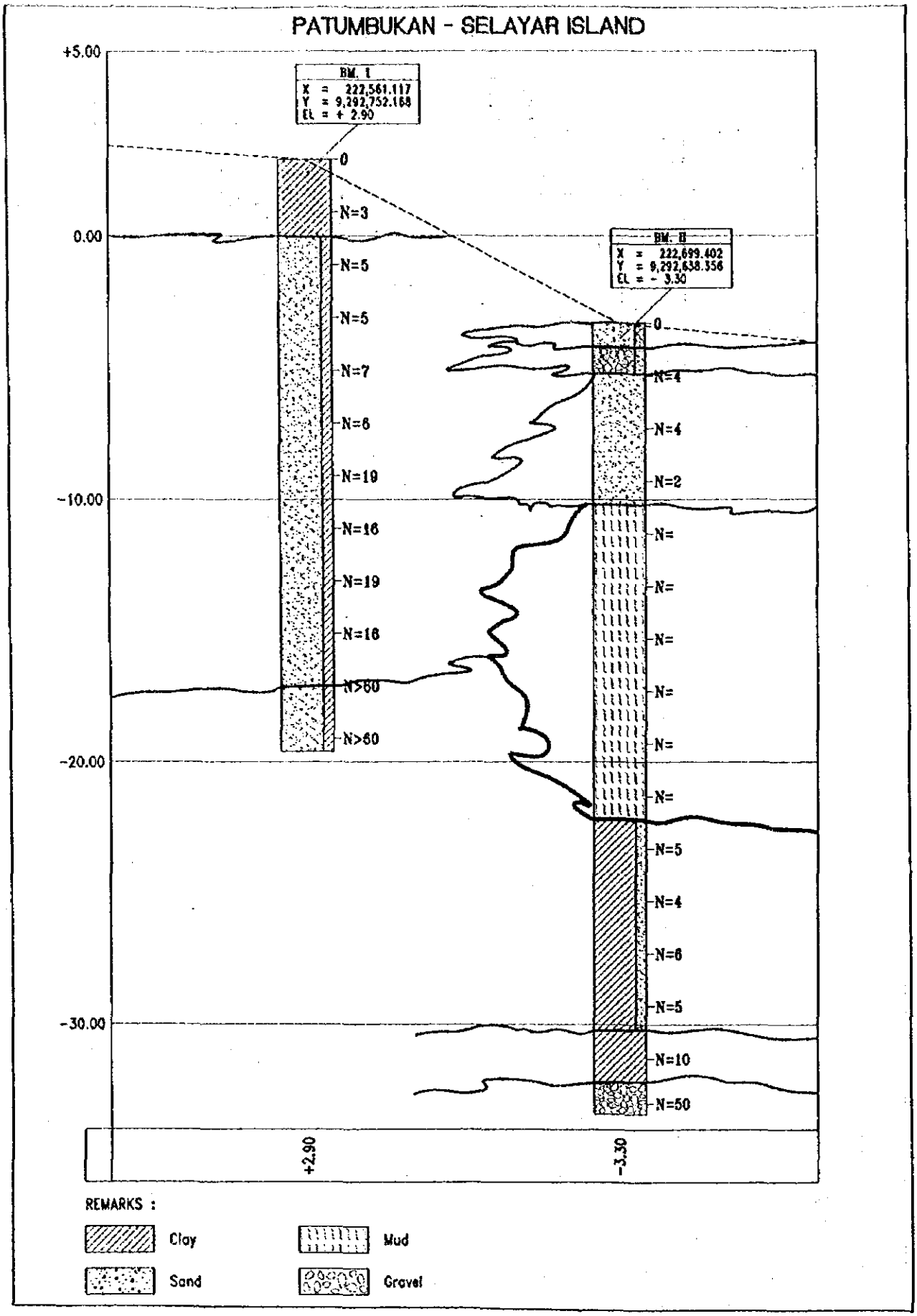


Figure A2.6.4 Soil Profile of Patumbukan Site (Selayar)

