Section 2 Technical Suggestion for Giving Priority to Three Proposed Sites

Contents

1. Purpose of the investigation

Three sites which have been selected by the Viet Nam's side are surveyed to investigate the following.

- Land form and natural conditions such as soil condition, climate, etc.
- Actual condition and future plan of infrastructures
- Utilities such as electricity, water, etc.
- Incidental facilities such as hospital and school
- Labor
- Availability of raw materials and fuels
- Market

The three proposed sites where a new steel production plant is constructed are judged appropriate for every items mentioned above based on current situation and future plan of each site. Then, priority is given to each site judging from the criteria which have been prepared. Also each site is examined to see possibility of accommodating expansion plan. Thus, the result is submitted to the Viet Nam's side for its final selection.

2. Formulation of criteria for site selection

2.1 The purpose of establishing the criteria

(1) To give priority to 3 proposed sites
(2) To examine possibility of accommodating expansion plan at 3 proposed sites

2.2 The criteria for giving priority to 3 proposed sites

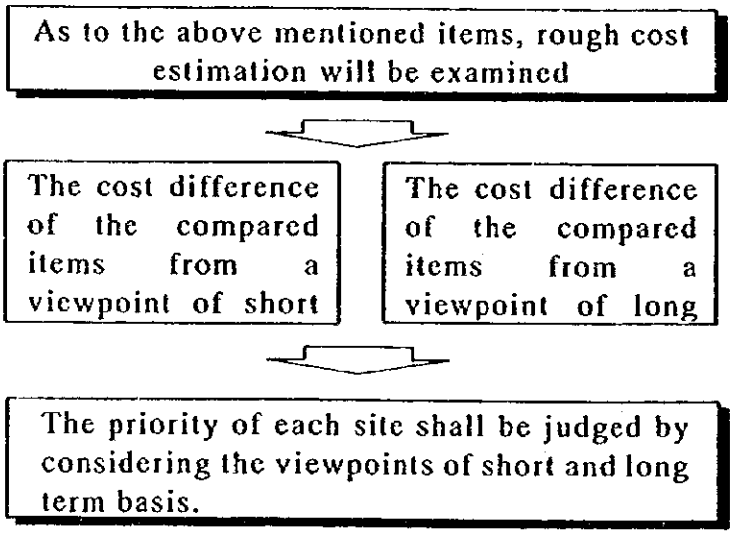
(1) The items of the criteria

Table 2-1 The items of the criteria

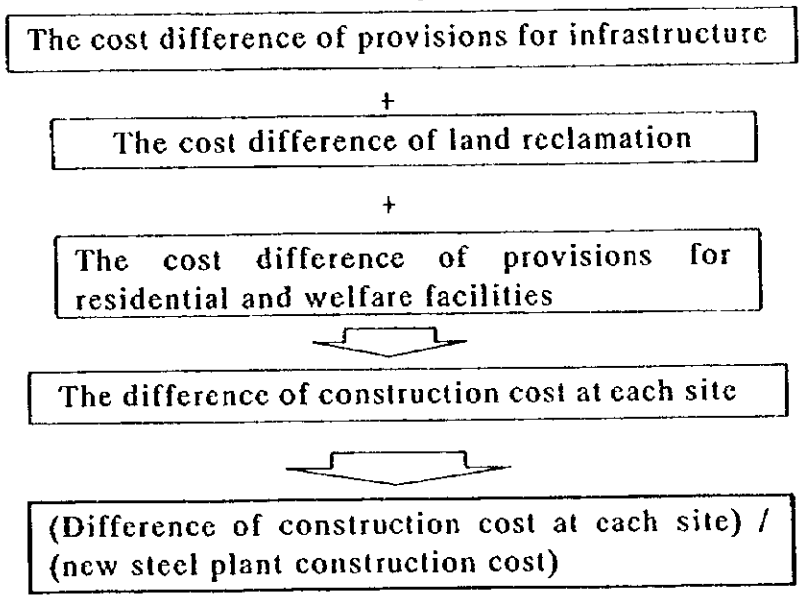
The items of criteria from a viewpoint of short term basis	The items of criteria from a viewpoint of long term basis
1) Infrastructure - Port - Water supply - Power supply - Telecommunication 2) Land reclamation 3) Current residential and welfare facilities	1) Labor 2) Accessibility to raw materials 3) Accessibility to markets

Note: These items which were recognized difference in 3 proposed sites and were not confirmed sufficiently in the previous survey have been selected based on the results of first site survey.

(2) The way of determining for the priority
The way of determining for the priority is shown in the flow below.

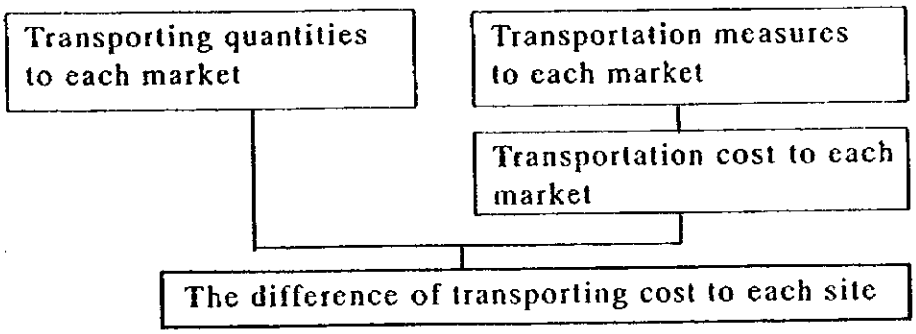


1) The compared items of criteria from a viewpoint of short term basis

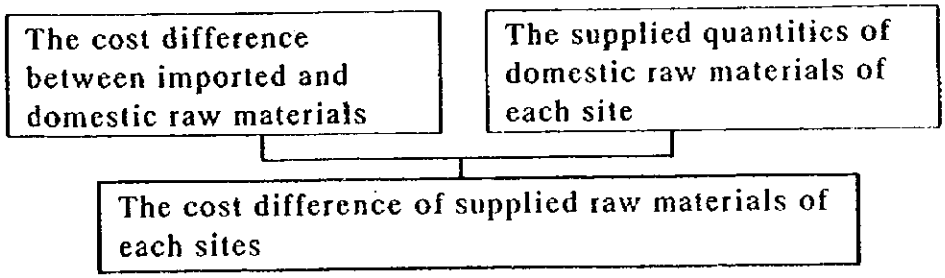


2) The compared items criteria from a viewpoint of long term basis

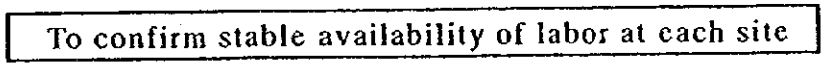
a) The difference of transporting cost to markets



b) The cost difference of supplied raw materials



c) Labor



2.3 Possibility of accommodating of expansion plan at 3 proposed sites

The criteria is shown in "The Criteria for Site selection in the 1st Survey (The Revised edition)".

Table 2-2 shows the relevant figures of criteria for each of the production processes.

Table 2-2 Relevant figures for the items

		BF & BOF	DR & EAF	SR & BOF	EAF
1. Site area (ha)		375～425	275～325	350～400	200～250
2. Water volume (m^3/day)		170,000 ～200,000	130,000 ～150,000	130,000 ～150,000	100,000 ～120,000
3. Electricity from outside network (MW)		200	320	260	260
4. Manpower (persons)		For construction --- 10,000～15,000			
		For operation --- 10,000～15,000			
5. Raw materials & fuels	5.1 Ore (t/year)	7,000,000	7,000,000	7,000,000	-
	5.2 Scrap (t/year)	-	-	-	5,000,000
	5.3 Coal (t/year)	3,500,000	-	4,500,000	-
	5.4 Others *1	1,500,000	700,000	2,000,000	200,000
	5.5 Natural gas or fuel	-	15,000,000 Gcal-net/year	-	-

*1: Such as limestone, ferroalloy, etc.

Note: In case of purchasing power from outside network, voltage should be 220 kV and voltage fluctuation should be within ±3%.

3. The result of the investigation for the ten proposed sites and other areas

3.1 The investigation results of the item from a viewpoint of short term basis

(1) The investigation results of port for each site (Table 2-3)

Table 2-3 The investigation results of port for each site

		1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1. Drawing		Refer to Appendix			
2.Characteristics		1) To be necessary of transferring raw material from sea-berth located in the open sea. 2)Transferring capacity raw materials to be reduced in typhoon season.	1) To be necessary of transferring raw material from sea-berth located in the open sea. 2)Transferring capacity raw materials to be reduced in typhoon season.	1) A certain amount of maintenance cost for dredging is required.	1) A certain amount of maintenance cost for dredging is required.
3.Cost	Initial cost difference *1 /new steel plant construction cost	Base	Almost same	No significant difference	5% up
	fixed maintaining dredging	Not Necessary	Not Necessary	Necessary	Necessary

*1 Initial cost difference --- (Initial cost of Each site - Initial cost of Cua Sot)

(2) The investigation results of water supply for each site (Table 2-4)

(2) The investigation results of water supply for each site (Table 2-4)

Table 2-4 The investigation results of water supply for each site

	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1. Plan of water supply for each proposed site	1) Name of reservoir Ke Go (Reserved volume--- 345 million m^3) 2) Supply volume for new steel plant **438,000 m^3/day** (Satisfies criteria) 3) Existence or future plan **existing** (No pipeline up to site) 4) Distance from site 27km 5) Rainfall 2,500 mm/year	1) Name of reservoir Ke Go (Reserved volume--- 345 million m^3) 2) Supply volume for new steel plant **438,000 m^3/day** (Satisfies criteria) 3) Existence or future plan **existing** (No pipeline up to site) 4) Distance from site 23km 5) Rainfall 2,500 mm/year	1) Name of reservoir Song Rac 2) Supply volume for new steel plant **350,000 m^3/day** (Satisfies criteria) 3) Existence or future plan **Future plan** (Investment **--70 million US$** including water pipeline) 4) Distance from site 25km 5) Rainfall 2,500 mm/year	1) Name of river Tra Bong Tra Khuc 2) Supply volume for new steel plant **300,000 m^3/day** (Satisfies criteria) 3) Existence or future plan **Future plan** (Investment **--90 million US$** including water pipeline) 4) Distance from site 12km 5) Rainfall 2,300 mm/year
2. (Initial cost difference*1) /new steel plant construction cost	**Base**	**No increase**	**2 % up**	**3 % up**

*1 Initial cost difference --- (Initial cost of Each site - Initial cost of Cua Sot)

(3) Investigation results of electric power supply (Table 2-5)

Table 2-5 The investigation results of electric power supply

	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1. Supply 500kV substation	Thachdien SS	Thachdien SS	Thachdien SS	Danang SS
2. Expansion of 500kVSS	450MVA x 2	450MVA x 2	450MVA x 2	450MVA x 1
(Existing transformer)	0	0	0	(450MVA x 1)
3. Distance to220kv new transmission line (km)	20	20	65	90
Initial cost difference of electric power supply	Base	Almost same	no significant difference	1% down

1. Construction cost is estimated based on estimated cost of Dung Quat Industrial zone.
2. Cost difference = (difference of construction cost at each site) / (new steel plant construction cost).

(4) The investigation results of land preparation (Table 2-6)

Table 2-6 The investigation results of land preparation

	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1. Plan of land preparation for each proposed site	1) Present land level H.W.L. -1 m 2) Future land level H.W.L . + 4.5 m 3) Height of land preparation + 3.5 m 4) Volume of banking and cutting **Banking** **--- 10 million m^3** **Cutting** **---- 0 million m^3**	1) Present land level H.W.L. + 2 m 2) Future land level H.W.L. + 4.5 m 3) Height of land preparation + 2.5 m 4) Volume of banking and cutting **Banking** **--- 8 million m^3** **Cutting** **---- 0 million m^3**	1) Present land level H.W.L. + 2 m 2) Future land level H.W.L. + 4.5 m 3) Height of land preparation + 2.5 m 4) Volume of banking and cutting **Banking** **--- 8 million m^3** **Cutting** **---- 0 million m^3**	1) Present land level H.W.L. +20 ~ 80 m · 20 ~ 50m → 150 ha · 50 ~ 80m → 150 ha 2) Future land level H.W.L . + 50 m 3) Height of land preparation -30 ~ +30 m 4) Volume of banking and cutting **Banking** **--- 70 million m^3** **Cutting** **---- 70 million m^3**
2. (Initial cost difference*1) / new steel plant construction cost	**Base**	**Almost same**	**almost same**	**2 % up**

*1 Initial cost difference --- (Initial cost of Each site - Initial cost of Cua Sot)

3.2 The investigation results of the item from a viewpoint of long term basis

(1) The investigation results of transportation cost (Table 2-7)

Table 2-7 The investigation results of transportation cost

	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1.Transporting volume To south(65%) To north(30%)	1,950,000 t/year 900,000 t/year			
2. Transporting distance Up to south Up to north	1,450 km 350 km	1,450 km 350 km	1,400 km 400 km	950 km 850 km
3. Transportation cost by ship (Not including load / unload / land transport cost)	0.01 US$/t.km			
Transportation cost for each site	31 million US$/year	31 million US$/year	31 million US$/year	26 million US$/year

3.3 Evaluation of each site

(1) Evaluation of each site from viewpoint of long term basis (Table 2-8)

Table 2-8 Evaluation of each site from viewpoint of short term basis

	1.Cua Sot	2.Thach Van	3.Mui Ron	4.Dung Quat
Ⅰ.Viewpoint of short term basis				
1.Initial cost difference of port	**Base** Remark: 1)To be necessary of transferring raw material from sea-berth located in the open sea. 2)Transferring capacity raw materials to be reduced in typhoon season.	**Almost same** Remark: 1)To be necessary of transferring raw material from sea-berth located in the open sea. 2)Transferring capacity raw materials to be reduced in typhoon season.	**No significant difference** Remark: 1)A certain amount of maintenance cost for dredging is required.	**5%up** Remark: 1)A certain amount of maintenance cost for dredging is required.
2. Initial cost difference of water supply	**Base** Remark : existing	**Almost same** Remark : existing	**2%up** Remark : future plan	**3%up** Remark : future plan
3. Initial cost difference of electric power supply	**Base**	**Almost same**	**No significant difference**	**1%down**
4. Initial cost difference of land preparation	**Base**	**No significant difference**	**No significant difference**	**2%up**
Priority	Ⅰ	Ⅰ	Ⅰ	Ⅱ
Remark	1)Cost difference = (difference of construction cost at each site) / (new steel plant construction cost)			

(2) Evaluation of each site from viewpoint of long term basis (Table 2-9)

Table 2-9 Evaluation of each site from viewpoint of long term basis

	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
I . Viewpoint of long term basis				
1. Labor	**Satisfies criteria** Remark : According to information from the people's committee of HATINH province.	**Satisfies criteria** Remark : According to information from the people's committee of HATINH province.	**Satisfies criteria** Remark : According to information from the people's committee of KYANH district HATINH province.	**Satisfies criteria** Remark : According to information from DUNG QUAT industrial estate authority.
2. Accessibility to raw materials	**Close to Thach Khe mine** Remark : 1) Assuming to use 500,000 t/year of iron ore 2) Assuming the life of mine as 30 years	**Close to Thach Khe mine** Remark : 1) Assuming to use 500,000 t/year of iron ore 2) Assuming the life of mine as 30 years	**50km far from Thach Khe mine**	**500km far from Thach Khe mine**
3. Accessibility to market	**31 million US$/year** Transportation cost by ship, not including load/ unload/ land transportation cost	**31 million US$/year** Transportation cost by ship, not including load/ unload/ land transportation cost	**31 million US$/year** Transportation cost by ship, not including load/ unload/ land transportation cost	**26 million US$/year** Transportation cost by ship, not including load/ unload/ land transportation cost
Priority	**No significant difference**	**No significant difference**	**No significant difference**	**No significant difference**

3.4 The investigation results of examining possibility of accommodating expansion plan for each site (Table 2-10)

Table 2-10 The investigation results of examining possibility of accommodating expansion plan for each site

Item \ Name of site	1. Cua Sot	2. Thach Van	3. Mui Ron	4. Dung Quat
1.The proposed criteria				
1.1 Site area				
More than 375 (ha)	A	A	A	A
1.2 Water supply volume				
More than 170,000m3/day	A	A	A	A
1.3 Electricity from outside network				
More than 400MW	A	A	A	A
1.4 Man power For construction, operation				
More than 15,000 persons	A	A	A	A

