

社会開発調査部報告書

FINAL REPORT

No. 52

THE STUDY ON THE DEVELOPMENT OF RAJANG PORT IN MALAYSIA

VOLUME IV PRELIMINARY ENVIRONMENTAL
IMPACT ASSESSMENT

FEBRUARY 1992

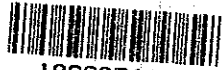
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Final Report

**THE STUDY
ON
THE DEVELOPMENT
OF
RAJANG PORT**

**IN
MALAYSIA**

**VOLUME IV
PRELIMINARY ENVIRONMENTAL
IMPACT ASSESSMENT**

FEBRUARY, 1992

J I C A

Japan International Cooperation Agency

国際協力事業団

23320

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1 PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT

1.1 INTRODUCTION

1.1.1 Environmental Policies in Malaysia

(1) Laws and regulations related to the Environment

Malaysia began introducing five-year plans for socio-economic development in 1955. The Fifth Malaysia Plan was completed in 1990, and from 1991 the Sixth plan started.

Statements on environmental preservation first appeared in the Third Malaysia Plan (1976-1980). In the Fourth Malaysia Plan, recognizing that a high rate of economic growth and rapid urbanization have an effect on the environment, it was stated that an environmental preservation policy was necessary to ensure the continuous and healthy growth of the economy and to maintain a healthy and safe environment for present and future generations. A national plan for the protection, management and development of the national forest was included in the Forest Plan. Then, the Malaysia Plan was broadened midway through its implementation and the Fifth Malaysia Plan (1986-1990) was issued on the March of 1986.

In 1974, the Environmental Quality Act, which set forth the inclusive regulations regarding the preservation of the environment, was established. The Act provides for the protection of air quality, water quality, soil and noise control. Environmental regulations and the prevention of environmental pollution are outlined in this Act. Also covered in the Act are the permitted emission standards on air quality, gas emission, palm oil and industrial waste water.

With regard to Environmental Impact Assessment (EIA), it is covered under the "Environmental Quality (Prescribed Activities) [Environmental Impact Assessment] Order 1987".

(2) Administration

As the main environmental administrative organization, the Ministry of Science, Technology and Environment has the Department of Environment under its auspices.

With respect to EIA procedure, the project initiator should submit a preliminary report to DOE, and if necessary, make a detailed assessment. Then, according to the report, the DOE examines the implementation of the project.

(3) Environmental policy objectives

The Third Malaysia Plan (1976-1980) and the Fifth Malaysia Plan embraced the following environmental objectives:

- (1) "---- to maintain a clean and healthy environment ----"
- (2) "---- to maintain the quality of the environment relative to the needs of the growing population ----",
- (3) "to minimize (the) impact of the growing population and human activities relating to mineral exploration, deforestation, agriculture, urbanization, tourism, and the development of other resources on the environment ----",
- (4) To balance "---- the goals for socio-economic development and the need to bring the benefits in a wide spectrum of the population --- against (the) maintenance of sound environmental conditions ----",
- (5) "---- to place more emphasis on prevention through conservation rather than on curative measure ----" inter alia by preserving the country's unique and diverse cultural and natural heritage,"
- (6) "---- to incorporate an environmental dimension in project planning and implementation ----" inter alia by determining "---- the implication of the proposed project --- and the costs of the environmental mitigation measures through Environmental Impact Assessment" studies; and
- (7) To promote "(greater) cooperation and increased coordination among relevant federal and state authorities --- as well as ---- (among) the ASEAN Governments. ----"

The ultimate aim of the Federal Government, working in close cooperation with the State Government, is to ensure as far as possible that all man's activities are in balance with his environment. To this end, in recognizing that the environment transcends national boundaries, the Governments will also cooperate with Foreign Governments either directly or through competent regional and international organizations.

As for the new strategies in environmental management, please refer to **Appendix IV-1-1-1.**

1.1.2 The Environment Impact Assessment

(1) The EIA Objectives

Procedures and guidelines of the EIA were made according to the policy stated in the Third Malaysia Plan.

The objective of the EIA is to evaluate the total impact on the environment of a project proposed by public or private project initiator. Concrete objectives of the EIA are listed below.

1. To examine and select the best project from the project options available
2. To identify and incorporate into the project plan appropriate abatement and mitigating measures
3. To predict significant residual environmental impact
4. To determine the significance of residual environmental impact
5. To identify the environmental costs and benefits of the project to the community

(2) Prescribed Activities

The prescribed activities, based on the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987, are listed below.

- | | |
|----------------------------|---|
| 1. Agriculture | 11. Mining |
| 2. Airport | 12. Petroleum |
| 3. Drainage and Irrigation | 13. Power generation and Transmission |
| 4. Land reclamation | 14. Quarries |
| 5. Fisheries | 15. Railways |
| 6. Forestry | 16. Transportation |
| 7. Housing | 17. Resort and Recreational Development |
| 8. Industry | 18. Waste Treatment and Disposal |
| 9. Infrastructure | 19. Water Supply |
| 10. Ports | |

(3) Summary of the procedure of EIA

According to the guideline handbook, the procedure of EIA should confirm to the flow chart presented in Fig. 1.1.2.1.

In the guideline, objectives and descriptions are related according to the level of Preliminary Assessment, Detailed Assessment and Review, respectively.

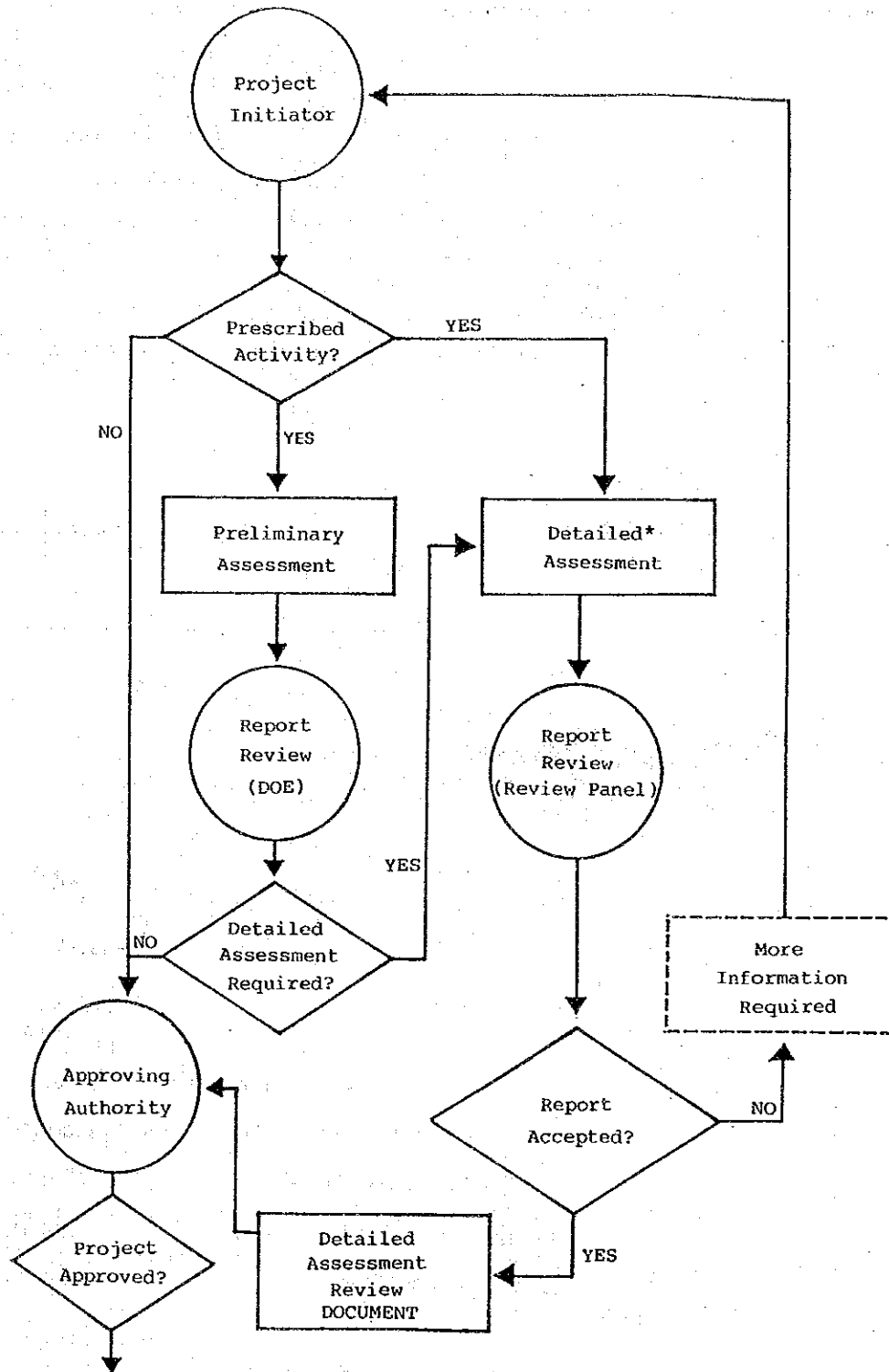


Figure-1.1.2.1 OUTLINE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURE IN MALAYSIA

* Consultation with DOE on Terms of Reference

1.2 Purpose and Methodology of Preliminary Environmental Impact Assessment

1.2.1 Summary of the project description

(1) Characteristics of the project

According to the Handbook of Environmental Impact Assessment Guidelines, prescribed projects are set as listed in 1.1.2 (2) and the project of this time (hereafter called "the Project") corresponds to "Marine Port Project".