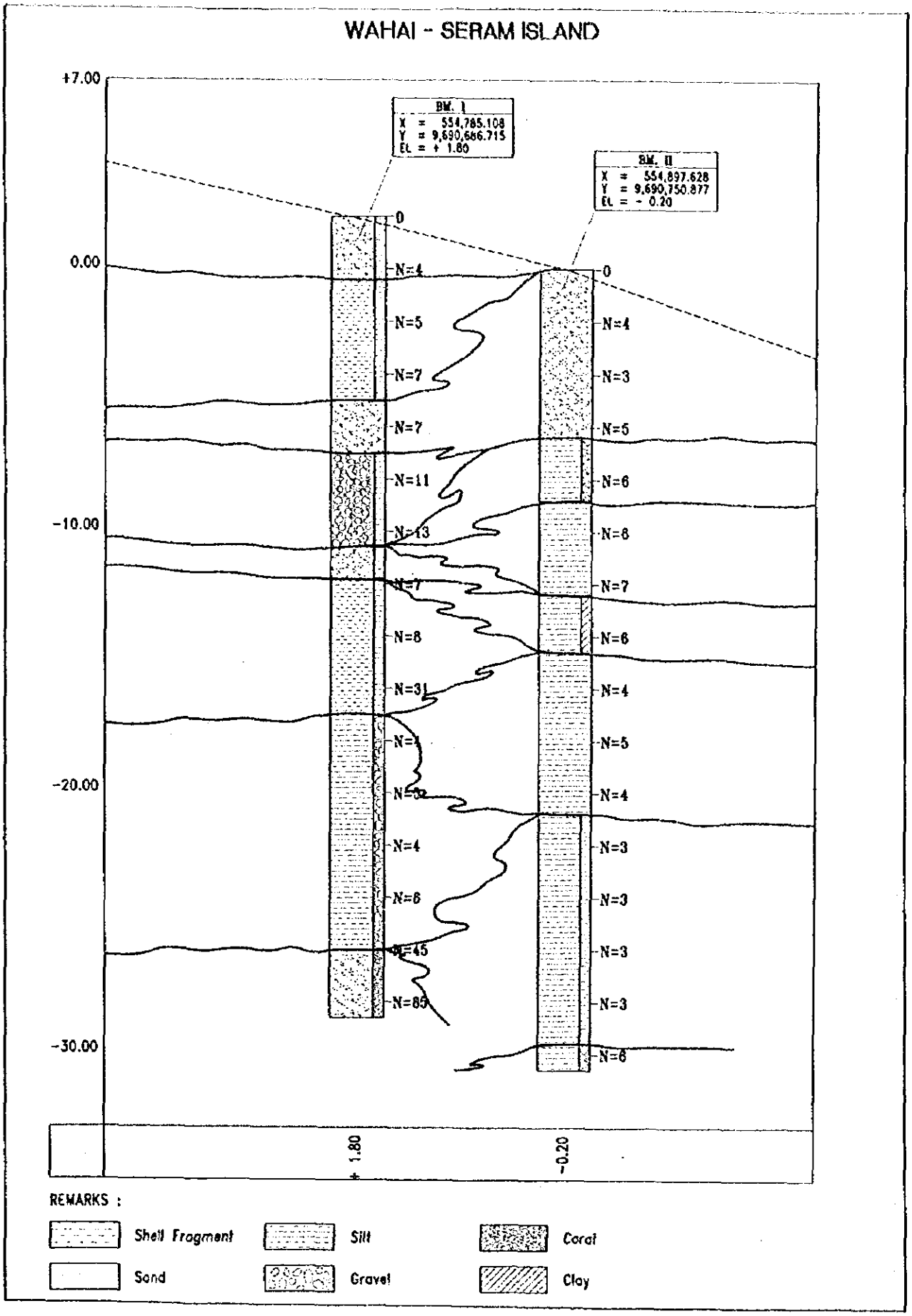


Figure A2.6.5 Soil Profile of Wahai Site