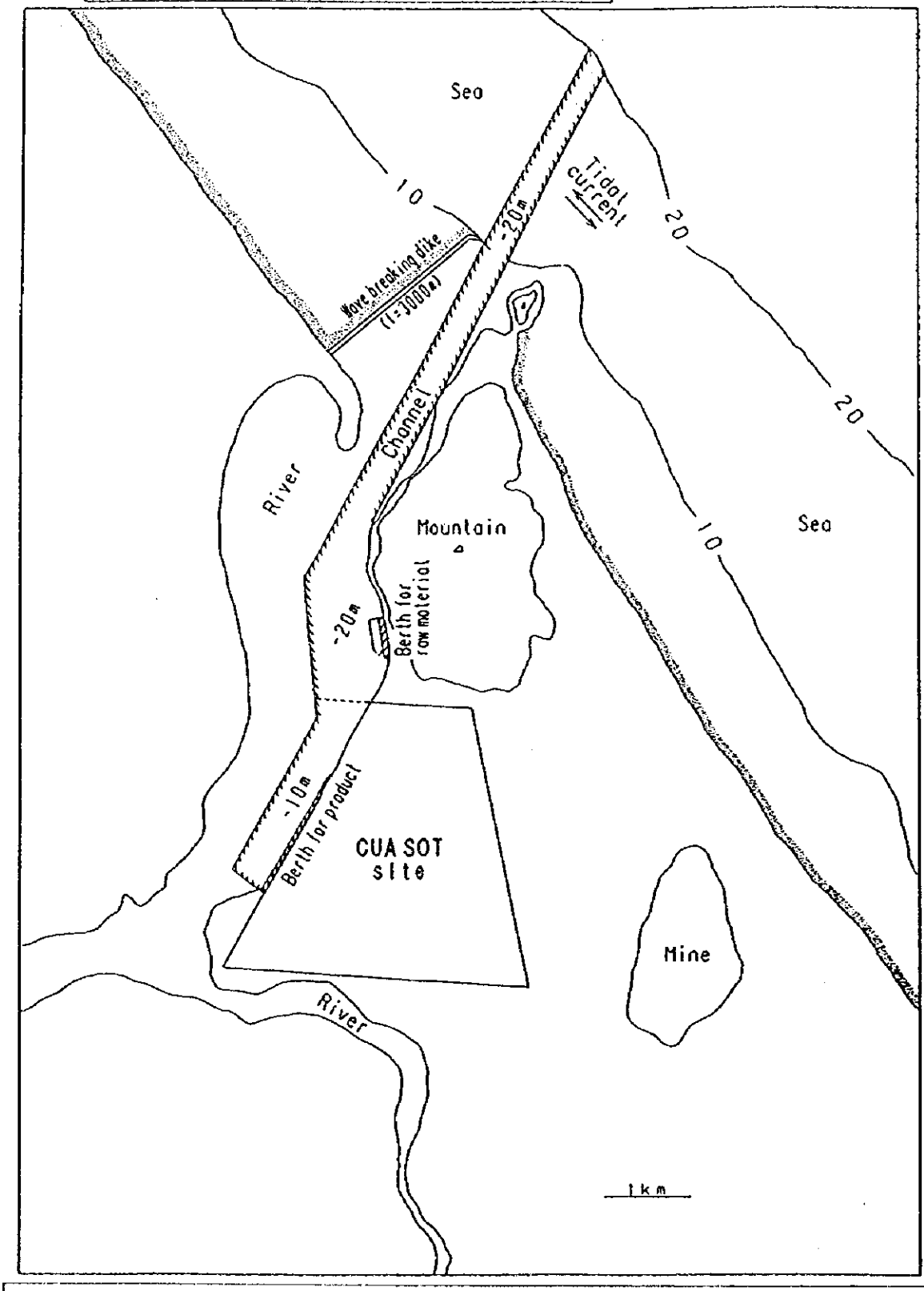
Note A : Satisfies criteria, B : Uncertain, subject to further information, C : Not satisfies criteria.

4. Decision of candidate site

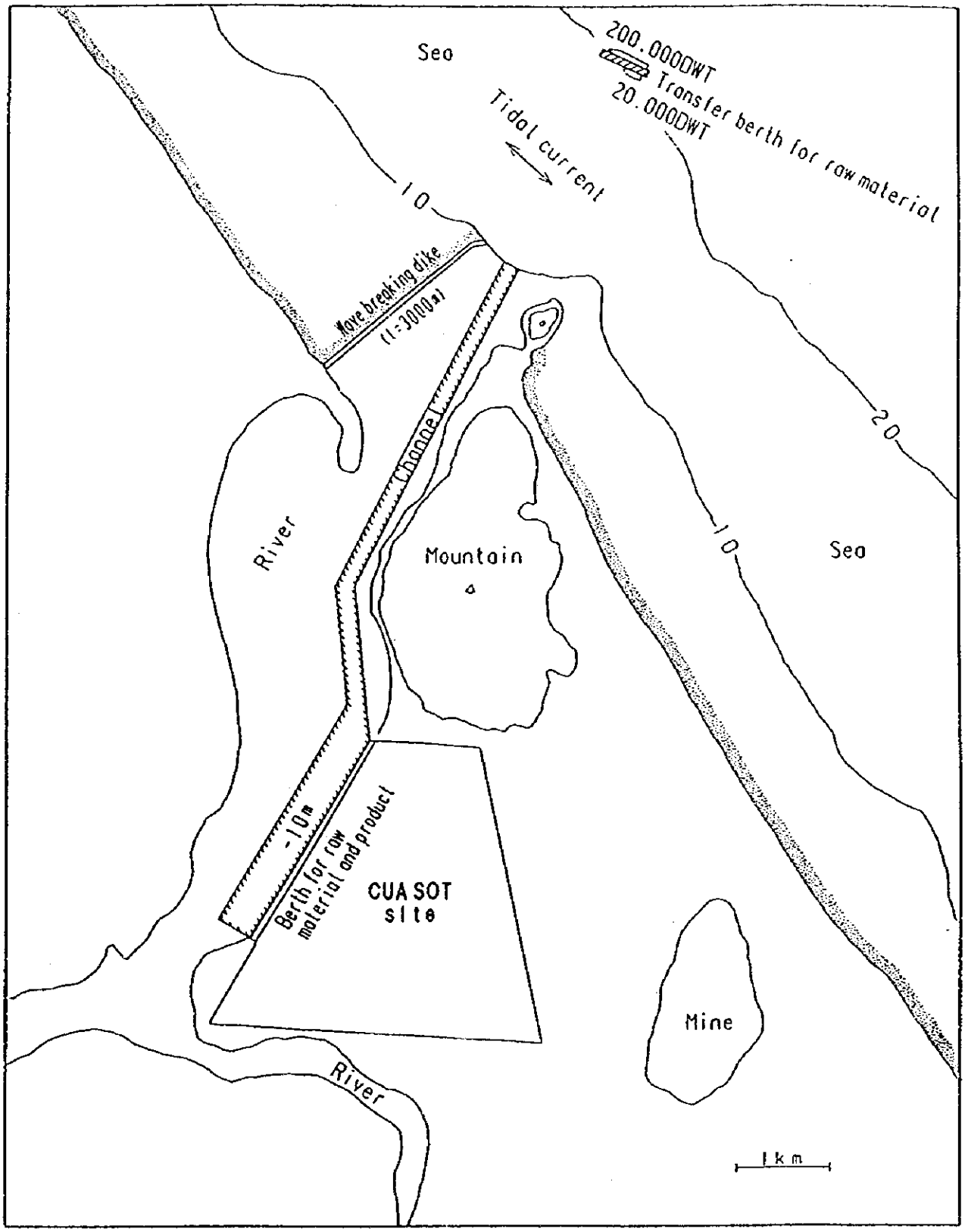
After the discussion from technical, economic and political points of view, the Steering Committee members proposed "Mui Ron" as the site for a new integrated steelworks on June 26, 1997.

Appendix I

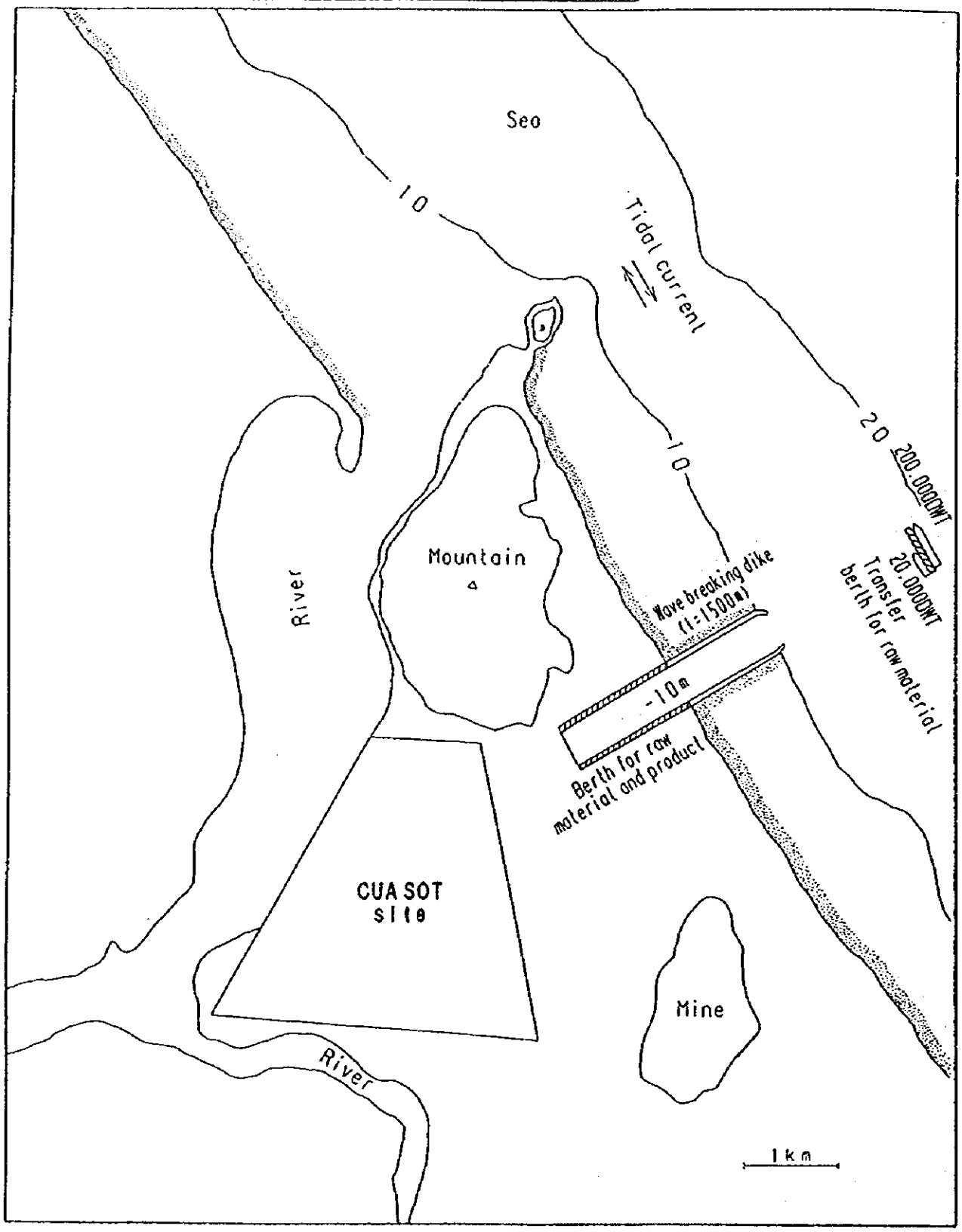
Case 1 of CUA SOT PORT PLAN



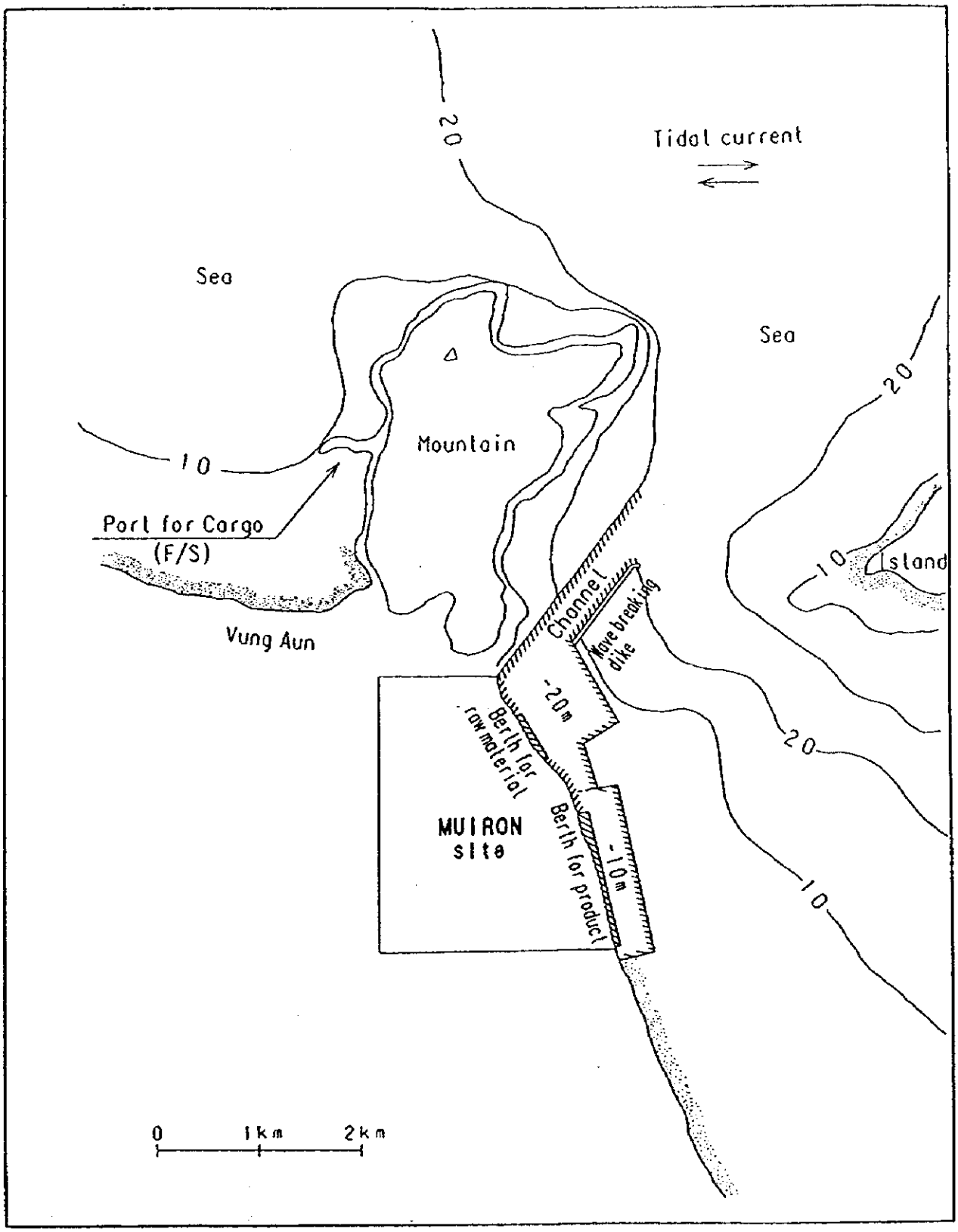
Case 2 of CUA SOT PORT PLAN



Case 3 of CUA SOT PORT PLAN

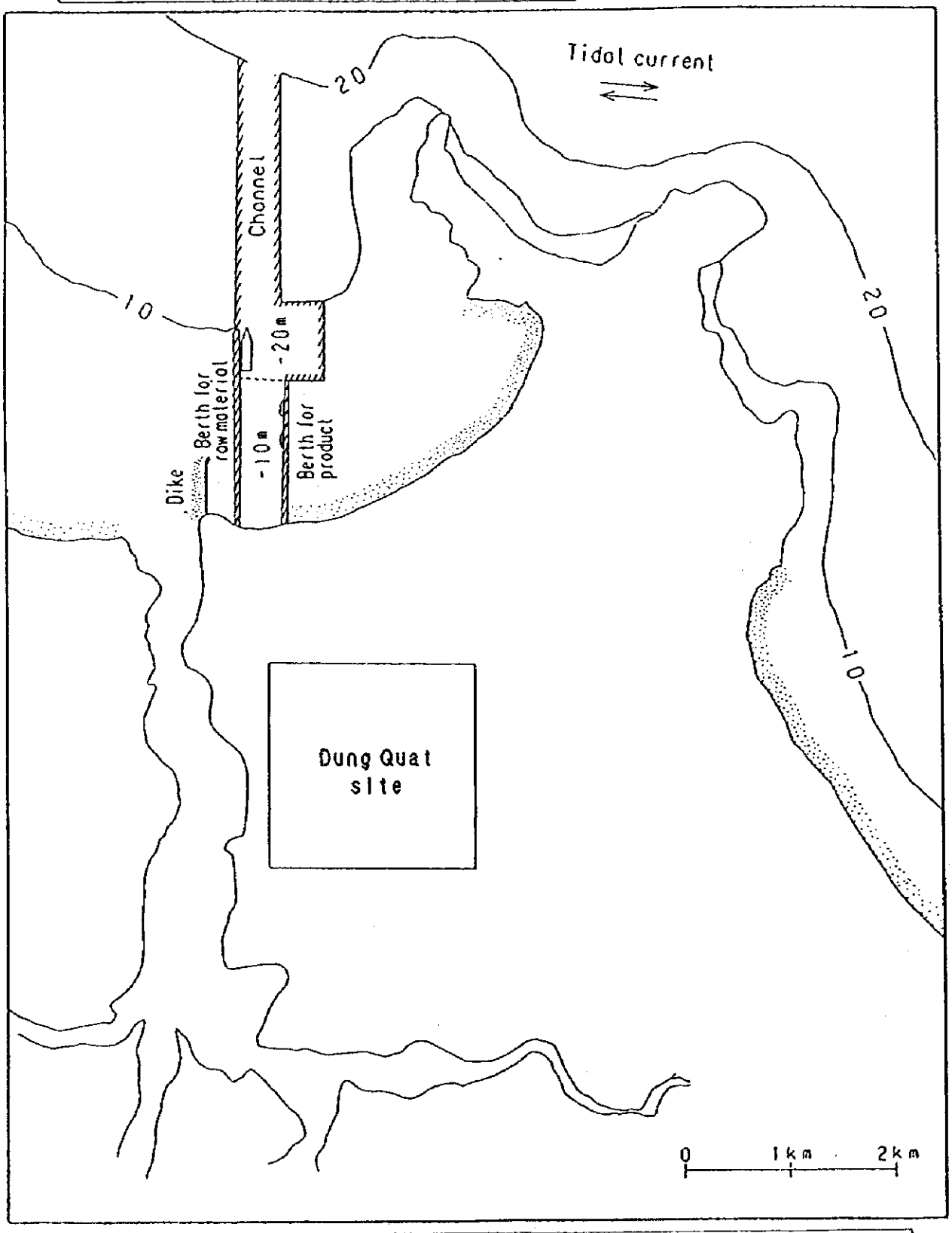


MUI RON PORT PLAN



Name of Project : Final Report Master Plan Study on the Development of Steel Industry in the Socialist Republic of Viet Nam				
JICA/Nippon Steel	Chapter	Part	Section	Page
Date: Feb 17, 1998 Rev.:	III	4	2	17