Though the Project involves land reclamation, its purpose is not only to develop land; so, the project should be regarded as a marine port project.

(2) The scale of the project

As explained in Volume 2, the scale of the project is listed below.

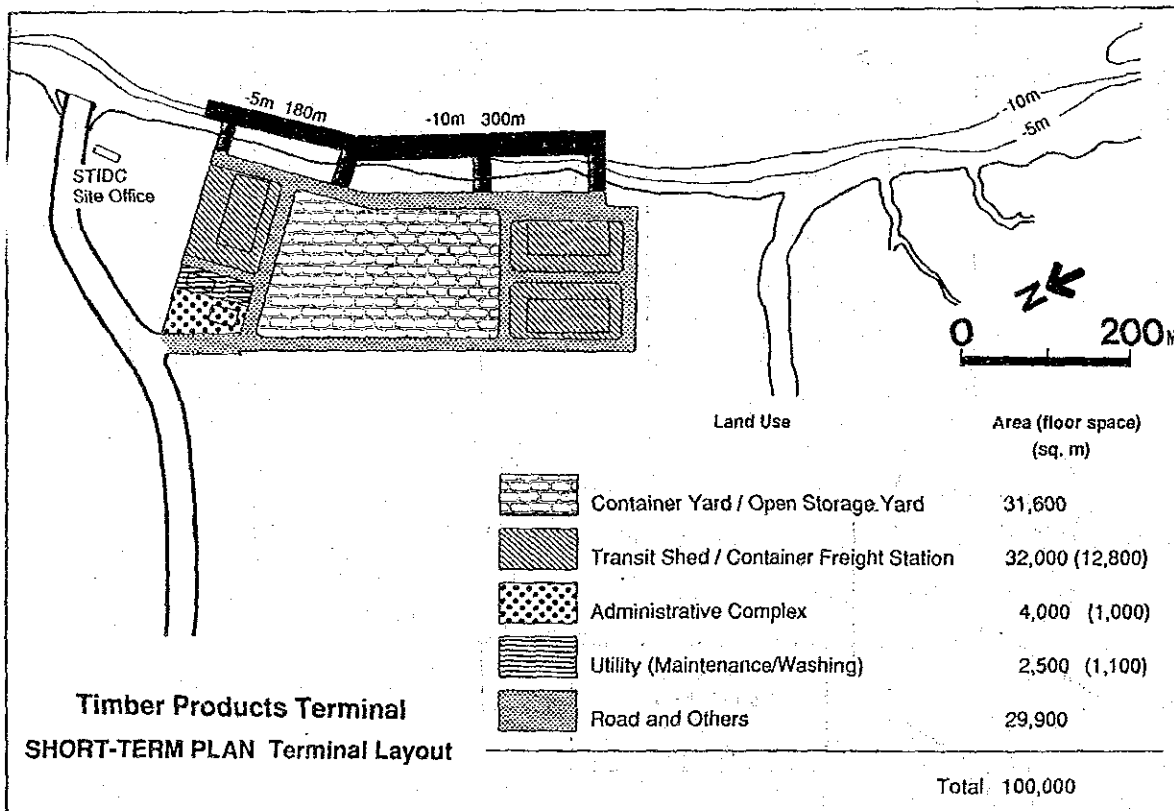


Figure-1.2.1.1 The Scale of Timber Products Terminal Project

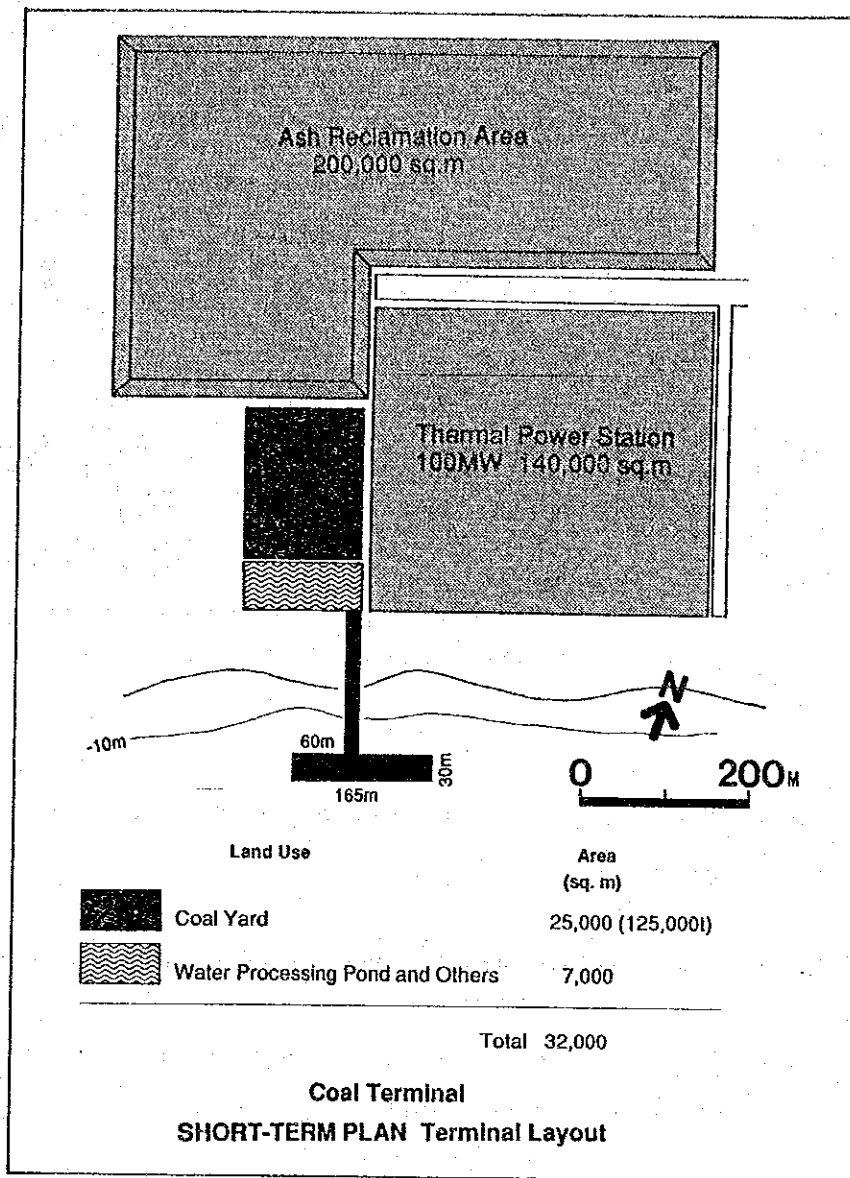


Figure-1.2.1.2 The Scale of Coal Terminal Project

(3) Project Life

The target year for the Project is 1997, construction work will start in 1994 and be completed by the end of 1996.

As for the implementation program, please see **Table 1.4.1.9.**

(4) Study Area

In this study, the study area for preliminary environmental assessment is indicated as in the following Figure.