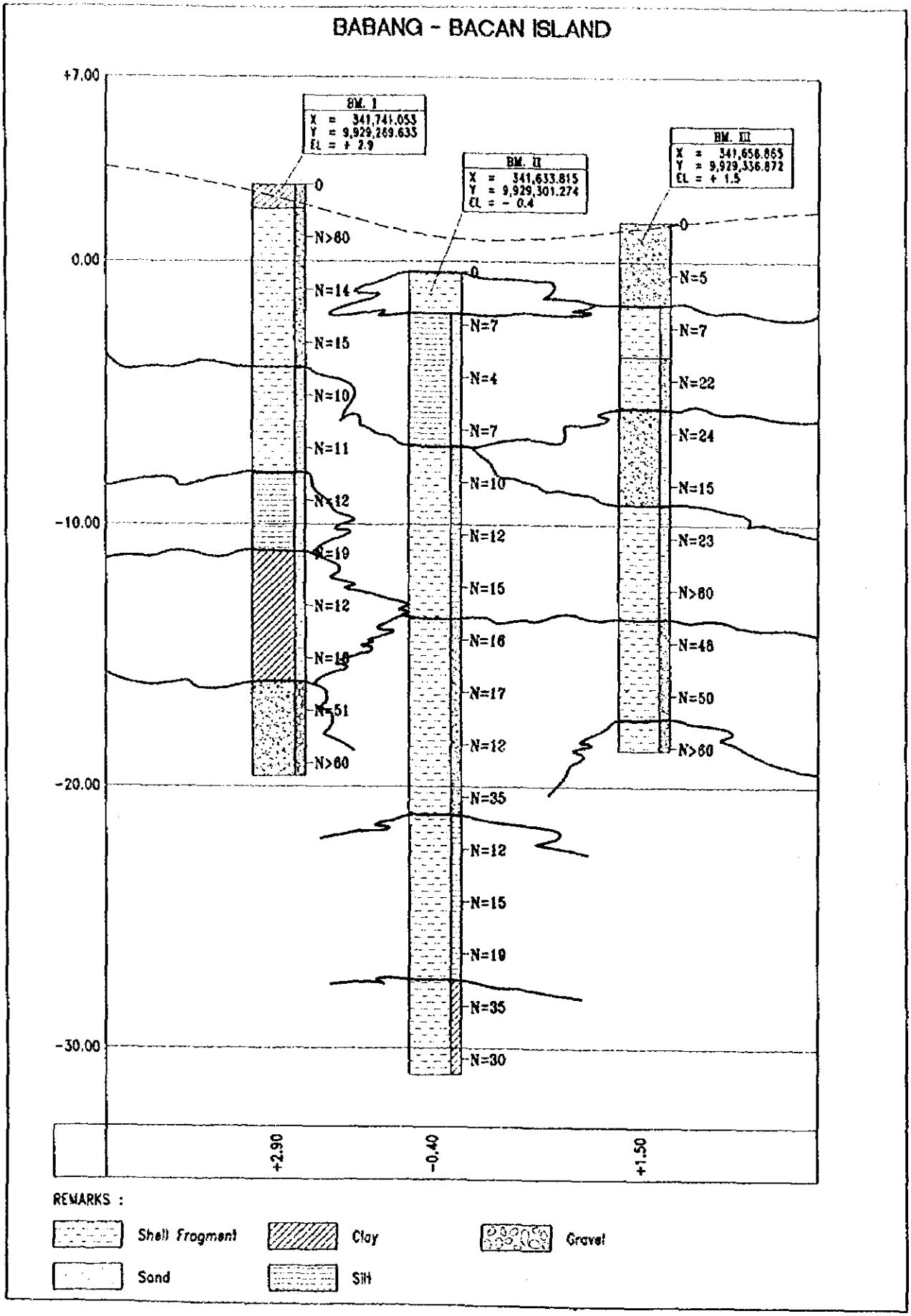


Figure A2.6.6 Soil Profile of Babang Site