DUNG QUAT PORT PLAN



Section 3 Survey for Mui Ron and Dung Quat

Contents

1. Purpose of the additional survey for infrastructure and utility in Dung Quat

Purpose of the additional survey is to reduce the investment cost for infrastructure and utility at Dung Quat site, under the following conditions:

1) To confirm the site conditions such as area allowed for the construction of the new integrated steelworks.
2) To share the port facilities such as breakwater and dredging with the Dung Quat port master plan by another JICA Master Plan team.

Dung Quat site is studied from the following points.

1) The difference of infrastructure conditions such as port, water supply, access to the electricity source, etc. between Mui Ron and Dung Quat should be compared. Then the influence of such differences is evaluated from viewpoint of impact on the new integrated steelworks.
2) General layout drawings for the both sites are prepared.

2. Facts and findings newly obtained and changed from the last investigation, through Dung Quat additional site survey

1) Location of the oil refinery
The location of the oil refinery is determined at the west-south region of the site and its related storage facilities are to be located at the east-south at the site.

2) Location of the new integrated steelworks
It was confirmed by the local authority that about two(2) km of coastal line from the breakwater at the river mouth to the southern direction would possibly be utilized by the steelworks, while about one(1) km of sea surface from the coastal line could also be utilized by the steelworks by reclaiming the port.
The western region of the site could be utilized for the steelworks without any restriction.

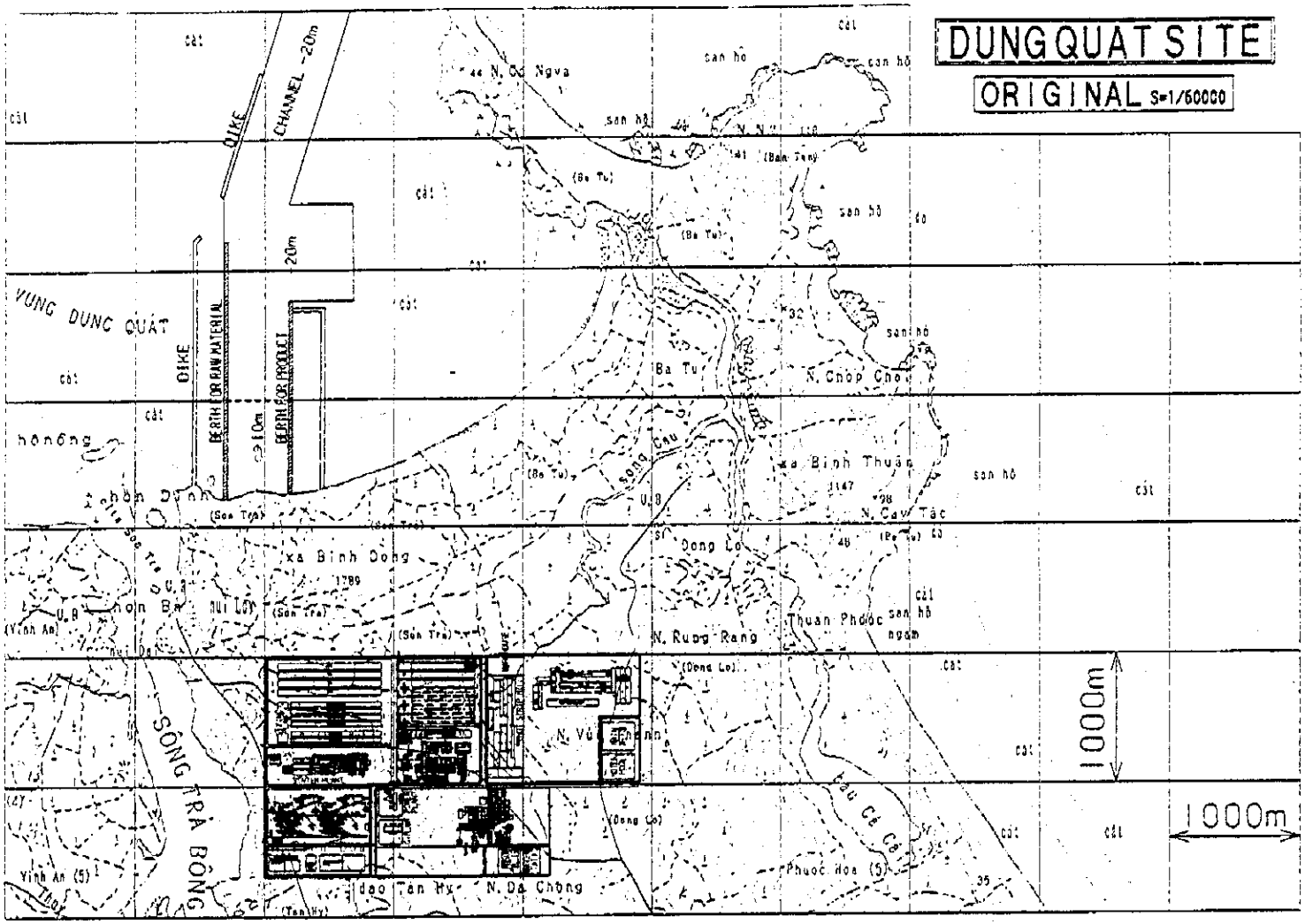
3) Construction of reservoir
New reservoir is required. However its construction cost is not required for water consuming industry.

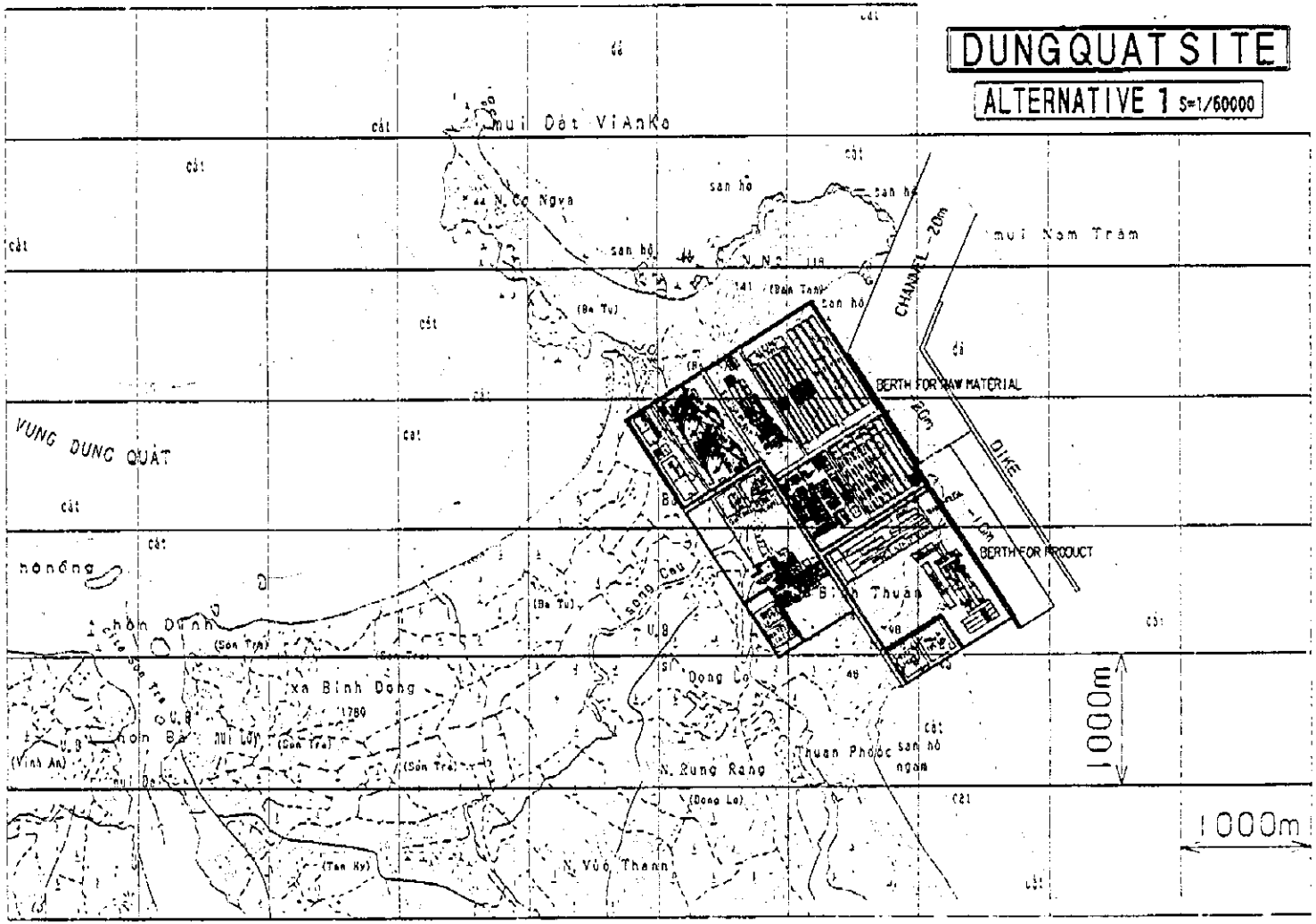
3. New layout for Dung Quat

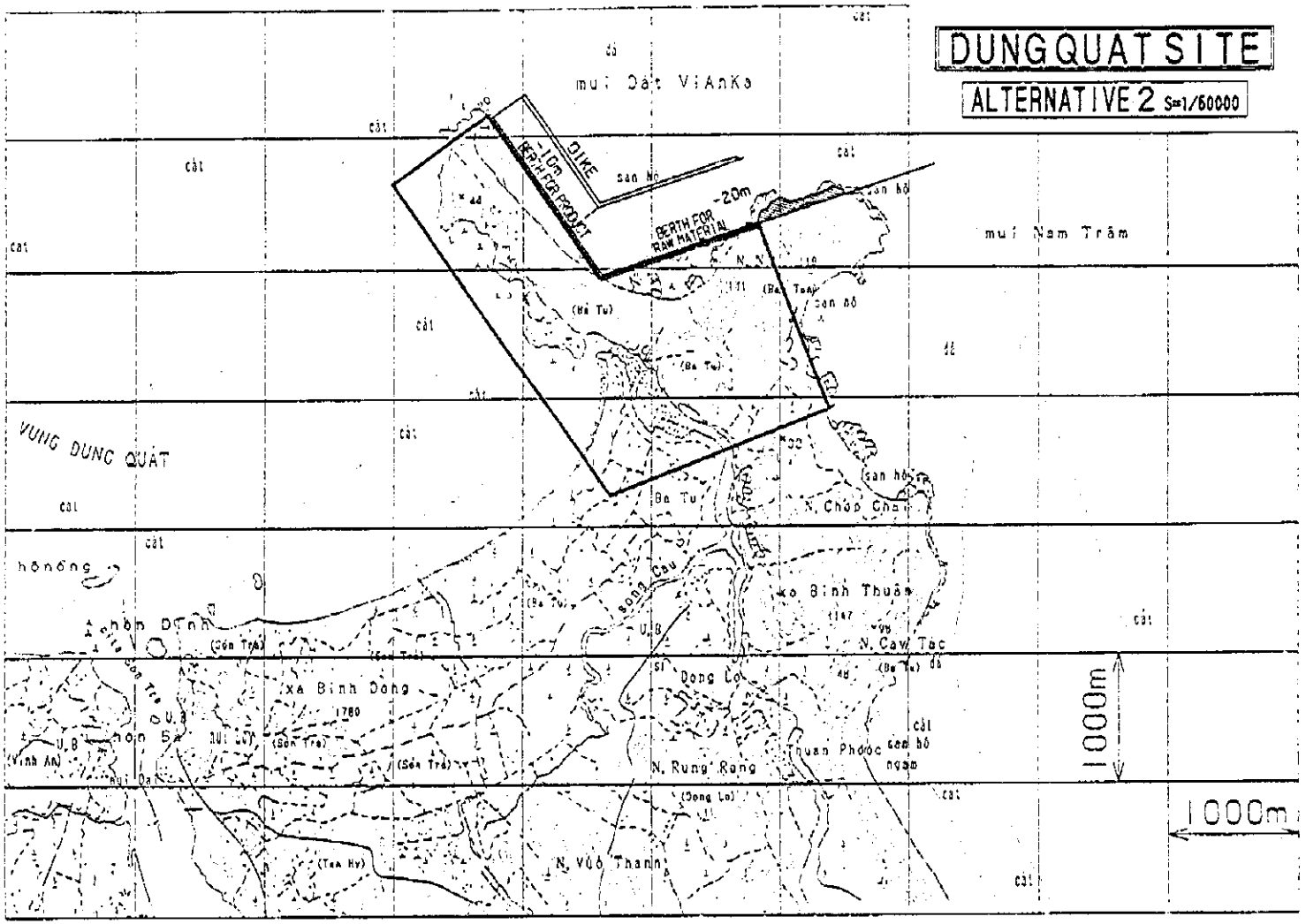
3.1 Layout drawings submitted by JICA team for the study