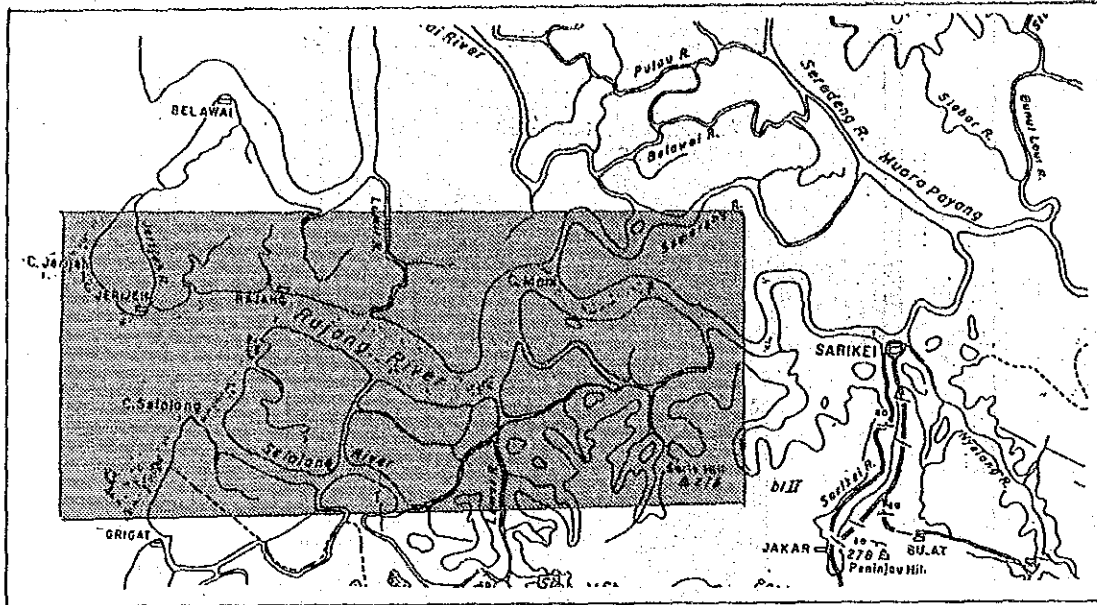


Figure-1.2.1.3 The Study Areas for PEIA

With regard to the regional socio-economic data and other data, the area is expanded according to necessity.

1.2.2 The Methodology of Preliminary Environmental Impact Assessment

In this study, PEIA has been carried out according to "A Handbook of Environmental Impact Assessment Guidelines".

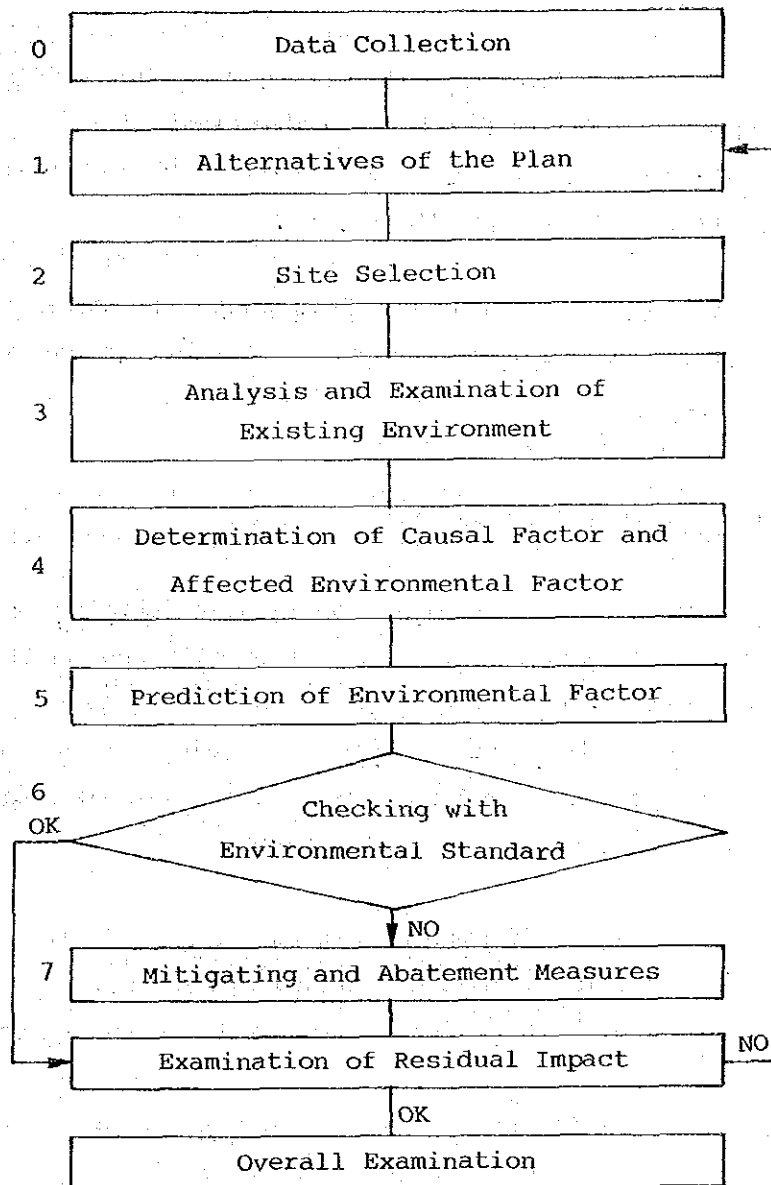
(1) The purpose of PEIA

The purpose of PEIA for Prescribed Activities are:

- a) To examine the project options available and make a decision based on that examination.
- b) To identify and incorporate appropriate abatement and mitigating measures into the project plan.
- c) To identify the significant residual environmental impact.

(2) Methodology of PEIA

The summarized procedure of PEIA as it pertains to the project is listed below.



0: The data for this study have been collected by field surveys and interviews as well as consulting books and other materials.

As for the field survey, the following factors have been examined: Water Quality, Flow Variation, Soil Composition, Land Forms, Sand Bar, Coastal Erosion, Village, Fishery, Traffic of Vessels, Flora, Fauna, Forest, Land Use and so on.

To collect the environmental data, the team interviewed related organization shown below.

Land & Survey, Department of Environment (KL, Kuching),
Meteorological Department, Fishery Department (Kuching, Berawai)
Forest Department, Statistic Department, Marine Department, JKR,
State Planning Unit, RPA, JICA, .etc.,.

Other data have been obtained from books and materials have been collected at shops selling government's publications and at related organizations.

1,2: Please refer to Volume II Site selection.

3: When the analysis and examination of the existing environment was made, items for examination were selected based on the Handbook of Environmental Impact Assessment. Although the explanation of the existing environment was made according to the collected data as much as possible, some factors were omitted to avoid overlapping with other sections of the explanations.

4: To determine the relationship between causal factors and affected factors, a matrix form was used for clear presentation and easy understanding of both the Construction Phase and Operating Phase.

5,6: As for the prediction of environmental factors, a quantitative analysis will be made as much as possible.

7: However, regarding some factors that have not been measured in or around the site, the effect on the environment will be examined by calculating the total emission volume.

Some mitigating and abatement measures will be proposed for primary causal factors according to the degree of their impact on environment.

1.3 Description of the existing environment

1.3.1 Land

(1) Landforms

The general characteristic of the sites and their surrounding areas are as follows:

Rajang River is the longest in Malaysia, and its total length is about 560km. The Coastal plain (mostly alluvial flats, mainly swampy) covers more than 5,500 square km and possesses the most fertile soil. Both sides of the river are covered with tropical forest such as mangrove and nippa palm trees.

The study area, Tg.Sezubal and Tg.Mains, are located respectively at 26 km and 30 km respectively upstream from the river estuary.

There are no unique or important landform features (refer; Fig. 1.3.1.3) within the project area with the exception of the existence of sandbars in the estuary.

Fig. 1.1.3.1 shows possible locations of the proposal project sites. The pictures on the following pages show each site in more detail.