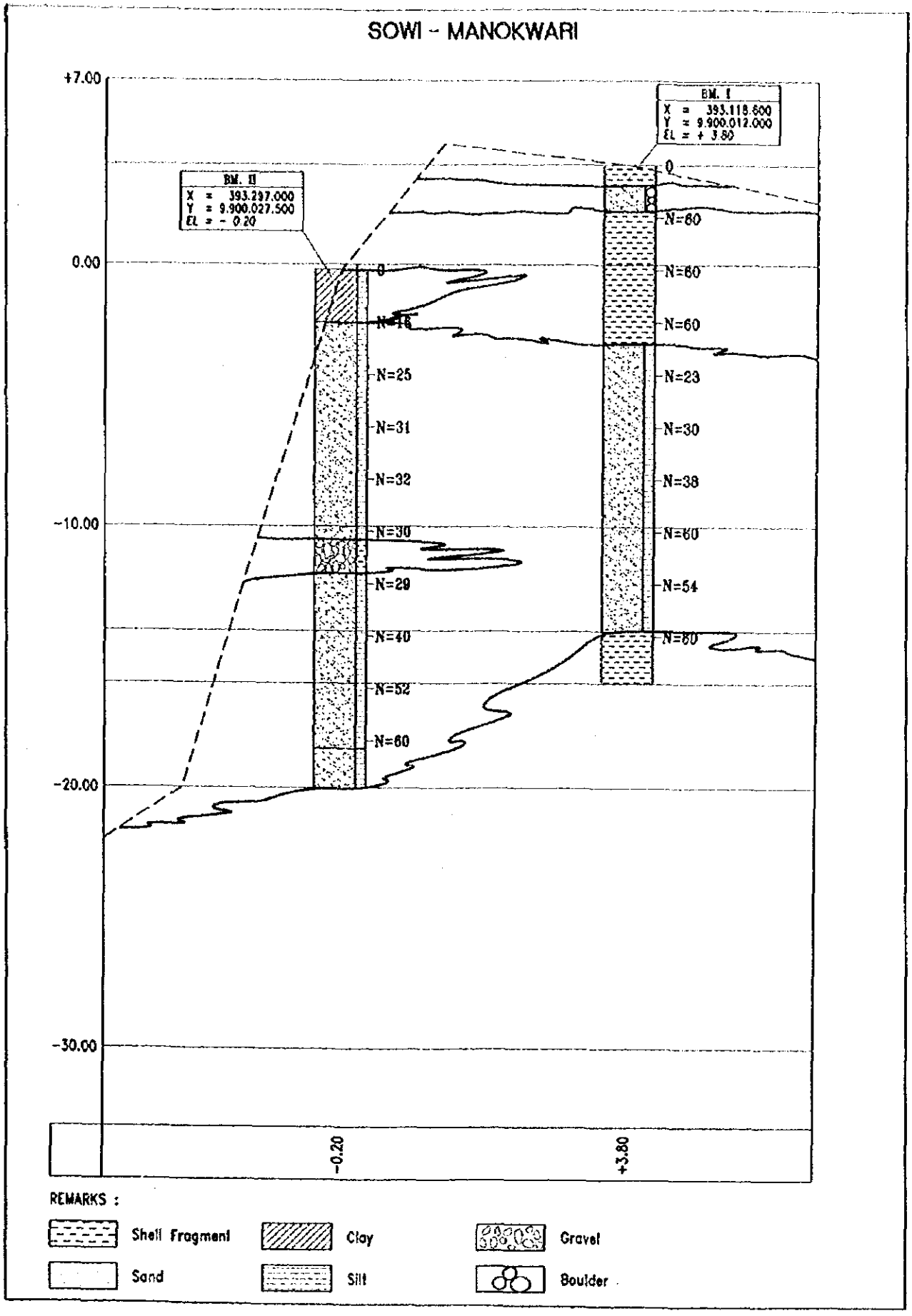


Figure A2.6.7 Soil Profile of South Sowi Site (Manokwari)