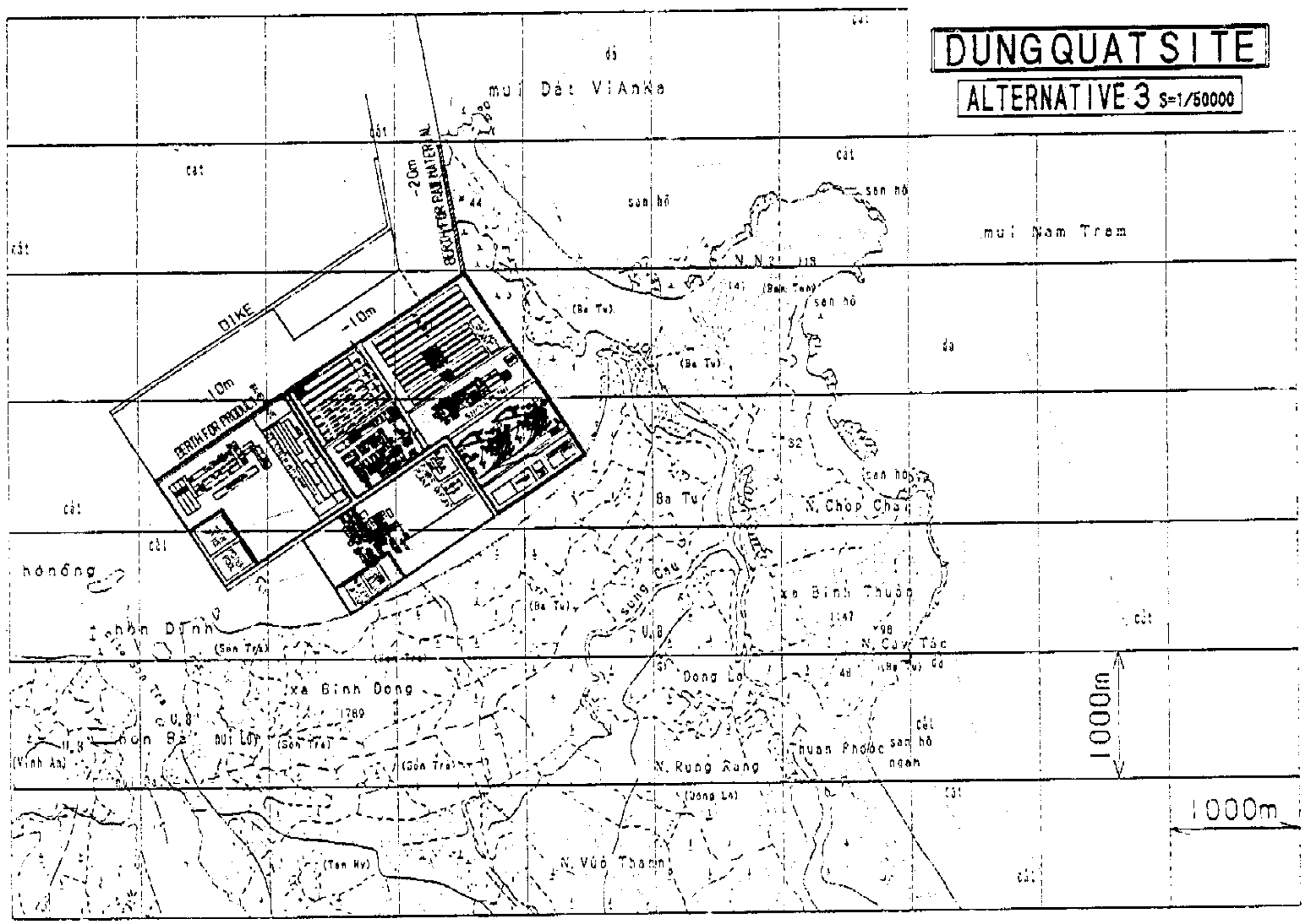
JICA team submitted the following four(4) layout drawings at Dung Quat site for the study of the local authority as attached hereto:

(1) Dung Quat(Original)
(2) Alternative 1
(3) Alternative 2
(4) Alternative 3


DUNG QUAT SITE
ORIGINAL S=1/60000
DIKE
CHANNEL -20m
20m
VUNG DUNG QUẤT
DIKE
BERTH FOR RAW MATERIAL
BERTH FOR PRODUCT
-10m
Ba Tu
N. Chop Cho
Binh Thuan
N. Cay Tac
Dong Lo
N. Rung Rang
Thuan Phuoc
N. Vu
SÔNG TRÀ BÔNG
Tan Hy
N. Da Chong
Phuoc Hoa (5)
1000m
1000m


DUNG QUAT SITE
ALTERNATIVE 1 S=1/60000
Mui Dat ViAnKo
Mui Nam Tram
CHANNEL -20m
BERTH FOR RAW MATERIAL
DIKE
BERTH FOR PRODUCT
VUNG DUNG QUAT
Binh Thuan
Dong Lo
Thuan Phuoc
1000m
1000m


DUNG QUAT SITE
ALTERNATIVE 2 S=1/50000
mui Dat VI An Ke
mui Nam Tram
DIKE
-10m BERTH FOR PRODUCT
-20m BERTH FOR RAW MATERIAL
VUNG DUNG QUAT
Ba Tu
N. Chop Cha
Binh Thuan
N. Cay Tac
Dong Lo
Binh Dong
N. Rung Rung
Thuan Phuoc
N. Vuo Thanh
1000m
1000m

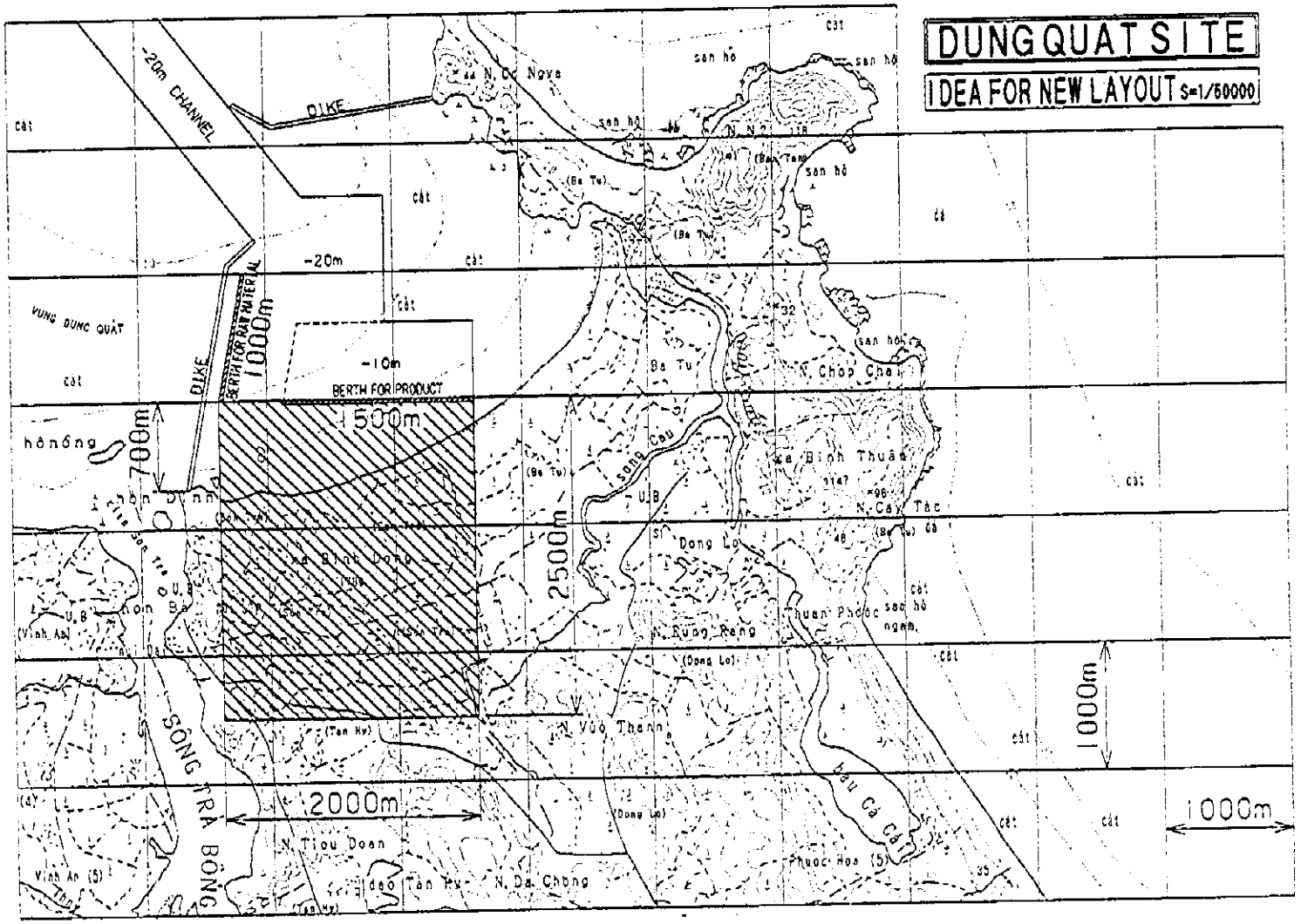

DUNG QUAT SITE
ALTERNATIVE 3 S=1/50000
DIKE
BERTH FOR RAW MATERIAL
BERTH FOR PRODUCTS
-20m
-10m
10m
1000m
mui Dat Vi Anka
mui Nam Trem
N. Chop Chai
xa Binh Thuan
xa Binh Dong
N. Cuy Tac
Dong Lo
N. Rung Rang
N. Vuo Thanh
Thuan Phuoc
Ba Tu
hon Ong

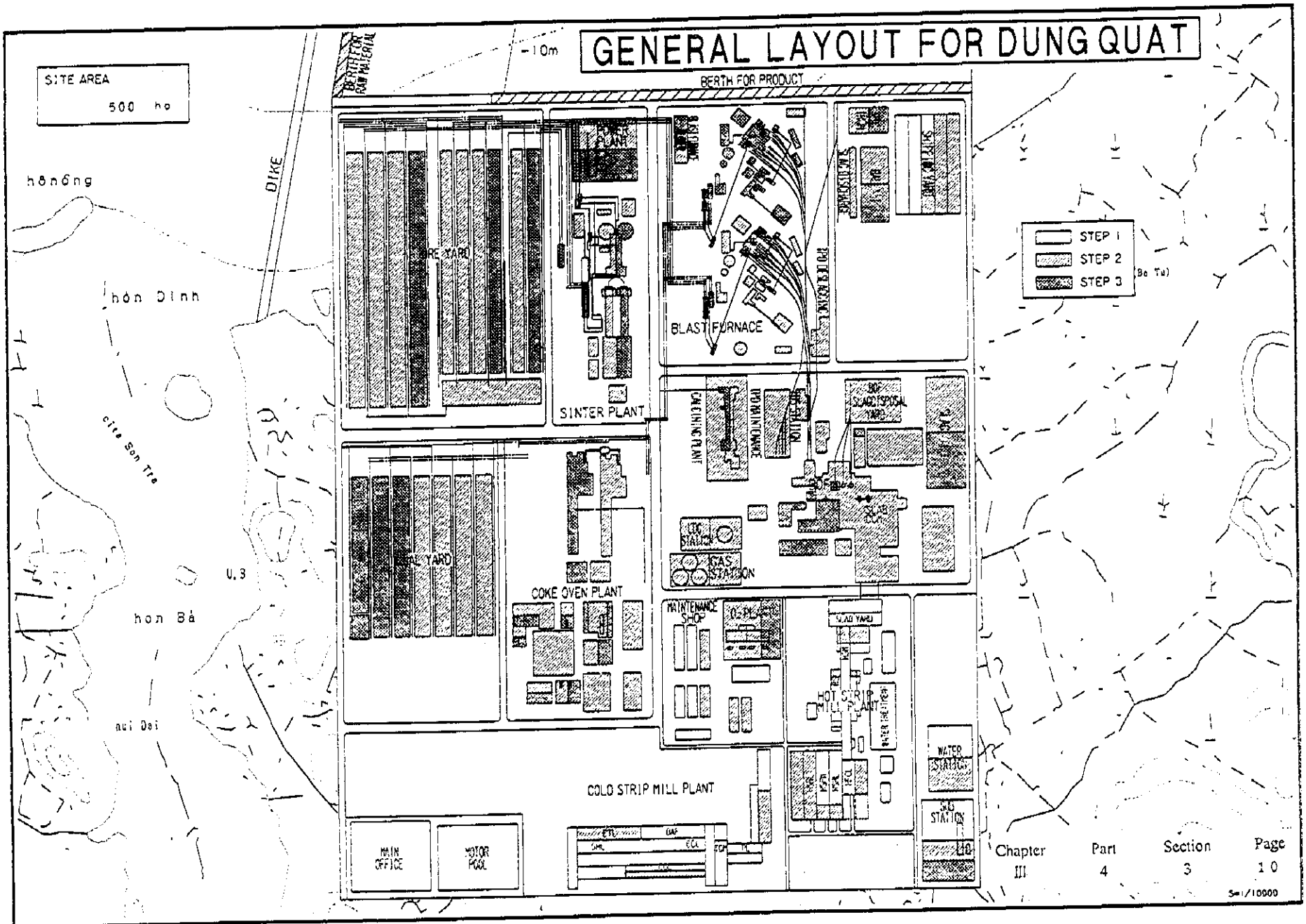
3.2 The results of alternative layouts based on discussions with Authority

(1) Alternative 1: Interferes with the oil refinery facilities
(2) Alternative 2: Also interferes with the oil refinery facilities
(3) Alternative 3: Requires full length of coastal line of Dung Quat port, making it difficult to plan other industrial facilities at the port area.
(4) The original : Requires the elevated construction cost for raw material berth and product berth of the steelworks

3.3 New layout for Dung Quat

New layout for Dung Quat based on the new site conditions is shown on the next page.


DUNG QUAT SITE
IDEA FOR NEW LAYOUT S=1/50000
-20m CHANNEL
DIKE
-20m
-10m
BERTH FOR PRODUCT
1500m
2500m
1000m
700m
2000m
1000m
SONG TRA BONG
VUNG DUNG QUAT
cát
san hô
hôn nông
Ba Tu
N. Chop Chai
Ba Binh Thuân
N. Cay Tac
Dong Lo
N. Rung Rang
Thuan Phuoc
N. Vuo Thanh
N. Tieu Doan
N. Da Chong
Thuoc Hoa (5)
Vinh An (5)



LY-OUNG2.DWG(OUNG2-A2.DWG)

4. The infrastructure conditions of Mui Ron and Dung Quat

The infrastructure conditions of Mui Ron and Dung Quat are shown in Table 3-1.

Table 3-1 The site conditions of Mui Ron and Dung Quat

Category	Mui Ron	Dung Quat
1. Site & ground condition	Ground level Sand and gravity with density of 2.68 g/cm^3 GL - 5 to 8m Clay with uniaxial compressive strength of 1.4 kg/cm^2 GL - 10 to 20m SPT(Standard Penetration Test) which is the most important information for soil properties has not been done yet.	Ground level Medium sand with small gravel GL - 6m Clay with sand GL - 20m SPT(Standard Penetration Test) which is the most important information for soil properties has not been done yet.
2. Meteorological condition	2.1 Weather Condition 2.1.1 Temperature a) Yearly average:(23 ~ 27)℃ b) Maximum in a year: (40.5)℃ c) Minimum in a year : (8.0)℃ 2.1.2 Rainfall a) Total amount of yearly rainfall:(2,000)mm/year b) Maximum in 24 hour:(150~200)mm/hour c) Yearly total amount : (1,600~3,400)mm 2.2 Marine condition 2.2.1 Tide a)GL:(DL+0.7~1.0m),LWL:(DL+1m),HWL:(DL+1.9m) b)Information on Tidal Wave: Maximum 3.2m 2.3 Earthquake: None	2.1 Weather Condition 2.1.1 Temperature a) Yearly average :(25.7)℃ b) Maximum in a year: (41) ℃ c) Minimum in a year : (12.4)℃ 2.1.2 Rainfall a) Total amount of yearly rainfall :(2,287)mm/year b) Maximum in 24 hour: (200~250)mm/hour c) Yearly total amount (~)mm 2.2 Marine condition 2.2.1 Tide a) GL:(DL+2.85m),LWL:(DL+0.4m),HWL:(DL+1.4m) 2.3 Earthquake: None

Category	Mui Ron	Dung Quat
3. Electric power and water	3.1 Electric Power Supply a) Supply substation---Tachidien S/S b) Transformer capacity:(450)MVA c) Power supply substation (65) km from site 3.2 Water Supply for industrial water a) Song Rac reservoir capacity:(110 million)m^3 b) Supply point and location:(20)km from the site	3.1 Electric Power Supply a) Supply substation---Doc Soi S/S b) Transformer capacity:(450)MVA c) Power supply substation (7) km from site 3.2 Water Supply for industrial water 1)Tra Kbuc reservoir(Future plan) a) capacity : (170)m^3/s b) Supply point and location:(7)km from the site 2)Tra Bong reservoir(Future plan) a) capacity : (20)m^3/s b) Supply point and location : (2)km from the site
4. Infrastructure-transportation	4.1 Available road from route 1 to the site a) Route: (1) b) Distance: (6)km c) Road width: (3～4)m	4.1 Available road from route 1 to the site a) Route: (1) b) Distance: (Around 15)km c) Present road width: (3～4)m
5. Environment	5.1 Water Quality - Reservoir Cl^- 3.7mg/l NO_3^- 3.9mg/l PO_4^{2-} 1.4mg/l SO_4^{2-} 2.3 mg/l - River Cl^- 706mg/l NO_3^- 4.1mg/l PO_4^{2-} 2.0mg/l SO_4^{2-} 86.9mg/l Refer to Chapter Ⅳ Part 12.	5.1 Water Quality - Reservoir Cl^- 5.7mg/l NO_3^- 0.84mg/l PO_4^{2-} 0.41mg/l SO_4^{2-} 2.5 mg/l - River Cl^- 101mg/l NO_3^- -mg/l PO_4^{2-} -mg/l SO_4^{2-} -mg/l Refer to Chapter Ⅳ Part 12.