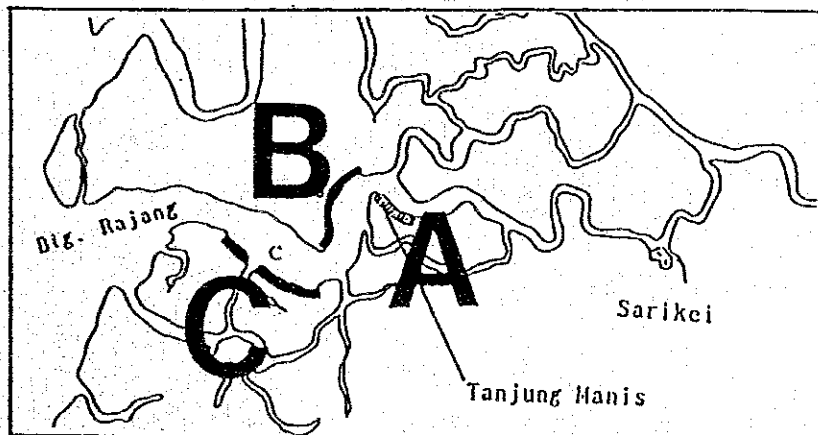


Figure-1.3.1.1 Possible location of the site

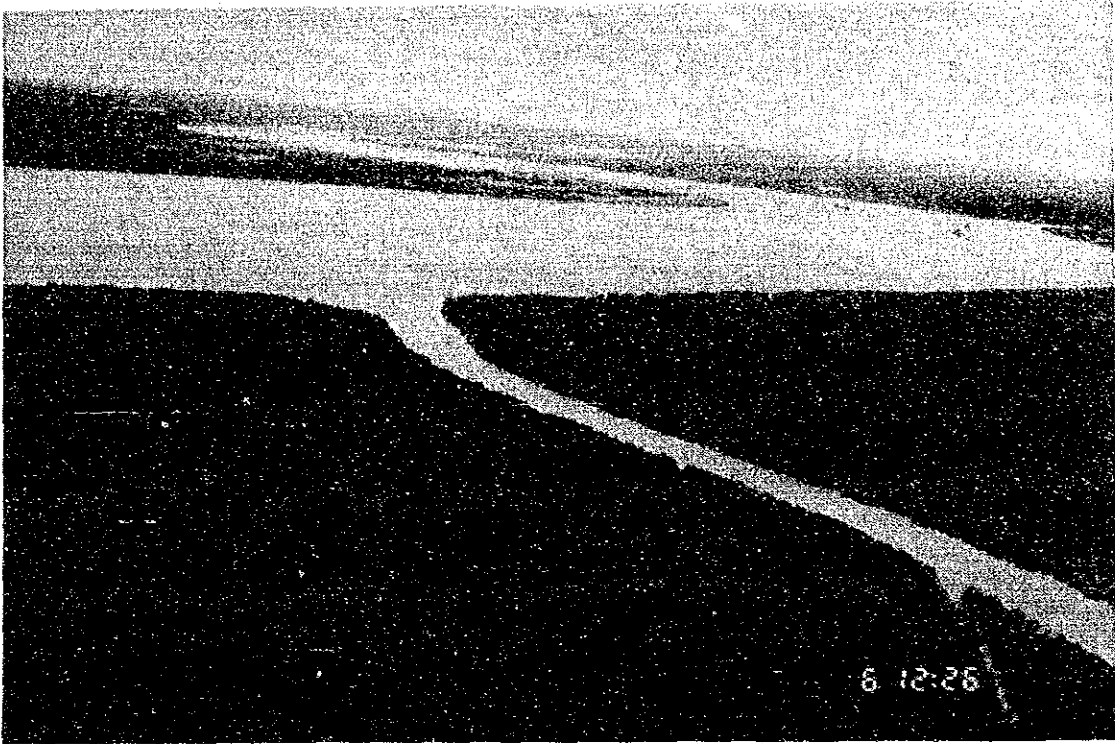
Site A



Site B

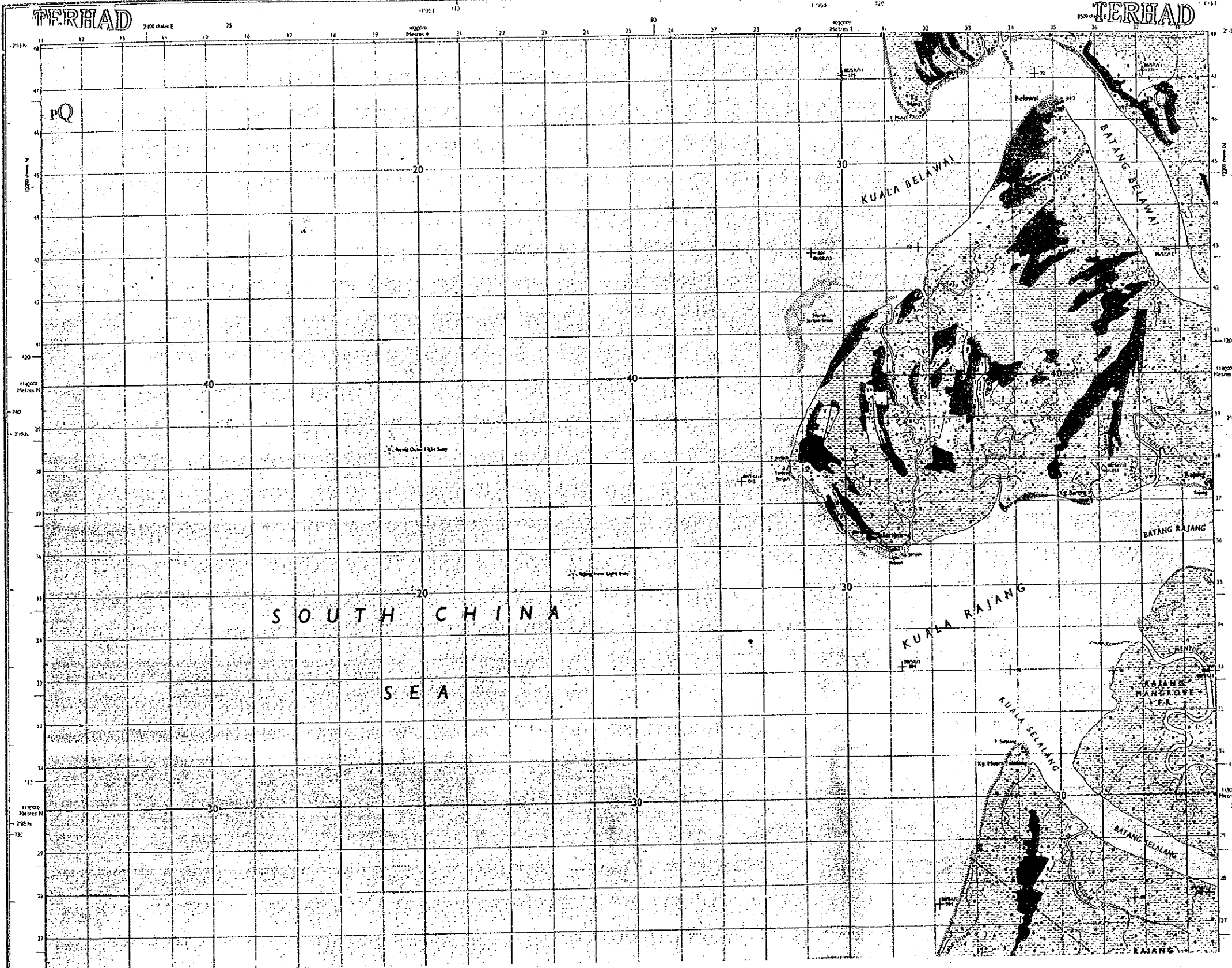


Site C



(Sand bar at the estuary)





UKA TAKSI DENGAN JORAN KAKI
ELEVATIONS IN FEET

AMALAN TERHAD:

1. Tanah	2. Jalan	3. Perumahan	4. Pagar	5. Sungai	6. Pantai	7. Gunung	8. Bukit	9. Teluk	10. Perikanan	11. Perikanan	12. Perikanan	13. Perikanan	14. Perikanan	15. Perikanan	16. Perikanan	17. Perikanan	18. Perikanan	19. Perikanan	20. Perikanan	21. Perikanan	22. Perikanan	23. Perikanan	24. Perikanan	25. Perikanan	26. Perikanan	27. Perikanan	28. Perikanan	29. Perikanan	30. Perikanan	31. Perikanan	32. Perikanan	33. Perikanan	34. Perikanan	35. Perikanan	36. Perikanan	37. Perikanan	38. Perikanan	39. Perikanan	40. Perikanan	41. Perikanan	42. Perikanan	43. Perikanan	44. Perikanan	45. Perikanan	46. Perikanan	47. Perikanan	48. Perikanan	49. Perikanan	50. Perikanan
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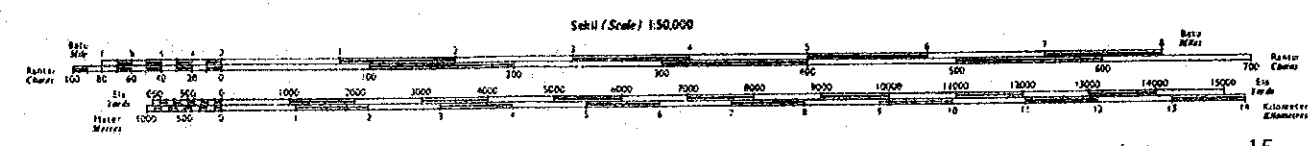
AMALAN TERHAD:

1. Tanah	2. Jalan	3. Perumahan	4. Pagar	5. Sungai	6. Pantai	7. Gunung	8. Bukit	9. Teluk	10. Perikanan	11. Perikanan	12. Perikanan	13. Perikanan	14. Perikanan	15. Perikanan	16. Perikanan	17. Perikanan	18. Perikanan	19. Perikanan	20. Perikanan	21. Perikanan	22. Perikanan	23. Perikanan	24. Perikanan	25. Perikanan	26. Perikanan	27. Perikanan	28. Perikanan	29. Perikanan	30. Perikanan	31. Perikanan	32. Perikanan	33. Perikanan	34. Perikanan	35. Perikanan	36. Perikanan	37. Perikanan	38. Perikanan	39. Perikanan	40. Perikanan	41. Perikanan	42. Perikanan	43. Perikanan	44. Perikanan	45. Perikanan	46. Perikanan	47. Perikanan	48. Perikanan	49. Perikanan	50. Perikanan
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AMALAN TERHAD:

1. Tanah	2. Jalan	3. Perumahan	4. Pagar	5. Sungai	6. Pantai	7. Gunung	8. Bukit	9. Teluk	10. Perikanan	11. Perikanan	12. Perikanan	13. Perikanan	14. Perikanan	15. Perikanan	16. Perikanan	17. Perikanan	18. Perikanan	19. Perikanan	20. Perikanan	21. Perikanan	22. Perikanan	23. Perikanan	24. Perikanan	25. Perikanan	26. Perikanan	27. Perikanan	28. Perikanan	29. Perikanan	30. Perikanan	31. Perikanan	32. Perikanan	33. Perikanan	34. Perikanan	35. Perikanan	36. Perikanan	37. Perikanan	38. Perikanan	39. Perikanan	40. Perikanan	41. Perikanan	42. Perikanan	43. Perikanan	44. Perikanan	45. Perikanan	46. Perikanan	47. Perikanan	48. Perikanan	49. Perikanan	50. Perikanan
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Figure-1.3.1.2
Map of Kuala Rajang



Topographic and bathymetric maps for each site surveyed by the team are shown below.

1) Tg. Manis

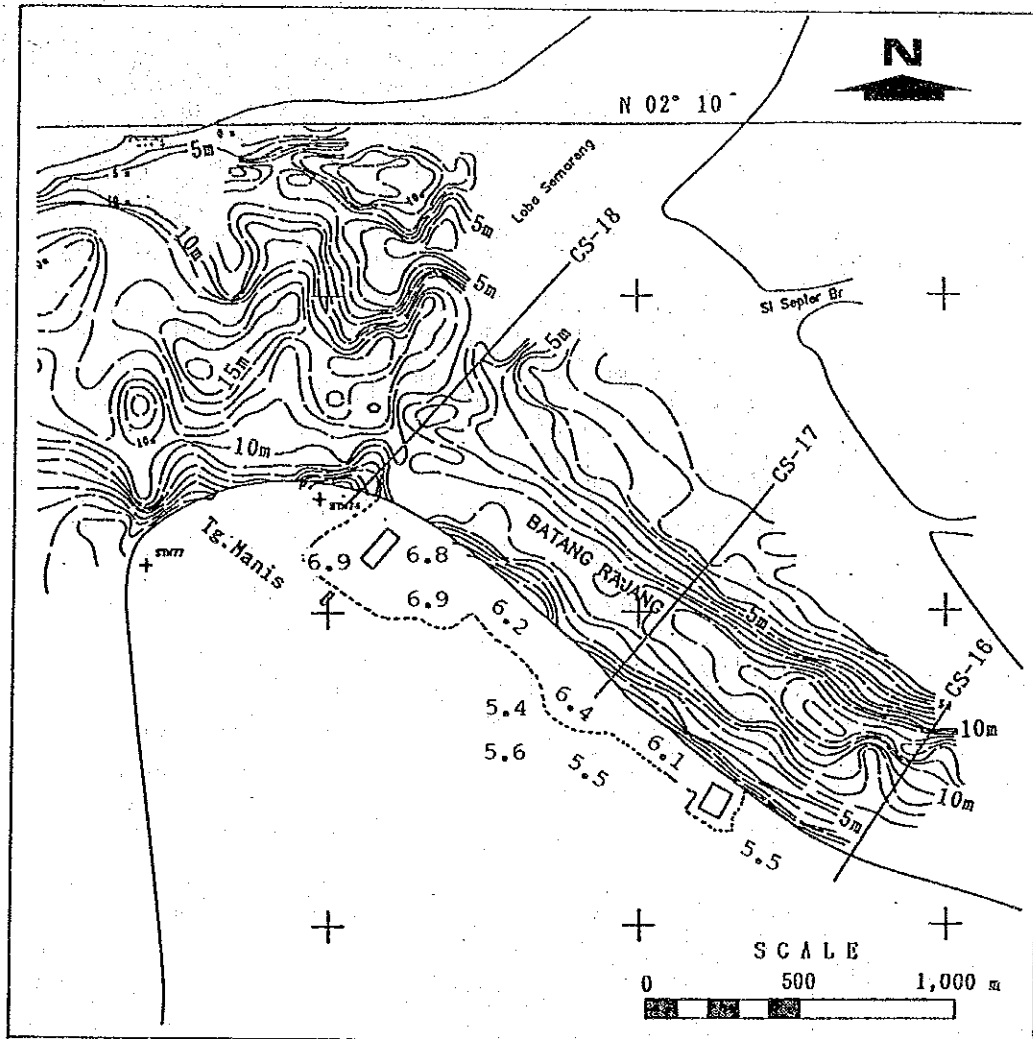


Figure-1.3.1.5 Topographic & Bathymetrical Map at Tg. Mains

The width of the river is about 1.2km at Tanjung Manis. The south bank has been developed by a private timber industry company while the north bank is covered with swampy forest. The ground elevation at the front line of the south bank varies between +2.0m at lower parts and +2.5m at higher parts above Land and Survey Datum. The difference between Land and Survey Datum and Chart Datum at Tg.Manis is 3.29m. Therefore, the ground elevation is recorded as C.D. +5.3m at lower parts and C.D. +5.8m at higher parts.

2) Tanjung Sebulal

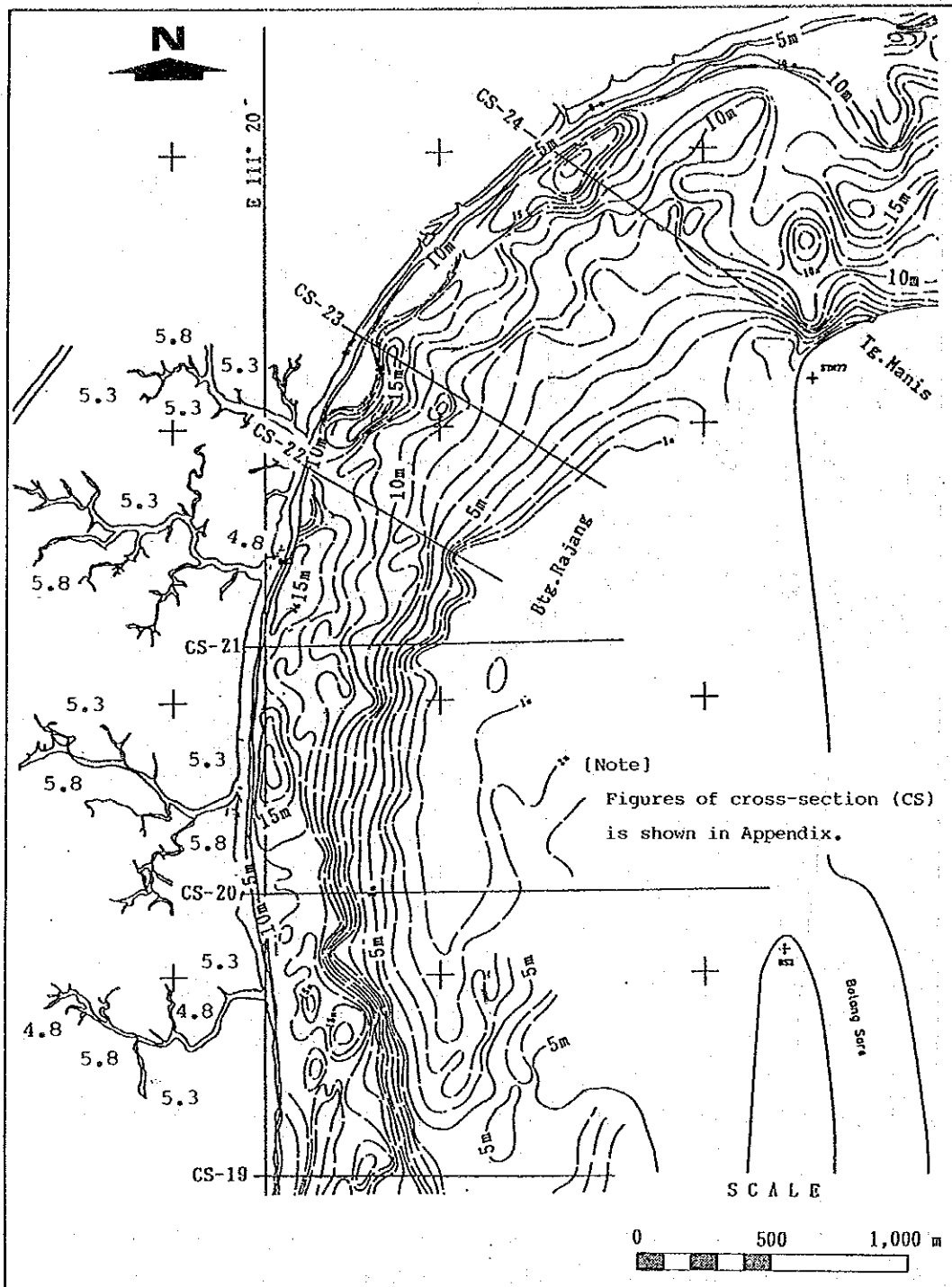


Figure-1.3.1.6 Topographic & Bathymetrical Map at Tg. Sebulal

The width of the river is about 1.7km at Tanjung Sebulal and both sides of the river are covered with mangrove forest. The ground elevation at this site is almost at the same level as that of Tg.Manis.

3) The opposite side of Tanjung Sebulal

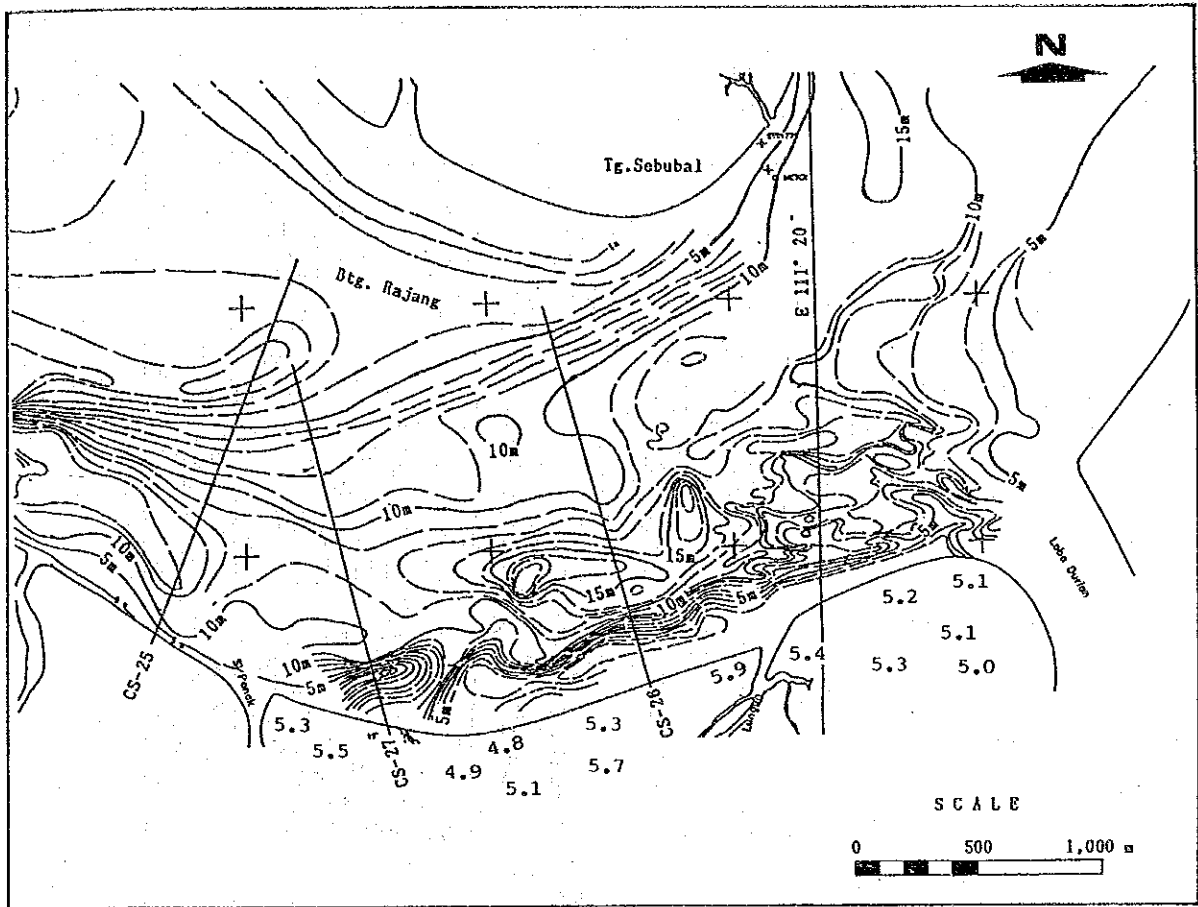


Figure-1.3.1.7 Topographic & Bathymetrical Map of opposite side of Tg. Sebulal

The width of the river is about 2.0km in front of this area and both sides of the river are covered with mangrove forest. The ground elevation at this site is about +2.0m above Land and Survey Datum.

(2) Soil Profile and Soil Composition

The study team carried out borings at nine points in the study area as in the following figure.

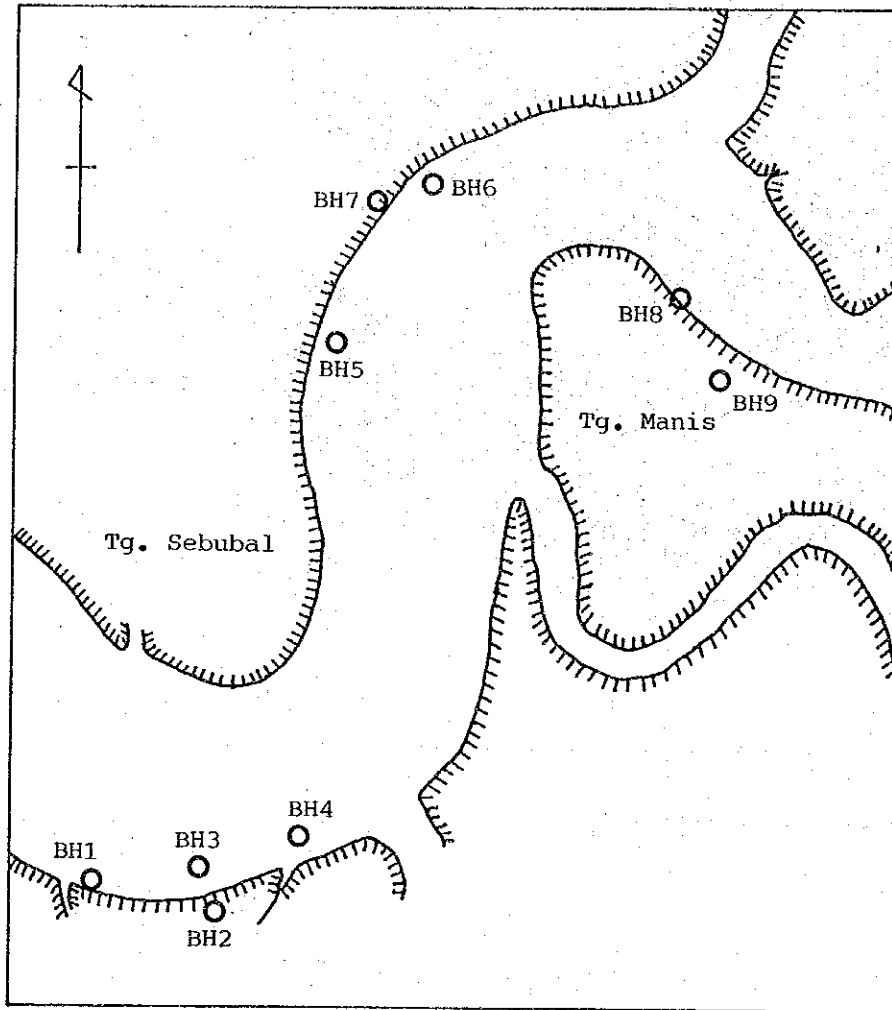


Figure-1.3.1.8 Location Map of Borings

The soil strata of the three areas are similar, but the level of the rock formation differs slightly at each location. The rock layer at Tg. Manis appears at a level of about C.D.-15m, which is shallowest in the area. At Gunong Ayer (east of Tg. Manis) where the custom office stands, the weathered rock formation is exposed.

The rock formation of the other two locations appears at a level of about C.D.-20m. The rocks consist of weathered sandstone with shale,

mudstone and siltstone. The strata above these rocks consist of very soft to stiff silt with sand & clay.