Category	Mui Ron	Dung Quat
	5.2 Noise Coastline / In the woods Leq 39.5dB / 40.2dB L5 41.8dB / 43.6dB L10 39.9dB / 42.5dB L50 36.5dB / 38.8dB L90 34.9dB / 36.1dB L95q 34.2dB / 35.3dB 5.3 NO_X and SO_X There is no problem in the effect of NO_X and SO_X emissions from the steel mill. Refer to Chapter Ⅳ Part 12.	5.2 Noise On the hill Leq 53.1dB L5 54.5dB L10 53.6dB L50 52.3dB L90 51.4dB L95q 51.2dB 5.3 NO_X and SO_X There is no problem in the effect of NO_X and SO_X emissions from the steel mill. Refer to Chapter Ⅳ Part 12.
6 . Unit price	6.1 Unit price 6.1.1 Electric power 700VND/kwh(Normal), 1,150VND/kwh(Peak) 400VND/kwh(Off peak) 6.1.2 Fuel LPG 6,900VND/kg Diesel oil 3,300VND/ℓ Heavy oil 1,700VND/ℓ 6.1.3 Water(industry) 1,000VND/m^3	6.1 Unit price 6.1.1 Electric power 700VND/kwh(Normal), 1,150VND/kwh(Peak) 400VND/kwh(Off peak) 6.1.2 Fuel LPG 6,900VND/kg Diesel oil 3,300VND/ℓ Heavy oil 1,700VND/ℓ 6.1.3 Water(industry) 1,000VND/m^3

Category	Mui Ron	Dung Quat
7. Estimated volume to be consumed in the new integrated steelworks (Production plan of 4.5 Mt/year)	7.1.1 Electric power 319MW/hr(Max.), 271MW/hr(Ave.) (Power plant capacity 150MW × 2unit) 7.1.4 Fuel COG 104.1×10^3 Nm^3/hr BFG 801.6×10^3 Nm^3/hr BOFG 46.6×10^3 Nm^3/hr Heavy oil 7.6 t/hr 7.1.3 Water(industry) Industry $101 \times 10^3 m^3$/day Potable $15 \times 10^3 m^3$/day Sea $1{,}050 \times 10^3 m^3$/day	7.1.1 Electric power 319MW/hr(Max.), 271MW/hr(Ave.) (Power plant capacity 150MW × 2unit) 7.1.4 Fuel COG 104.1×10^3 Nm^3/hr BFG 801.6×10^3 Nm^3/hr BOFG 46.6×10^3 Nm^3/hr Heavy oil 7.6 t/hr 7.1.3 Water(industry) Industry $101 \times 10^3 m^3$/day Potable $15 \times 10^3 m^3$/day Sea $1{,}050 \times 10^3 m^3$/day

5. Evaluation of each site

5.1 Evaluation of each site from viewpoint of short term basis (Table 3-2)

Table 3-2 Evaluation of each site from viewpoint of short term basis

	1.Mui Ron	2.Dung Quat
1. Initial cost difference of port	**Base** Remark: A certain amount of maintenance cost for dredging is required.	**- 7 million US$** Remark: - A certain amount of maintenance cost for dredging is required. - Main construction cost of port is not included. Dredging cost from -17m to -20m is included as the initial investment.
2. Initial cost difference of water supply	**Base** Remark : Existing	**± 0** Remark : Future plan, however reservoir construction cost is not required for water consuming industry.
3. Initial cost difference of electric power supply	**Base**	**- 20 million US$** Remark : One half of the required power from the new integrated steelworks can be supplied by the existing substation.
4. Initial cost difference of land preparation	**Base**	**+ 45 million US$**
Cost difference	**Base**	**+ 18 million US$**

5.2 Evaluation of each site from viewpoint of long term basis (Table 3-3)

Table 3-3 Evaluation of each site from viewpoint of long term basis

	1. Mui Ron	2. Dung Quat
1. Labor	**Satisfies criteria** Remark : Information obtained from the people's committee of KYANH district HATINH province.	**Satisfies criteria** Remark : Information obtained from DUNG QUAT industrial estate authority.
2. Accessibility to raw materials	**Base** Remark : Ore and coal are imported from foreign countries.	**Same** Remark : Ore and coal are imported from foreign countries.
3.Accessibility to market	**31 million US$/year** Remark : Transportation cost by ship, not including load/ unload/ land transportation cost	**26 million US$/year** Remark : Transportation cost by ship, not including load/ unload/ land transportation cost
Cost difference	**Base**	**- 5 million US$/year**

6. Evaluation of each site from viewpoint of IRR

Precondition for IRR calculation is as follows;

- The initial investment cost of infrastructure of Mui Ron site is US$18 million cheaper than that of Dung Quat site.
- Dung Quat site can save US$5 million/year of the product transportation cost to the market than Mui Ron site.

IRR calculation results of each candidate site is shown in Table 3-4.

Table 3-4 IRR calculation results of each candidate site

	Mui Ron	Dung Quat
IRROI (After tax)	**6.67%**	**6.71%**
IRROI (Before tax)	**7.57%**	**7.61%**
IRROE	**12.00%**	**12.91%**
Variable cost		
10%up	5.85%	5.92%
10%down	9.22%	9.24%
Operation fixed cost		
10%up	7.30%	7.34%
10%down	7.83%	7.87%
Total investment		
10%up	6.51%	6.55%
10%down	8.77%	8.81%
Slab import price		
10%up	7.27%	7.31%
10%down	7.88%	7.92%
Evaluation	No significant difference	

7. Consideration

1) From viewpoint of initial investment
There is no significant difference in initial investment between Mui Ron and Dung Quat sites. The difference of US$ 18 million should be considered as a small amount in view of the total capital expenditures required for the integrated steelworks.

2) From viewpoint of product transportation
Dung Quat site is more advantageous than Mui Ron site. US$ 5 million of transportation cost will be saved every year as far as the steelworks is operated.

3) From viewpoint of expansion possibility in the future
Mui Ron site is more advantageous than Dung Quat site. Because of the limited site space to eastern direction at Dung Quat site, the expansion work for additional installations will not be easy, if the integrated steelworks will need to expand its production capability in the future. On the other hand, Mui Ron site is easy to expand its production capability to the west, east and south directions, in case such expansion becomes necessary in the future.

Note: The general layout of Dung Quat is a preliminary layout. Comparison of layout drawings for the both sites from technical viewpoint is not appropriate at this stage of pre-feasibility study.

Part 5 Recommendation

Section 1 Basic Information for Recommendation

Contents

1. Outline of macro-economic performance

Although various policies were undertaken for promoting economic reform and opening its market to foreign countries under the doi moi program which was introduced in 1986, the Viet Nam economy suffered from macro-economic instability from the start because of soaring inflation (an annual increase of three-digit per cent), stagnation of production, a big deficit of the current account, falling value of the currency, etc.

Further drastic economic policies were implemented to prompt the reform and try to put it back on track from 1988 to 1989, resulting in the improvement of the national economy through a recovery of agricultural production and the curving of inflation. However, the government still encountered a lot of difficulties.

Macro-economic management after the early 1990s has shown better performance enabling both stability and development at the same time. Figure 1-1 shows the GDP growth rates. GDP has been growing at over 8% p.a. in real terms since 1992. The annual inflation rate has decreased to the order of 10% or less since 1992 from much higher rates before 1991. The annual economic growth rate was 8.2% p.a. on average from 1991 through 1995, which greatly exceeded the target of the 1991-95 Five-Year Plan which was 5.5 - 6.5% p.a.

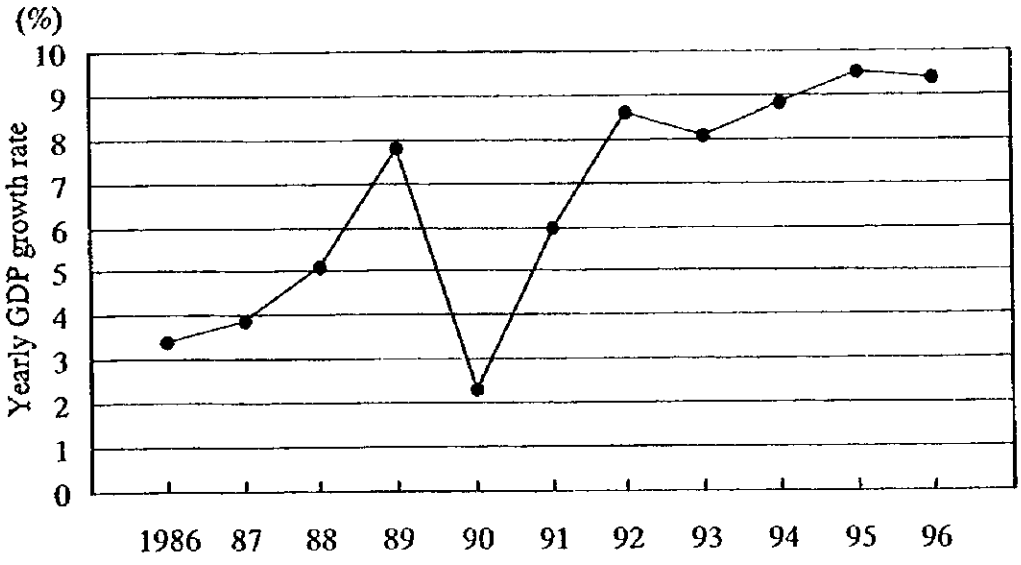


Figure 1-1 GDP growth rates

The average annual growth rates by industrial sector in the 1991-95 period were 4.5% for agriculture, 13.3% for industry and 12% for services. The industrial sector, which includes mining and construction sub-sectors, recorded the highest growth rate among the three sectors reflected by the boom of construction and oil & gas exploration and production.

Table 1-1 shows the GDP composition by industrial sector. The share of industry and services in GDP increased steadily, while that of agriculture decreased. The problem with the agricultural sector is that the work force engaged in it is considered over 70% of the total work force in Viet Nam, although it only accounts for about 30% of GDP.

It is noted that the output of the industrial sector surpassed that of the agricultural sector in 1995, so it can be said that Viet Nam is surely stepping toward becoming an industrial country from an agricultural country.

Table 1-1 GDP composition by industrial sector

(Unit: %)

Item	1990	1995
Agriculture, forestry & fishery	38.7	29
Industry	22.7	29.1
Services	38.6	41.9
Total	100	100

Source: General Statistical Office, VIIIth National Congress Documents

2. 1996-2000 Five-Year Plan

2.1 General

The 1996-2000 Five-Year Plan was discussed in the VIIIth National Congress held in June 1996 and approved by the National Assembly held in November 1996.

To achieve the "accelerated industrialization and modernization which is described in the plan", the priority is put on selective development of heavy industry (energy and fuel, building materials, engineering, shipbuilding and repair, metallurgy (steel), chemicals) as well as development of the food processing industry, production of consumer and export goods, and electronics and information technology.

2.2 Targets of GDP growth rate and GDP structure

Table 1-2 shows the targets of GDP by the 1996-2000 Five-Year Plan. By achievement of an average annual economic growth rate of 9-10%, the per-capita GDP in the year 2000 can be double that of the level of 1990.

As is experienced by many countries, the growth rate of agriculture, forestry and fishery is set comparatively low, although it is expected to steadily grow. By reflecting the high growth rates achieved in the 1991-1995 period, the industrial and service sectors are given higher growth rates at 14-15 and 12-13% p.a., respectively.

Table 1-2 Targets of GDP by the 1996-2000 Five-Year Plan

	Av. growth rate (% p.a.)	GDP structure in 2000 (%)
GDP	9-10	100
Agriculture, forestry & fishery	4.5-5	19-20
Industry (incl. construction)	14-15	34-35
Services	12-13	45-46

2.3 Industrial development programs

The government has made various industrial development programs to boost production and upgrade technology as shown in Table 1-3.

Table 1-3 Production by the year 2000

Item	1996	2000
Oil and gas		
Crude oil (million t)	8.5	16
(BPD)	170,000	320,000
Gas (billion m^3)	0.73-1.1	3.7-4
Electricity		
Capacity (MW)	4,435	5,400
Supply (billion kWh)	14.6	30
Coal (million t of sorted coal)	9	10
Steel (million t)	1.0	2
Cement (million t)	7.5	18-20
Phosphate fertilizer (million t)*		1.2
Ha Bac urea plant (1000 t)*	110	350-400
Gas-sourced N-fertilizer (1000 t)*	-	600

*: Capacity

Source: Viet Nam's newspapers, magazines, etc. (figures in 1996)
VIIIth National Congress Documents (figures in 2000)

The following are the targets and tasks for industrial sub-sectors relevant to JICA's study:

1) Oil and gas:
a) Crude oil production: 16 million t/y (320,000 BPD)
b) Gas production: 3.7-4 billion m^3/y
c) To make a natural gas utilization master plan
d) To complete the two gas pipeline projects (4.5-5 billion m^3/y)
e) To construct the first oil refinery (6.5 million t/y = 130,000 BPD)

2) Power supply:
a) Additional capacity of about 2,500-3,000 MW
b) Power generation of about 30 billion kWh
c) Rehabilitation of, and addition to, the network of transformer stations and electricity grid
d) Application of effective policies and measures to ensure rational and economical power consumption

3) Coal industry: Increase the current capacity to about 10 million t/y of sorted coal output

4) Fertilizers:

a) Phosphate fertilizer production capacity to reach 1.2 million t/y

b) Expansion of Ha Bac urea plant to 350-400 thousand t/y

c) Construction of the first gas-sourced nitrogen fertilizer plant with a capacity of 600,000 t/y

5) Cement: Production capacity to reach 18-20 million t/y

6) Steel: Production capacity to reach 2 million t/y

7) Mechanical engineering:

a) To renew equipment and technology of existing factories so as to achieve a degree of modernization

b) In the immediate future; to focus on the production of complete equipment for farm-produce processing, various types of transport means, cement furnaces, brick and tile production, and spare parts and accessories production

c) To promote vigorous development of ship-building and ship-repair industries, car and motorcycle assembly, and the building and manufacturing of low- and medium-voltage power equipment

d) To begin manufacturing high-voltage equipment, high-power engines and engines for high-sea vessels

e) To meet demands in hand tools

2.4 Major balances of the 1996-2000 Five-Year Plan

2.4.1 Financial balances

(1) Accumulation-consumption balances

Average per capita consumption is expected to register an annual increase of about 6% in the five years to come, nearly double that of the previous five years and, by the year 2000, to be 1.5 times over that of 1990. Accumulation and development investment will increase by 15% per annum on average. The total aggregate assets accumulation of the five years will be about 33% of GDP (as against 24.6% in the 1991-1995 period) comprising: fixed assets accumulation making up the main part (about 90%); current assets accumulation; and an increase in the precious

and rare property reserve.

(2) Foreign currencies

Table 1-4 summarizes the foreign currencies inflows and spending for 1996-2000.

Table 1-4 Foreign currencies inflow and spending for 1996-2000

Item	US$ billion
Inflow of foreign currencies	88-90
Export*	58-60
ODA/loans	7-8
FDI, overseas VN's remittances, etc.	22-23
Foreign currencies spending	86-87
Import	75
Air transport/postal/tourist services	2
Debt payment, repatriation of JV, etc.	9-10

*: US$64.5-67 billion including in-country exports

Source: VIIIth National Congress Documents

The inflow of foreign currencies is estimated at about US$88-90 billion, of which US$58-60 billion will come from exports, and if in-country exports (both commodities and services) are included, total foreign exchange earnings from exports will reach about US$64.5-67 billion; about US$7-8 billion will come from loans and aid; and the rest from foreign direct investment, overseas Vietnamese' remittances.

Total foreign currencies spending in the five years is estimated at US$86-87 billion, of which US$75 billion is for imports; US$2 billion for air transport services, postal services, tourist services; and the rest for debt payment, repatriation of joint venture profits, etc.

Thus, according to initial forecasts, in the five years 1996-2000 there will be a sharp increase in the foreign currencies inflow. Although import continues to exceed by far exports, the international balance of payment may still bring about a surplus.

2.4.2 Investment planning

Table 1-5 shows the investment structure planning for 1996-2000. The total investment is planned to be US$41-42 billion. The investment in industry is planned to be US$18 billion or 43% of the total investment. Heavy industry, which accounts for 70% of the total investment in industry, is planned to get investment of US$13 billion which is equivalent to the investment of US$ 2.6 billion annually.

Table 1-5 Investment structure planning for 1996-2000

	%	US$billion*
Agriculture, forestry & fishery and water conservancy	20	8
Industry	43 (100%)	18
Light industry	13 (30%)	5
Heavy industry	30 (70%)	13
Communications and posts infrastructure	18	7
Social infrastructures, education, public health, culture, environment, science and technology	14	6
Others	5	2
Total	100	41-42

*: round figures calculated from the total investment planning (US$41-42 billion)

Source: VIIIth National Congress Documents

Table 1-6 summarizes the capital mobilization planning for 1996-2000. Domestic investment is planned to slightly exceed the foreign investment (ODA+FDI). Among the domestic investment, however, the investment from the population is as small as 33%.

Table 1-6 Capital mobilization planning for 1996-2000

	%	US$billion	US$billion			
			Foreign			
			ODA	FDI	Total	Domestic
National budget	21	8.7	3.3	-	3.3 (16%)	5.4 (25%)
State credit capital	7	3.0	-	-	-	3.0 (14%)
Self-invested capital by state enterprises	24	10.0	4.0	-	4.0 (20%)	6.0 (28%)
Investment capital from the population	17	7.1	-	-	-	7.1 (33%)
FDI	31	12.9	-	12.9	12.9 (64%)	- (-)
Total	100	41-42	7.3	12.9	20.2 (100%)	21.5 (100%)
Investment rate	100%	-	(17%)	(31%)	48%	52%

Note: figures in US$billion calculated by percentages which are given by the source below
Source: VIIIth National Congress Documents (percentage and total capital)

2.4.3 State budget balances

Table 1-7 shows the State budget planning for 1996-2000.