The subsurface soil profiles of these areas are shown in Figure-1.3.1.9 to Figure-1.3.1.11.

i) Tg. Manis

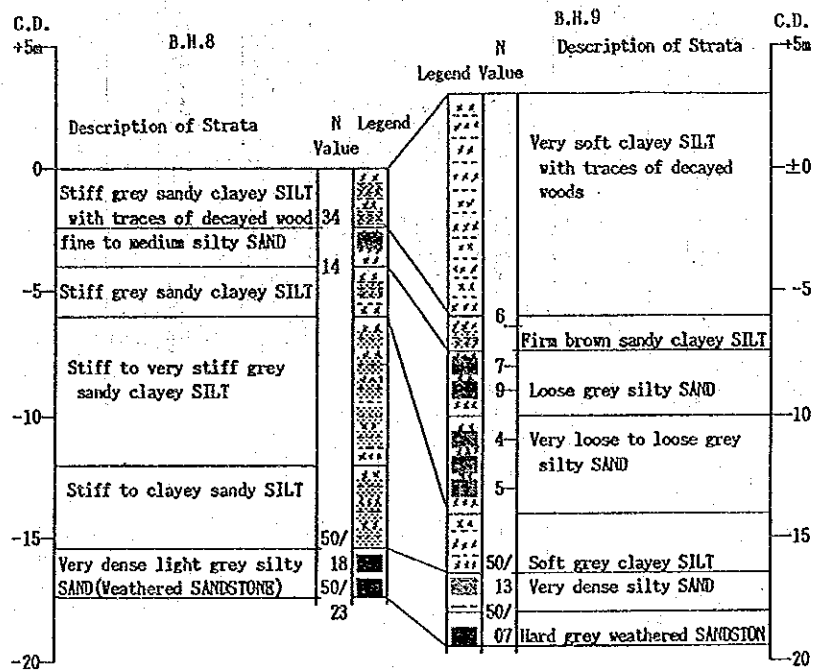


Figure-1.3.1.9 Subsurface Soil Profile at Tg. Manis

ii) Tg. Seubal

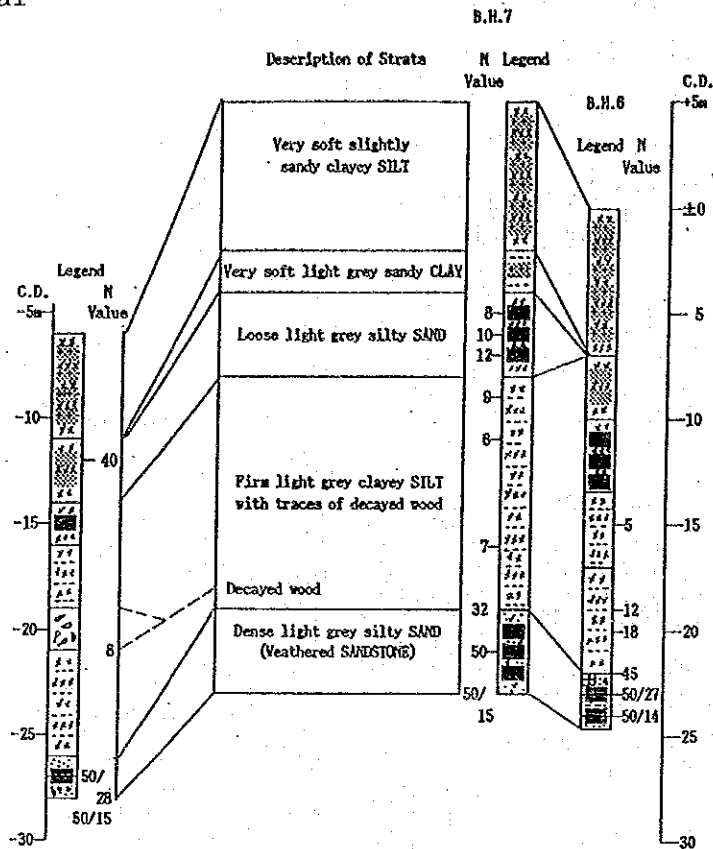


Figure-1.3.1.10 Subsurface Soil Profile at Tg. Seubal

iii) The opposite side of Tg. Seubal

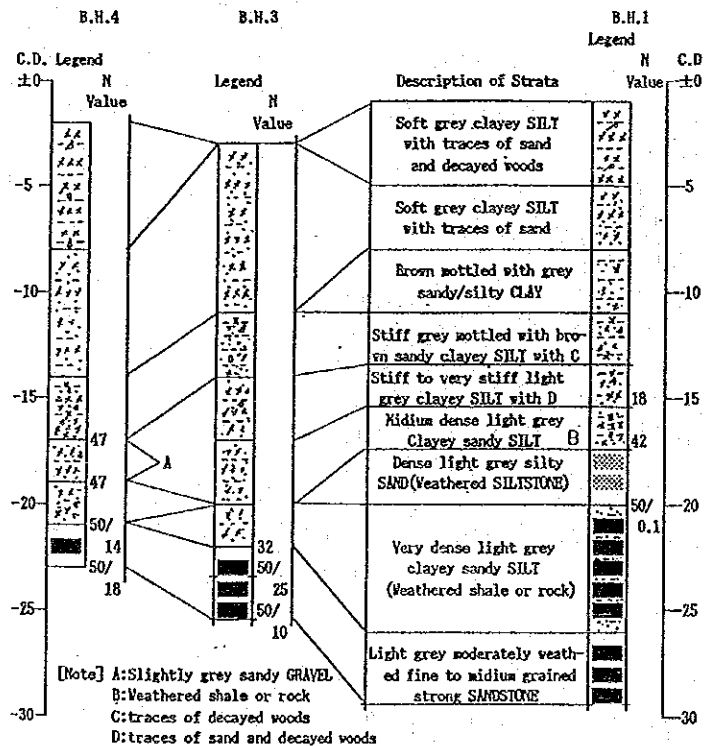


Figure-1.3.1.11 Subsurface Soil Profile at the opposite side of Tg. Seubal

In order to study the suitability of the river bed sediment as the construction material, sampling tests were carried out in the Tg. Manis area as shown in Figure-1.3.1.12.

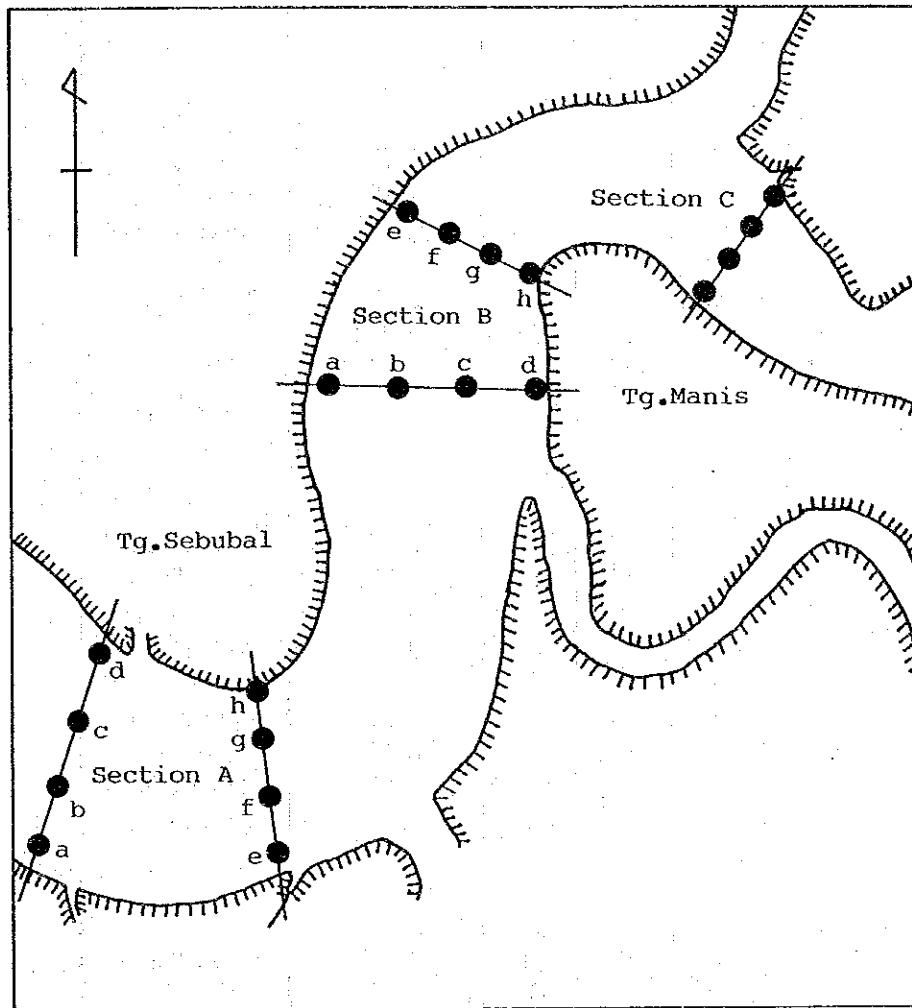


Figure-1.3.1.12 Location of Bottom Sediments Sampling

The results of the grain size analysis are shown in the following table. In addition, judging from the results of boring carried out by STIDC, almost all of the soil (sand) at the sand bars (west of Tg. Manis & south of Tg. Seubal) can be used as reclaiming material.

Table-1.3.1.1 Grain Size Analysis of the River Bottom Sediments

Location	Grain Size Distribution (%)				Classification of Soil		
	Gravel	Sand	Silt	Clay	D=50 Size(mm)	Classification	Suitability *①
South Tg.Manis (Section A)							
a	4	45	34	17	0.055	Silt	×
b	0	91	0	9	0.15	Fine Sand	○
c	0	93	0	7	0.15	Fine Sand	○
d	0	99	0	1	0.32	Medium Sand	○
e	0	98	0	2	0.23	Medium Sand	○
f	0	16	56	28	0.012	Silt	×
g	0	14	62	24	0.009	Silt	×
h	29	25	29	17	0.08	Fine Sand	△
Tg. Seubal (Section B)							
a	3	80	0	17	0.23	Medium Sand	○
b	3	70	16	11	0.20	Fine Sand	△
c	0	97	0	3	0.33	Medium Sand	○
d	0	100	0	0	0.28	Medium Sand	○
e	0	99	0	1	0.30	Medium Sand	○
f	2	66	18	14	0.17	Fine Sand	△
g	0	93	0	7	0.25	Medium Sand	○
h	2	91	0	7	0.25	Medium Sand	○
Tg. Manis (Section C)							
a	2	50	33	15	0.065	Fine Sand	△
b	0	40	40	20	0.03	Silt	×
c	3	18	56	23	0.012	Silt	×
d	2	23	52	23	0.02	Silt	×

*① : Suitability of soil for land reclamation

○ Suitable △ Applicable × Unsuitable

(3) Subsidence and Compaction

Because the study area has been covered with natural forest, observations regarding subsidence and compaction have never been carried out.

However, according to the results of some interviews and field survey, there are evidently no traces of subsidence and compaction in the study area because the area has consisted of natural forest, and the ground water in the area has never been pumped up in a quantity massive enough to cause subsidence and compaction.

(4) Slope Stability

Although there is no evidence that landslides will be a problem in the study area, further study and periodical observation will be required.

(5) Erosion and Accumulation

1) Main causes of erosion and accumulation

It is reported that erosion of the river bank occurs continuously along the Rajang River.

The main causes of bank erosion are as follows:

- a) Natural currents due to tidal motions and river discharges,
- b) Water level variations due to tidal waves and peak discharges in monsoon season,
- c) Surface run off due to heavy rainfall,
- d) Currents and waves induced by passing vessels,
- e) Deforestation, cutting and removal of trees along the shoreline

As for d), express boats are regarded as the main cause of the erosion in a report entitled "Master Plan Study for Coastal and Riverine Transport in Sarawak", but express boats have already been prohibited from traveling at over 15 knots. Therefore, the virtual effect of the cause "d" is not

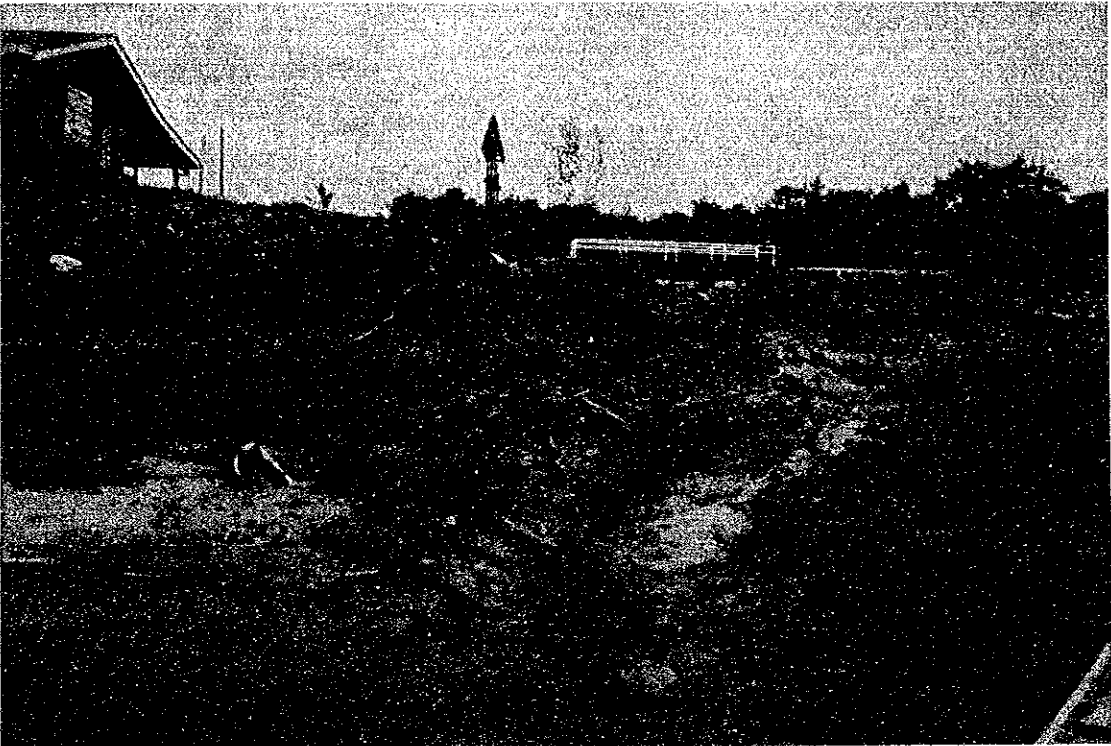
substantially greater than others.

The following pictures show the present situation of the shoreline in and around the project site.

Further, some of these samples shows typical types of the erosion found along the banks of the Rajang River.



Tg. Manis STIDC Site (1)



Tg. Manis STIDC Site (2)

Tg. Manis
STIDC (3)



Tg. Manis (4)



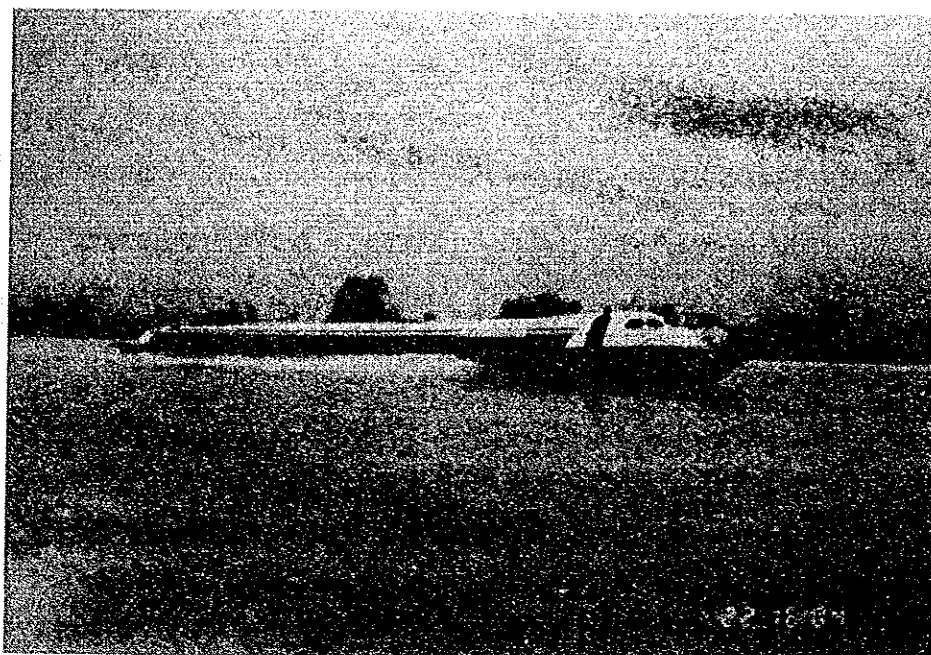
Sample 1



Sample 2



Express Boat



Sample 3