Table 1-7 State budget planning for 1996-2000

	% of GDP
State budget (A)	21-22
Revenues from taxes and fees	20-21
State budget expenditures (B)	24-25
Current expenditures	14
Debt payments	3.5
Development investments	6.5-7
Budget deficit (B-A)*	3-3.5

*:to be balanced at over 50% by domestic loans and nearly 50% by long-term overseas loans.
Source: VIIIth National Congress Documents

Total revenues of the National budget in the five years 1996-2000 will account for 21-22% of GDP, with revenues from taxes and fees making up about 20-21% of GDP (the corresponding figures were 20% in the 1991-1995 period and 21.6% in 1995, respectively).

State budget expenditures will total about 24-25% of GDP (25.5% in 1991-1995), comprising of current expenditures about 14% of GDP, debt payments about 3.5% of GDP, development investments about 6.5-7% of GDP (6.4% in 1991-1995) or about 26% of the total state budget expenditures. Budget deficits will amount to 3-3.5% of GDP and are planned to be balanced out with over 50% from domestic loans and nearly 50% from long-term overseas loans.

Implementation policies and measures are stated in the Five-Year Plan as follows:

"To continue with the second phase of the tax reform, meeting the requirements of economic renewal and conforming to international practices without reducing budget revenues.

In the guidance and management work, apart from full collection of taxes and fees as stipulated by the law, it is necessary to foster and increase sources of taxation while tapping thoroughly other sources of revenues (land, natural resources, houses, offices...) in order to increase budget revenues, better meeting the ever growing demands for State spending. At the same time, to gradually realize social equity, it is necessary to revise and amend taxes, thus effectively regulating the incomes of the different population strata.

To ensure current expenditures at a necessary, rational and economical level, with priority given to the training of human resources, heightening of the people's intellectual standard, acquisition of modern technologies, public health care, national defense and security, and settlement of urgent social problems.

To rapidly increase investment funds for capital construction on the basis of boosting production and strictly practicing thrift in production and consumption. Capital sources from abroad should be used in such a way as to ensure efficiency and debt payment capacity.

Increases in current expenditures should be at a lower pace than those of investment expenditures and budgetary expenditures.

To have more initiative in management, the yearly budget should have adequate reserves and a financial reserve fund for the next year.

To gradually reduce budgetary deficit, and to avoid filling the deficit by issuing more money in any form. Careful calculation should be made while borrowing from the population or from foreign countries to ensure utilization efficiency; in particularly a quick end should be put to high-interest short-term loans which increase the debt payment burden on the budget."

3. Present situation of industrial sub-sector

3.1 General

The development of industry greatly influences steel consumption in Viet Nam. Industrial sub-sectors which have a big impact on steel consumption are described here. The development of these industries is of vital importance in the development of the steel industry in the country.

3.2 Steel industry

The present situation of steel industry is described in Chapter II.

3.3 Construction material manufacturing (steel)

3.3.1 Steel structures

Steel structures are used in factory buildings, industrial plants, warehouses, etc. The total demand of steel structures is estimated to be 60,000 tons in 1996 and it will increase to 110,000 tons in 2000. Pre-engineered steel buildings, all of which are imported now, are used in quality factory buildings etc. Such demand is estimated to be 30,000 tons at present, of which Zamil Steel provides about 70%. Zamil Steel plans to construct a factory to produce pre-engineered steel buildings with an initial capacity of 20,000 t/y in 1998 in Hanoi. It will be expanded to 50,000 t/y by 2000. About 40% of the products will be exported to neighboring countries.

3.3.2 Steel sheet processing

Steel sheet processing includes corrugated GI, galvanneal and formed color sheet, whose present demand is estimated at 120,000 t/y in total.

There are 3 big joint ventures and 9 small private manufacturers, having annual production capacity of 200,000t in total. All cold roll coils for galvanizing are

imported. CGL with a capacity of 50,000 t/y is under construction and will be operational in 1997.

3.4 Cement

The demand of cement has been growing rapidly along with the construction of many buildings (hotels, office buildings and factory buildings) and infrastructures. The cement demand was estimated at 9 million tons in 1995, of which 7.5 million tons were produced domestically and the remaining 1.5 million tons were imported. According to the Ministry of Construction, the cement requirements will expand to 12.5 million tons in 1998 and 20 million tons by the year 2000.

There are 4 large cement factories producing more than 4 million tons of cement in total, and some are under construction. In addition, there are many small plants, most of which may stop operation in the future because of inefficient operation as well as the low quality of the product. The steel consumption is closely related to the cement consumption; for high rise buildings, 90-100kg of steel rods are used in $1m^3$ of reinforced concrete which contains about 300kg of cement (steel/cement=30% by weight).

3.5 Heavy industry

Despite the strong emphasis given to the development of a heavy industrial sector, the industry remains relatively small. Most factories are operated by outdated machinery with a low level of technology in general. The products therefore often fall well short of maximum capacity and is usually of low quality against international standards.

The circumstance of heavy industry is such in Viet Nam; however, there are several companies which have potential to manufacture rather sophisticated equipment. HAMECO is one such company. It now produces equipment for sugar plants and other plant equipment in addition to machine tools.

3.6 Shipbuilding and repair

The shipbuilding industry has not been well developed in Viet Nam, having ship building capabilities of less than 10,000 DWT of ship and barges. There are more

than 30 large and medium size ship repairing companies. One of the largest ones is BASON SHIPYARD at Saigon Port in HCMC, which receives 200 repair contracts annually. The maximum weight ship that can be repaired in the shipyard is 35,000 DWT. The company uses 4,000-5,000 tons of steel annually, of which 70% are steel plate and the rest consists of sections, pipes and bars. It plans to expand its capacity by up to 300% by 2000.

A joint venture with Hyundai Corp. and Vietnam Shipping industry Co. gets licenses to build and repair ships in Khanh Hoa with an investment capital of US$95.4 million.

3.7 Automobiles

There are about 300 thousand cars registered in Viet Nam including 90 thousand trucks, 70 thousand buses, 50 thousand cars for military use and some 90 thousand cars of passenger class. At present, 14 car manufacturers get licenses or have applied for licenses, among which 6 manufacturers have already started production. The total production capacity will be 240,000 units/y when all of the announced capacities are on stream as scheduled, while the aggregated domestic demand is estimated to be 40,000 and 80,000 units in 1996 and 2000, respectively.

3.8 Home appliances

Along with the improvement of living standards, the purchasing power for home appliances will become stronger, especially for color TVs, refrigerators and washing machines. Present demand (1996) of home appliances is estimated as follows:

- Color TV 600,000 units/y
- Refrigerator 50,000 units/y
- Washing machine 70,000 units/y
- Air conditioning 70,000 units/y

Source: estimated by interview survey

Several manufacturers (SONY, SAMSUNG, etc.) produce color TVs in the country; one manufacturer (SANYO) will start production of washing machines in 1997, while a couple of companies are considering it; one manufacturer (DAEWOO) produces refrigerators and some will produce them in the near future.

3.9 Metal processing

3.9.1 Can with tin plating

There are two manufacturers for producing tin plated cans. The biggest user of tin plated cans is a condensed milk producer which also produces them by itself. Other users are canned food producers which process pineapples, straw mushrooms, etc. for export. The total demand of tin plated cans is about 40,000 tons/y.

3.9.2 Freight containers

The first steel container manufacturers will be operational with a capacity of 28,000-29,000 TEU/year in Da Nang in August 1997. Containers of 4,000 TEU will be produced for the first year of operation and 20,000 TEU containers are expected to be manufactured by 2000. If there is enough demand, the production will be expanded to 120,000 TEU.

3.10 Plant construction

Plant construction will greatly influence the steel consumption, if a significant volume of plant equipment can be produced domestically. There are the following plant construction plans in the country:

- Thermal power plants
- Hydro power plants
- Refineries
- Gas pipelines
- Petrochemical plants
- Fertilizer plants
- Cement plants
- Steel plants
- Sugar plants
- Paper plants
- Water treatment plants

Section 2 Importance of Development of Steel Industry

Contents

1. Importance of steel industry in national economy

Figure 2-1 illustrates the relation of steel with investment and industry. The steel industry is closely related to capital investment and the manufacturing industry. Capital investment supported by economic growth not only requires large amounts of steel but also provides manufacturing facilities to produce automobiles, home appliances, ships, etc. which use a lot of steel. Steel is also used in buildings and infrastructures. Steel is indispensable in the development of the economy of a country.

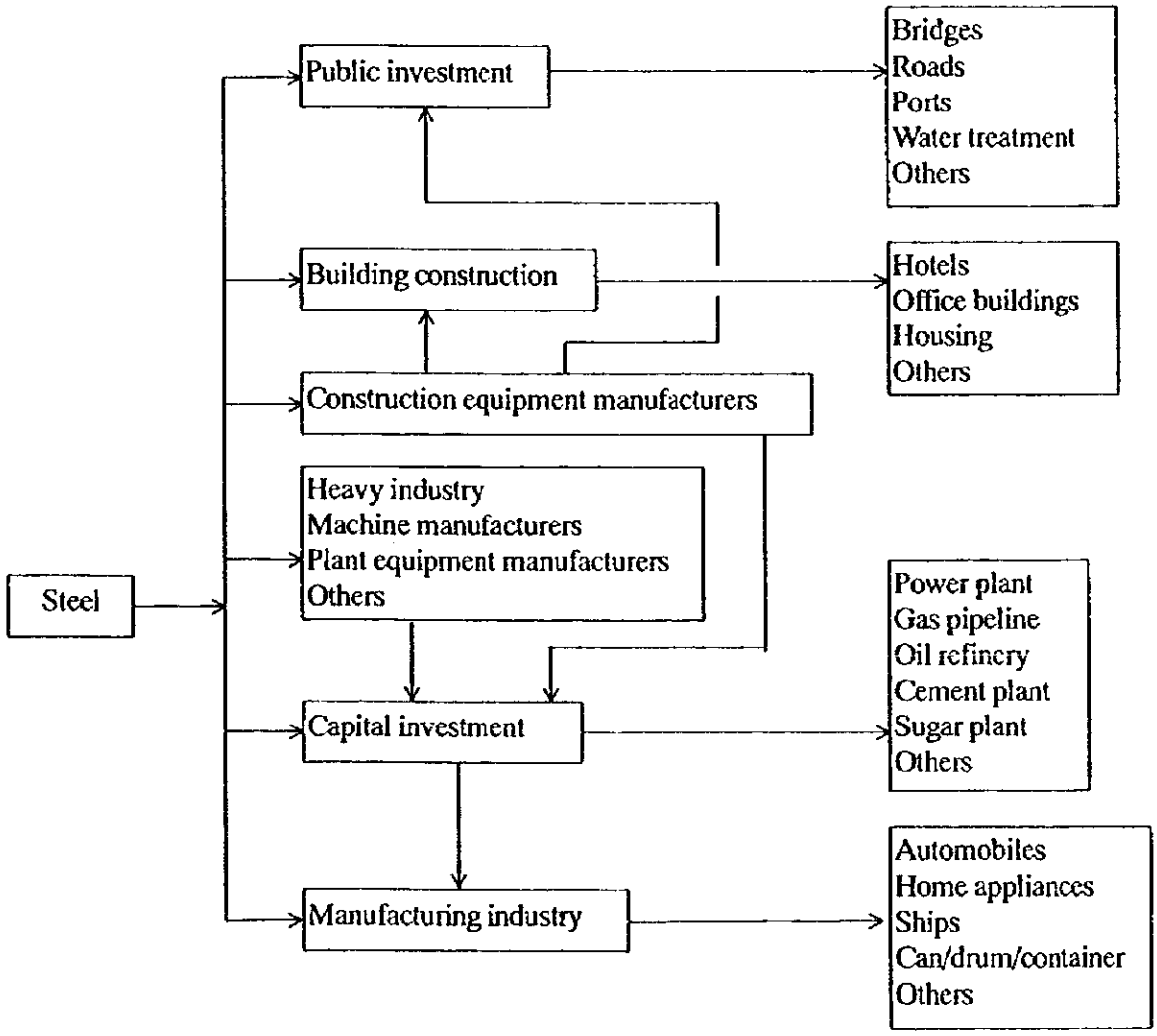


Figure 2-1 Relation of steel, investment and industry

Table 2-1 shows the dependence of crude steel demand to final consumption in Japan (1985). Excluding export which accounts for about 40% of total crude steel dependence, its dependence on private capital investment and public investment was 44% and 26%, respectively; domestic crude steel demand depended heavily on these two types of investment (70% in total). In other words, investment in plant and equipment (mainly by the private sector) as well as investment in infrastructures (mainly by the public sector) plays a quite important role in the development of the steel industry; only with these vital investments can the steel industry survive.

Table 2-1 Degree of dependence of crude steel demand to final consumption in Japan (1985)

(Unit: %)

Item	Degree of dependence	
Expenditure by private sector consumption	8.5	14.4
Housing investment by private sector	6.7	11.4
Private capital investment	26.0	44.1
Public investment	15.5	26.3
Others	2.3	3.8
Sub-total	(59.0)	100.0
Export	41.0	-
Total	100.0	-

Source: Inter-industry Relations Projection 1987-1992, Japan Management Association (JMA)

Table 2-2 summarizes the stimulation factors of crude steel demand in Japan (1985). The stimulation factor can be interpreted as follows: if the investment (or expenditure) was one billion yen (US$5 million in 1985), the crude steel demand would be stimulated by 1,019 tons (1.019 x 1,000t) as in the case of private capital investment, for instance. Both private capital investment and public investment showed stimulation factors over one, which provided the biggest impact on crude steel demand.

Table 2-2 Stimulation factor of crude steel demand in Japan (1985)
(Unit: 1,000t per billion yen or 1,000t per ca. US$ 5 million)

Item	
Expenditure by private sector consumption	0.099
Expenditure by government consumption	0.042
Housing investment by private sector	0.713
Private capital investment	1.019
Public investment	1.079
Investment for stocks	0.673
Export etc.	1.670
Import etc.	0.362
Expenditure by consumption except family budget	0.092

Source: Inter-industry Relations Projection 1987-1992, Japan Management Association (JMA)
Note: US$1= ca. 200 yen (1985)

The above is the situation in Japan, and a similar tendency can be applied to Viet Nam. In order for the development of the steel industry, growth of private investment as well as public investment is of great importance.

Table 2-3 summarizes the projection for iron and steel demand stimulation in Japan (projection for 1987 made in 1985). Although the final products given were limited, the product which gave the highest stimulation factor of crude steel was the ship, followed by the power generator and the electric motor.

Passenger cars gave a relatively small stimulation factor; however, the production volume was large, resulting in a big consumption of crude steel in total.

Table 2-4 summarizes the composition of carbon steel consumption by the industrial sub-sector. The industries listed in the table are important for the steel industry.

Table 2-3 Projection for iron & steel demand stimulation in Japan
(projection for 1987 made in 1985)

(Unit: 1,000t per 100 billion yen or 1,000t per ca. US$500 million)

	Pig iron	Crude steel	HR steel	Steel pipe	CR steel	Coated steel	Forged steel	Cast steel'	Cast pipe
Building/construction									
Wooden house	32.5	41.5	38.1	7.0	19.2	16.7	0.1	0.1	0.0
Non-wooden house	98.4	130.6	122.5	7.1	21.1	9.7	0.2	0.2	1.9
Wooden building	28.4	37.1	34.7	1.9	23.0	24.0	0.1	0.1	0.2
Non-wooden building	122.4	165.5	155.6	6.1	23.3	9.3	0.2	0.3	1.1
Road construction (Public works)	70.7	96.7	91.3	0.3	5.2	0.9	0.1	0.1	0
Water-related works (Public works)	91.9	119.6	113.0	1.1	6.5	1.2	0.1	0.1	5.7
Agri/forest works (Public works)	56.8	76.0	71.4	2.5	4.0	1.9	0.1	0.1	0.9
Railway tracks Construction	95.5	128.8	120.4	8.2	8.0	1.3	0.2	0.2	1.2
Electric Facility Construction	208.5	287.5	270.7	12.9	12.0	1.9	0.3	0.3	0.1
Telecommunication Facility construction	49.4	62.9	55.9	24.4	7.0	1.7	0.3	0.2	2.3
Final products									
Power generator	149.4	191.9	137.9	1.3	83.1	0.7	13.0	12.2	0.0
Power transmission Equipment	89.6	112.4	95.4	2.0	62.6	0.8	3.3	3.0	0.0
Electric motor	125.7	152.6	100.4	0.2	64.9	1.6	17.0	9.3	0.1
Ship	169.2	230.4	215.0	7.1	30.6	1.8	1.2	0.6	0.0
Railway vehicle	110.2	143.4	127.4	6.3	16.3	2.2	1.8	2.6	0.4
Passenger car	82.4	86.0	77.9	2.8	41.6	11.0	1.2	0.8	0.1
Truck	94.9	103.2	94.3	2.7	29.4	6.0	1.2	0.3	0.0

Source: Inter-industry Relations Projection 1987-1992, Japan Management Association (JMA)
Note: US$1= ca.200 yen (1985)

Table 2-4 Composition of carbon steel consumption by industrial sub-sector

(Unit: %)

Industrial sub-sector	1960	1965
Shipbuilding	7.6	11.0
Automobiles	7.7	9.0
Industrial machinery	8.0	7.9
Electric machinery	6.4	3.8
Home & office appliances	2.4	2.0
Containers	4.8	3.4
Construction	46.8	47.7
Engineering	(21.6)	(21.4)
Building	(25.2)	(26.3)
Secondary production	12.7	12.6
Others	3.6	2.6
Total	100	100
Total consumption (million t)	14.1	22.6

Source: Japan's Steel Industry, T. Kawasaki

2. Present industrial policies for the steel industry by Viet Nam government

The government gives a steel industry development plan in the 1996-2000 Five-Year Plan as follows:
"To make investment to complete existing steel production lines and start construction of a number of steel mills, paying special attention to the production of steel products. Steel output is to reach 2 million tones in 2000. To prepare for the construction of the Thach Khe iron ore mine and of a large-scale steel complex."

In relation to the above, the following construction plans are under investigation:

- Three billet centers in the north, central and south with an annual production capacity at 300-500 thousand t each
- A scrap based integrated steel plant with the initial capacity at 1 million t/y (final capacity: 2 million t/y) as a short-term program
- An iron ore based integrated steel plant as a medium-and long-term program
- Development of Tack Khe iron ore mine and maximum use of iron ore at the above integrated steel plant
- Import of iron ore before Thak Khe iron ore is available and import of necessary tonnage of iron ore depending on the utilization rate of Thak Khe ore after the development

after the development
- A natural gas based DR plant with a capacity at 1 million t/y

There seems few industrial policies specific to the steel industry at present; however, general industrial policy has been applied to it. The general industrial policy encompasses the importance of FDI, protection of domestic products, etc. The quality of steel products is indispensable in the development of steel industry. The problems are the lack of national guidance on it and little concern about it by state enterprises.

3. Japanese industrial policies for the steel industry

3.1 Industrial policies for the steel industry for 20 years after World War II

The Japanese steel industry resumed its activities from the disastrous conditions left after World War II. In the late 1940s when Japan came back to the society of international economies, the Japanese steel industry not only suffered from a sharp decline of production but also lost its international competitiveness, and it could only export limited amounts of steel products depending on subsidies given in various forms from the government.

In 1949, in accordance with an order by the relevant occupation authorities, a series of policies was put into force to transform its economy from a controlled system to a market system, aiming at elimination of the budget deficit, designation of a unified (single) exchange rate, abolition of subsidies and economic control, etc. as main subjects.

In these processes, the steel industry was given the main targets of industrial policies set by the government and authorities concerned, resulting in the industry getting various protection and promotion measures. Especially, the Ministry of International Trade and Industry (MITI) put into force various policies which enabled the promotion of strategic resource distribution to the steel industry as the nucleus of heavy and chemical industries and, at the same time, promoted the inter-enterprise coordination aiming at a controlled investment as well as a stable price and production.

The various policies were put into force in the steel industry from the early 1950s to the early 1960s. It is considered that the policies were prepared aiming specifically

at:

- industrial rationalization/modernization
- strengthening of international competitiveness based on performance of growth in macro-economy
- balance of enhanced international balance of payments; and
- full employment.

As mentioned above, the Japanese economy was transformed from controlled economy to market economy after 1949. The steel production was about 2 million and 3 million in 1948 and 1949, respectively. These Japanese situations have some similarities to Viet Nam's present steel industry in that:

- The Japanese economy was just transformed from a controlled economy to a market economy;
- Steel production volume was relatively small, say 2 and 3 million t in 1948 and 1949, respectively;
- Equipment was obsolescent and technology was outdated;
- Productivity was low (e.g.: 1/7 of that in the U.S. for blast furnace);
- Hourly wage was low (about 20% of U.S. wage); and
- The Japanese steel industry lost international competitiveness.

Such Japanese experiences are considered to be of some help for the preparation and enforcement of Viet Nam's industrial policies for the steel industry to be modernized.

For the purpose of achieving the immediate recovery of the steel industry from the early 1950s, the First Rationalization Program was put into practice under the General Plan on Rationalization Policy based on the report by the Industry Rationalization Council organized within MITI. Three Rationalization Programs were implemented as shown in Table 2-5.

Table 2-5 Outline of steel industry rationalization program

	1st Rationalization Program (1951-1955)	2nd Rationalization Program (1956-1960)	3rd Rationalization Program (1961-1965)
Preparation and implementation of the programs	- Policy making by the Council for Industrial Rationalization - Implementation by direct involvement of government	- Coordination and guidance by MITI	- Coordination by private steel mills
Features of the programs	- Giving importance to modernization of rolling facilities - Introduction of strip mill operation technology from ARMCO	- Modernization of rolling facilities - Focus on construction/ expansion of BFs and LD converters - Introduction of plant operation technology	- Continuous modernization of steel plants - Construction of integral steelworks at coastal industrial zones
Investment	128 billion yen (US$ 360 million)	546 billion yen (US$ 1.51 billion)	859 billion yen (US$ 2.38 billion)
Financing sources	- Japan Development Bank - Main (private) banks	- World Bank - Main (private) banks - EXIM Bank	- Main (private) banks - EXIM Bank
Development of infrastructures	Poor infrastructures, but small impact on the rationalization	Poor infrastructures; big impact on the rationalization (designation of "special harbors" and harbor development based on it)	Relief from bottle neck of infrastructures
Results of the rationalization	Inferior to US productivity	Catching up with US productivity	Ahead of US productivity

In order to surely realize the modernization of the steel industry during the program periods, the following laws and regulations were promulgated in the early stage of the First Rationalization Program:

- Supply of modernization capital by the government investment and loan program, especially loans of capital investment through Japan Development Bank (JDB)
- Application of a special depreciation system to specified machine facility (50% increase of depreciation for 3 years): 1951
- Exemption of import duties for important machines: 1951

- Special depreciation at 50% for the first year and exemption/reduction of property tax: 1952
- Deduction of export income in tax calculation: 1953
- Approval system for foreign technology license and allocation of foreign exchange to imports (practically imposing an import quota)

The objectives of the above policies included the following:

- Promotion of capital investment through the supply of strategic capital and tax reduction
- Promotion of export and upgrading of technology by tax reduction
- Introduction of strategic technology
- Protection from international competition

3.2 Preparation of industrial policy and industrial vision in Japan

3.2.1 Preparation of industrial policy

In Japan the Ministry of International Trade and Industry (MITI) has been deeply involved in Japan's industrial policy from its preparation to execution. The industrial policy by MITI's view can be summarized as follows:

The industrial policy, based on the principle of market economy, not only provides supplementary measures to solve the uncertainty of changing market situations such as pollution problems, trade conflicts, difficulties in promoting large-scale R&Ds and instability of energy supply, but also assists in the smooth transition of industry and transformation of labor by avoiding potential social conflicts.

The following measures are included in MITI's industrial policy:

- Regulation by law
- Supply of information to show future industrial vision and guidance
- Indirect actions to induce an advantageous tax system, and favorable financing and credits by governmental financing institutions
- Advice and guidance by MITI

The following should be taken into consideration for the successful industrial policies:

- Adoption of consistent standards for selection of industry to be promoted

- Establishment of targets to be accomplished by industry during the period of industrial policies
- Introduction of appropriate protection measures (specified duration)
- Introduction of appropriate promotion measures (specified duration)
- Protection and development of supporting industry
- Adoption of appropriate price for foreign exchange stability to keep or enhance competitiveness in international market

3.2.2 Preparation of industrial vision

Of importance for industrial policy making is the existence of a long-term industrial vision which can provide a basis for it. The industrial vision must have content which can give consensus of opinion of not only the people concerned but also of most people in the country. The industrial vision must declare a "common principal target" and state an "introductive guideline" to realize it.

In the past, the common principal target of Japanese MITI was "economical and industrial improvement to the levels of advanced countries in Europe and America". After its accomplishment now, a new industrial vision titled "Industrial and Trade Policy in the Year 19XXs" is now prepared every 10 years. The process for preparation of this industrial vision (see Figure 2-2) includes not only councils and study committees being held but also various studies and investigations with modern analytical methods being carried out to support them. It is reported that for more than two years over 500 staff were involved in the preparation of the recent industrial vision. A vast amount of data was collected and analyzed, and the knowledge and know-how accumulated during the process is of importance as well. It is indispensable for the preparation of an industrial vision to build up an information infrastructure by rationalizing the nation-wide statistics network. Since the industrial vision has been made based on a variety of data in cooperation with many people, it is evaluated to be realistic and effective.

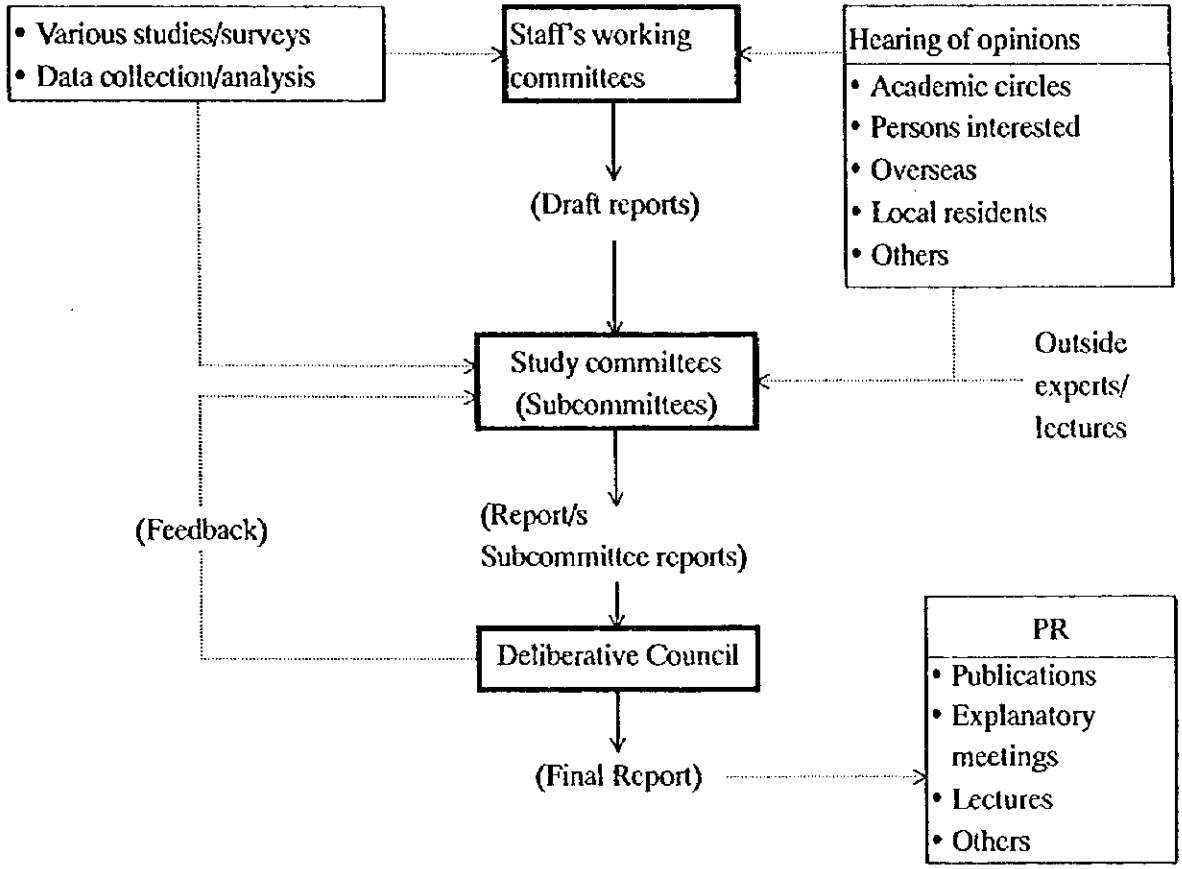


Figure 2-2 Process for preparation of industrial vision

The final target for Viet Nam's industrial vision is stated in "Goals for the Periods to 2020 and 2000" in 1996 - 2000 Five-year Plan as follows:

"From now to the year 2020, we will strive strenuously to turn ours basically into an industrialized country."

Of importance is how the above principal target was planned. The positioning of the steel industry in the national economy as well as a statement of a steel industrial vision should have been discussed in it. The problem is that the reliability of statistics is sometimes questionable and rationalization of information networks is far behind the level necessary, causing difficulties to make a competent industrial vision. It is recommended that the authorities concerned should establish a system for making a comprehensive industrial vision.

4. Industrial policies of Korea and Taiwan

Table 2-6 makes comparison of the industrial policies between Japan, Korea and Taiwan before the 1980s. The industrial policies employed by Korea and Taiwan are outlined as follows:

1) Designated industries and industrial sub-sectors to be developed,
2) Provided various favorable treatments intensively within a limited time period,
3) Canceled or relieved regulations for assistance when they were not necessary,
4) Supported R&D, and
5) Specified the future industrial visions.

However, there were differences in the industrial policies between Korea and Taiwan: the former aimed at industrialization of heavy and chemical industries, while the latter utilized the vitality of private sectors.

Table 2-6 Industrial policies of Japan, Korea and Taiwan

	Japan	Korea	Taiwan
Leadership of government and cooperation of private sectors *1	Middle	High	Low
Main measures taken by industrial policies*2	Favorable treatments in financing and taxation	Favorable treatments in financing	Favorable treatments for state enterprises
Degree of favorable treatments*3	Low	High	Low
Source of industrial capital*4	Private savings	Foreign loan	FDI
Export-oriented behavior*5	Middle	High	High
Industrialization of heavy and chemical industries*6	Active, successful	Active, successful	Not active, not successful
Liberalization of trade and foreign capital	1960s-1970s	1980s	1980s

Source: TCI's in-house study paper (lecturer: S. Wakiyama)

*1 (Leadership of government and cooperation of private sectors):

(1) Korea

- Since there were a lot of officers in the upper level of the government until the late 1960s, the governmental leadership was taken by the power of the state.

- The president usually made a top-down decision.
- Limited resources had to be effectively used under the control of the centralization of power.
- Dialogue and discussion between the government and the private sectors were easy because of the close relationship between the government and the zaibatsu (financial combine) which dominated the economy.

(2) Taiwan

- Since the economy was mainly led by the small and medium companies and they tended to behave independently, it was difficult for the government to control them.

*2 (Main measures taken by industrial policies):

(1) Korea

- The political financing share was high in corporate financing (1963:85%, 1980: 81%, 1990: 68%).
- There was a big difference in interest between the political finance and the general finance. It was 10% at maximum for the domestic finance and higher for the export finance (1966–72: 17.1%). It was reduced to the order of 1% after the 1980s.

(2) Taiwan

- Since the small and medium enterprises dominated the economy and the overseas Chinese were reluctant to invest in long-term projects, basic industries had to be operated by state enterprises.
- There was only a small difference in interest between the political finance and the general finance. It was 3-5% between the export finance and the general finance, and 0.7-2.5% between domestic political finance and the general finance in the 1970s-80s.

*3 (Degree of favorable treatments):

(1) Korea

- There was an export compensation system by which the loss from export could be compensated by the government. The compensation rates were 12-19% in 1961; however, it was abolished.
- A subsidy rate for bonded processing was about 20% in 1970s-80s, which was reduced afterwards.

(2) Taiwan

- Main political measures were direct investment in state enterprises and the degree of favorable treatments was not so big.

*4 (Source of industrial capital):

(1) Korea

- The ratio of foreign capital was high.
  1) The rate of foreign financing
     1960s --- 29%
     1970s --- 13%
     1980s --- 5%
  2) The rate of foreign investment (1962-91…22% ave.)
     1962-66 --- 53%
     1967-71 --- 39%
     1972-76 --- 23%

1977-81 --- 18%
1982-84 --- 11%
1985-91 --- 6%

- The government guaranteed the issue of foreign bonds of private enterprises.

(2) Taiwan

- Direct foreign investment (FDI) was actively introduced.

*5 (Export-oriented behavior):

- Both countries were active in promotion of exports, since their domestic markets are small.

*6 (Industrialization of heavy and chemical industries):

(1) Korea

- POSCO started its construction with Japanese assistance in 1969 and completed it in 1973. The official announcement of industrialization of heavy and chemical industries was in 1973. Four heavy industrial development projects (special steel, shipbuilding, casting and machine tools) were planned to use products from POSCO in 1969.
- It was decided in 1973 that the priority for industrial development was placed on 6 industrial sub-sectors: iron and steel, petrochemical, non-ferrous metal, machine tools, shipbuilding and electronics.
- It was an up-stream-oriented program (from steel to machines).
- The initial targets were almost accomplished by the early 1980s.
- The share of heavy and chemical industries in total industry:

1970 ---	Production	29.5%
	Export	20.6%
1980 ---	Production	51.6%
	Export	52.1%

(2) Taiwan

- The decision for industrialization of heavy and chemical industries was several years behind the Korean decision. Since the adverse impact of the oil shock was great and the cooperation of private sectors was passive, Taiwan succeeded in the industrialization less than Korea did. However, the electronics industry was successful because of the active involvement of small and medium enterprises. Development of the steel industry was given up and that of the export-oriented car industry failed.

Section 3 Recommendation

Contents

1. Necessity of industrial policies

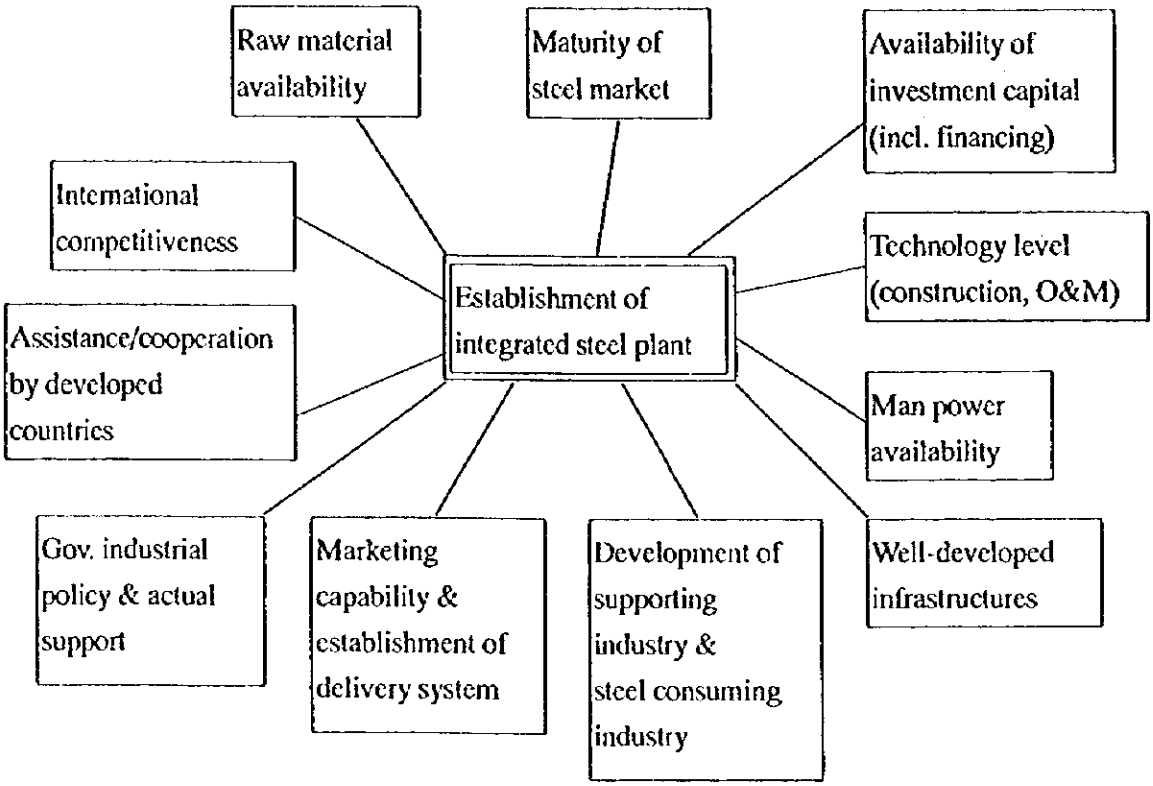
Free competition is the basis of a market economy; however, it can only be applied to an industry which has already reached to a level of having enough capability to deal with free competition. If an industry which has not reached to such a level comes to face free competition, it is obvious that it will surely suffer from destructive damages. As for such an industry, it will need some reasonable measures of protection and promotion based on national industrial policies. It is noted that as industrial circumstances are changing dynamically, industrial policies have to change dynamically to cope with them. In addition, excessive protection measures for a long-term period tend to become vested rights, leading to interruption of healthy industrial development, and thus loss of international competitiveness. Therefore, industrial policies should specify the period valid for its application, and industrial policies which no longer meet the actual circumstances should be abolished or modified. It is needless to say that the target of industrial policies is to upgrade the industry to a level which enables free competition in a period as short as possible.

The outline of present Japanese industrial policies is cited previously, which is considered to be of help for Viet Nam.

The conditions for establishment of an integrated steelworks is illustrated in Figure 3-1. Various conditions in various fields are necessary for it. It is considered that many of them have not reached to the required levels in Viet Nam, and it is necessary to upgrade them by implementing appropriate industrial policies.

Since the steel industry is related to various industries, the industrial policies for it will involve measures to promote these industries. Therefore, of importance is not only industrial policies for steel but also those of other related industry in general.

The following are necessary for planning industrial policies: (i) grasp of basic structures by industrial sub-sector, (ii) preparation of reliable statistics, and (iii) creation of institutional framework to be applied and a system to analyze the effects, etc. It is necessary to establish a system for preparation of industrial policies as well as develop human resources for it by the assistance from developed countries and/or international institutions.



Source: Nippon Steel Corp.

Figure 3-1 Conditions for establishment of integrated steelworks

2. International division of labor (vertical division of labor)

ASEAN countries try to promote the international division of labor within the ASEAN economic zone, aiming at efficient economic development within the zone. International division of labor consists of: (i) horizontal division of labor which enables production sharing for parts and components, and (ii) vertical division of labor which entirely relies on a certain product or major components to other countries. The former is considered to have a significant advantage, because it can supplement the production at each other; however, the latter might result in the loss of the corresponding industry. A thorough consideration is, therefore, necessary for such an international division of labor (vertical division of labor) taking into account the comparative advantage of the country, the national interests, etc.

In general, a certain industry can not exist by itself, but often correlates closely to another. It can be applied to technology as well. If a country fully relies on another country for some production, the technology related to the industry can no longer be accumulated in the country, resulting in the hampered development of not only the industry itself but also the related technology of other industries. Therefore, to get rid of this setback, an ideal is that all industry can be developed within the country.

However, in order to promote industrial development with limited capital and resources in such a country as Viet Nam, specific industries should be firstly selected for strategic development. In considering the international division of labor in ASEAN countries under these circumstances, it is advisable that a deliberative council consisting of officers of MPI and MOI (in charge), related private enterprises, and academic circles be organized to make a future industrial vision, and then (based on it) to discuss and investigate the international division of labor which is considered to give the least adverse effect to the national economy.

Since the steel industry has been ranked as a strategic industry, it can not be considered at present that it will cease to exist.

3. Creation of steel demand

3.1 Encouragement of capital investment

The concrete targets for industrial development are provided by the 1996-2000 Five-Year Plan. Basically large capital investment will be guided based on them.

Viet Nam's domestic savings are so small that they cannot afford most of the required capital investment. While public investment can utilize not only government funds but also the finance of ODA and World Bank, capital investment will be mainly made by FDI. Therefore, further improvement of laws and regulations as well as speedy action with formalities is required.

3.2 Promotion of manufacturers' development and enforcement of local contents

Steel demand for construction is expected to keep growing because of the existence of requirements for the development of the infrastructures, urbanization and renovation of cities; however, of importance for the development of the steel industry is to enhance a new steel demand by development of industries which are not well established in Viet Nam.
In order to make the above possible, the following industries should be established in the country. Especially for the construction of integrated steel plants, the establishment of industrial sub-sectors which use flat products is indispensable. Application of industrial policy is necessary to increase local contents of parts and equipment for plant construction and machine assembly step by step by observation of development of manufacturers.

3.2.1 Heavy industry/plant equipment manufacturing industry

Since there are many plans to construct not only power plants but also petrochemical plants, fertilizer plants and cement plants in Viet Nam, large demand for plant equipment is expected. It is important to promote development of heavy industry to enable domestic production of atmospheric pressure tanks/equipment, general plant equipment, structures, piping, etc. These products not only can sell domestically but also could be shipped to neighboring countries for export to earn foreign exchange.

3.2.2 Shipbuilding

Along with development in Viet Nam, the maritime industry will become more

important. With regards to steel, the integrated steel plant provides opportunities for shipping steel products by sea, resulting in the requirement of more ships which can be built in Viet Nam.

3.2.3 Press processing industry

Press processing companies should be developed to make domestic production of parts for home appliances and automobile.

3.2.4 Machining industry

Machining industry should be developed to manufacture machine parts.

3.2.5 Casting and forging industry

Cast and forged products as well as machined semi-finished products are used in machine parts. Since the cast technology exists in Viet Nam, it is important to further develop it. The introduction of forging technology is important as well. As cast and forged products can be exported to ASEAN countries, the promotion of the industry is important.

3.2.6 Supporting industries for the steel industry

Supporting industries, which does not always consume steel, include firebrick manufacturers, relining companies, etc.

4. Plan for capital investment in steel plants

Along with the increase of steel demand, a new steel plants will be required. The capital investment in steel plants can be divided into the following: (i) relatively small investment in EAF etc., and (ii) large investment in integral steelworks.

4.1 Present plan of capital investment

- It is important to make and execute consistent steel industrial policy taking into account the steel supply and demand forecast of steel for the short- and middle/long terms. Especially, FDI licensing should be fully investigated to avoid double investments in similar plants which seem unnecessary so that potential double failures can be eliminated and limited capital can be effectively used.
- The capacities of existing EAFs are small, causing problems in term of inefficient raw material consumption, productivity, energy consumption, etc. Plant integration should be investigated, and promoted in the future.

4.2 Capital investment in integrated steelworks

- It is necessary that an integrated steelworks be established in the form of either a sole state owned enterprise or a joint venture with VSC and private company(s).
- The timing of integrated steelworks construction should be decided taking into account the steel supply and demand. It should be considered to firstly invest in downstream equipment such as rolling facilities etc. as have been experienced in other ASEAN countries.

5. Financing for integrated steelworks

It is essential to know how to finance the integrated steelworks proposed in the study, because its investment cost is estimated to be as large as half of Viet Nam's state budget or more.

5.1 Government capital

In Japan there is a governmental investment and financing system whose source of finance is based on various public funds such as postal savings and welfare pension plans collected through the governmental credit system to invest in or finance certain projects, according to a certain plan in order to accomplish the objective of national policy. During the rehabilitation and high growth periods after the War, much governmental funds were invested almost exclusively in modernization of basic industries such as steel making, electricity and coal mining to make up for the scarce private funds.

It is considered that there is no similar system to the Japanese one to support the governmental investment and financing. It is supported by a part of the state budget as well as ODA loans and WB loans through the government. It is advisable to establish a similar system to the Japanese one in Viet Nam in the future.

5.2 Application of ODA funds and WB loans

It is a subject to be discussed whether ODA funds/WB loans can be applied to steel plant projects; however, it is highly probable that they can be applied to development of infrastructures around the steel plant. It is recommended to raise the priority of steel plant construction among planned projects within ministries concerned so that the ODA fund/WB loans can be applied to it. The credibility of the project will be

enhanced by the above application, resulting in possible cofinancing with private banks.

5.3 Issue of corporate bond and stocks

In case of the construction of integrated steelworks by JV, it is recommended that a system enabling issue of corporate bond and stocks of JV be established so as to raise construction capital by preparation of related laws and regulations. Especially as for stocks, it is necessary to investigate measures to enable opening of stocks before the plant operation, and therefore get profit by increased (sometimes decreased) value of stocks which can make up the investment cost.

6. Governmental assistance to support steel industry

6.1 Favorable treatments of taxation etc.

A vast amount of capital is required for construction of integrated steelworks. It greatly impacts not only on its finance but also on its manufacturing cost. Capital costs, including depreciation costs and interest payments which are necessary after the commencement of operation, will rebound on the product prices in the form of higher prices.

On the other hand, there are many overseas steel plants whose depreciation are almost over and interest payments are far smaller. It is estimated that such plants can provide products at cheaper prices than Viet Nam's plant, even adding ocean freight. Supposing lower labor cost become available in Viet Nam, the higher prices of products will continue 10 years or so after the commencement of operation.

Therefore, it is recommended that such advantageous treatment as specified in the present Foreign Investment Law etc. should be applied as much as possible to reduce the manufacturing cost.

6.1.1 Tax system

New Foreign Investment Law stipulates the following advantageous treatment which should be applied to the integrated steelworks project:

(1) Corporate tax

- Tax rate: 10%
- Tax reduction: 100% exemption (1-4 years)

50% reduction (5-8 years)

- Applicable period: 15 years

(2) Import duties
- Capital goods: exempted
- Raw material: exempted

(3) Reduction of property tax

6.1.2 Electricity price

It is recommended that the electricity price be applied equal to or lower than the price for state owned enterprises (US$0.08/kWh).

6.2 Moderate protection and promotion for the time being

6.2.1 Improvement of present status

The present steel market is in an excessive over-supply situation, caused by ignoring the actual demand and allowing the uncontrolled import of steel (including smuggling). As a result, domestic steel factories including JV factories are suffering from low operation rates as well as a decline in products price and increase of stocks. Especially, the increase of stocks of raw materials and products including imported ones leads to an inefficient use of foreign currency as well as the degradation of stocks in quality caused by generation of rust etc., resulting in significant losses. For example, the stocks in 1996 are estimated to be 600 - 800 thousand tons including imported billets, whose value is estimated at more than US$200 million and which is not yet mobilized in the national economy. It is advisable to take effective measures to enable the import quota system to become reasonably functional.

6.2.2 Maintenance of competitiveness of products in integrated steelworks

As stated before, the products of integrated steelworks are considered to have a lack of international competitiveness at an initial stage of the operation. Introduction of policies might be necessary by taking some measures which could be accepted in ASEAN countries etc. for a limited period until the time when the domestic products come to be able to compete. Viet Nam is now in a position where it must respect AFTA's free trade concept by affiliation with ASEAN members; however, it is necessary that allowable protection and promotion measures should be investigated, thus considering a right balance between the industrial promotion by the national interests and AFTA's obligation.

7. Development of infrastructures for integrated steelworks

An integrated steelworks requires infrastructures of not only access measures on land (road and railway siding) but also port, electricity and industrial water supplies which will cost an enormous amount of money. Bearing all of this cost by a company means that the project itself will not be feasible.

The development costs for infrastructures should be independently considered and covered by the budget of the government and loans arranged by the government.

8. Introduction of advanced technology

Steel companies under VSC have maintained a far less advanced level in productivity, energy efficiency and unit consumption of raw material than steel companies in advanced countries. This means the waste of natural resources, leading to loss in the national economy. Especially for those countries which have scarce resources and energy like Viet Nam, it is of importance to take necessary measures to develop technology for the establishment of energy conservation processes.

In Japan, the Japan Productivity Center (Japan Productivity Center for Socio-economic Development at present) was established in 1955 to improve productivity for industry. It greatly contributed to the improvement of productivity, the introduction of a modern administration system, etc. for the steel industry through overseas visits and observation of foreign technologies etc.

It is recommended that Viet Nam's government should take actions to improve its technology by reviewing the past experience of Japan and other countries. At the same time, it is necessary to take steps for promoting the introduction of foreign technology as well as collection of technical information and public access to it.

9. Improvement of quality

Improvement of quality cannot be ignored if they want to enhance international competitiveness. It seems that steel companies under VSC consider the quality less important. However, there is a possibility that they will lose competition to not only foreign companies but also to a joint venture in the country which has already started manufacturing competitive quality products. The competition with foreign products could be avoided by some protection measures implemented by the government for a certain period; however, the competition can not be avoided for domestically produced products which should compete in a free competitive market.

It is recommended that national quality standards should be established and measures should be taken for quality assurance such as enforcement of mill sheet attachments to any products. The equipment cost to deal with it should be financially supported by donations or subsidies.

10. Reform of state owned enterprise

The reform of state owned enterprise is a crucial problem; however, there have been various study reports concerning its reform, and much attention need not be given in this report. It is necessary to achieve reformation of the following issues:

- Modernization of equipment and technology
- Production management
- Quality management
- Cost control
- Corporate planning
- Market development
- Research and development (R&D)

The accomplishment of the above reforms is an urgent matter for TISCO and SSC to compete with a joint venture such as VINAKYOEI. In addition, the rehabilitation plan proposed in the study report should be implemented as a part of the reform program.

11. Environmental preservation

It is a matter of course that any integrated steelworks should be controlled by environment laws and regulations in Viet Nam. In the construction of integrated steelworks, obligations should be given for undertaking of environmental assessment prior to the project implementation, and environmental guidances which conform to the steel plant should be designed.