

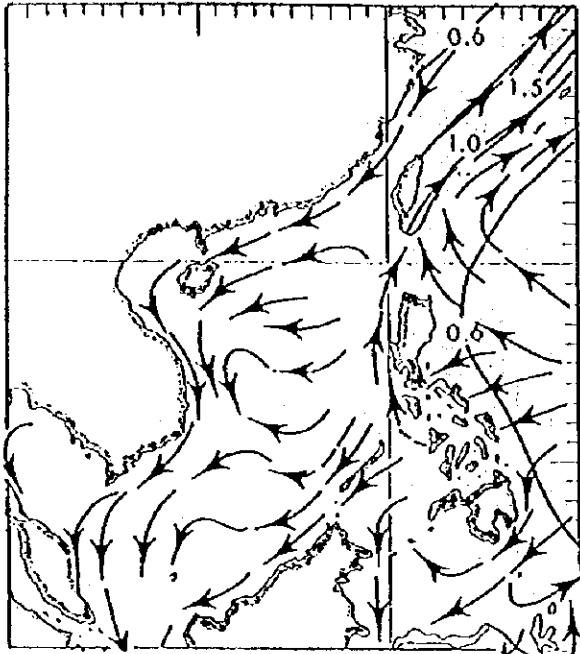
Table A 4.3.7 Waves by Typhoons with a Return Period of 50 Years (Dung Quat)

Offshore deepwater wave: $H_0 = 8.8$ m with $T_0 = 13.5$ sec.

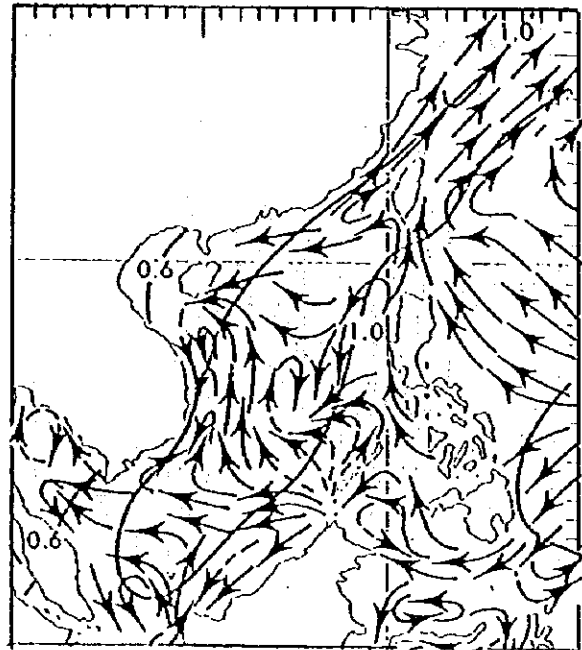
Offshore Wave Direction	Location	Water Depth (m)	K_{d1}	K_{d2}	K_r	K_{sb}	$H_{1/3}$ (m)	H_{max} (m)	H_D (m)	Incident wave angle (deg)
NE	MS1	16.7	0.83	-	0.93	0.97	6.6	11.2	11.2	9.5
	MS2	16.9	0.76	-	0.93	1.00	6.2	10.9	10.9	42.5
	MS3	9.7	0.45	-	0.92	1.17	4.2	6.9	6.9	25.5
	MS4	12.5	0.83	0.12	0.93	1.00	0.8	1.5	1.5	36.0
	MS5	10.3	0.83	0.15	0.93	1.10	1.1	2.0	2.0	77.0
	MS6	7.7	0.83	0.15	0.93	1.20	1.2	2.1	2.1	82.0
	MS7	4.5	0.83	0.12	0.93	1.38	1.1	2.0	2.0	83.0
	ISP1	17.7	0.73	-	0.93	1.00	6.0	10.0	10.0	42.5
	ISP2	18.4	0.66	-	0.93	0.98	5.3	9.3	9.3	48.5
	ISP3	2.7	0.73	0.07	0.93	1.75	0.7	1.2	1.2	N197
ISP4	2.7	0.73	0.05	0.93	1.67	0.5	0.9	0.9	N154	
ENE	MS1	16.7	0.67	-	0.89	1.00	5.2	9.0	9.0	39.5
	MS2	16.9	0.57	-	0.89	1.00	4.5	8.1	8.1	61.5
	MS3	9.7	0.27	-	0.85	1.10	2.2	4.0	4.0	25.5
	MS4	12.5	0.67	0.08	0.89	1.00	0.4	0.8	0.8	36.0
	MS5	10.3	0.67	0.08	0.89	1.00	0.4	0.8	0.8	77.0
	MS6	7.7	0.67	0.05	0.89	1.00	0.3	0.6	0.6	82.0
	MS7	4.5	0.67	0.05	0.89	1.33	0.4	0.7	0.7	83.0
	ISP1	17.7	0.53	-	0.89	0.98	4.1	7.5	7.5	56.0
	ISP2	18.4	0.46	-	0.89	0.97	3.5	6.4	6.4	48.5
	ISP3	2.7	0.53	0.05	0.89	1.50	0.3	0.5	0.5	N197
ISP4	2.7	0.53	0.05	0.89	1.50	0.3	0.5	0.5	N154	
E	MS1	16.7	0.47	-	0.79	1.00	3.3	5.9	5.9	39.5
	MS2	16.9	0.38	-	0.79	0.96	2.5	4.7	4.7	61.5
	MS3	9.7	0.14	-	0.77	1.11	1.0	1.8	1.8	25.5
	MS4	12.5	0.47	0.08	0.79	1.00	0.3	0.6	0.6	36.0
	MS5	10.3	0.47	0.08	0.79	1.00	0.3	0.6	0.6	77.0
	MS6	7.7	0.47	0.08	0.79	1.00	0.3	0.6	0.6	82.0
	MS7	4.5	0.47	0.08	0.79	1.33	0.4	0.7	0.7	83.0
	ISP1	17.7	0.33	-	0.79	1.00	2.3	4.1	4.1	56.0
	ISP2	18.4	0.28	-	0.79	1.00	1.9	3.4	3.4	48.5
	ISP3	2.7	0.33	0.05	0.79	0.50	0.1	0.3	0.3	N197
ISP4	2.7	0.33	0.05	0.79	0.50	0.1	0.3	0.3	N154	

Note: The "incident wave angle" is the angle from the line perpendicular to the face line of a breakwater or a seawall. "N30E" implies the angle of 30 degrees measured clockwise from the north.

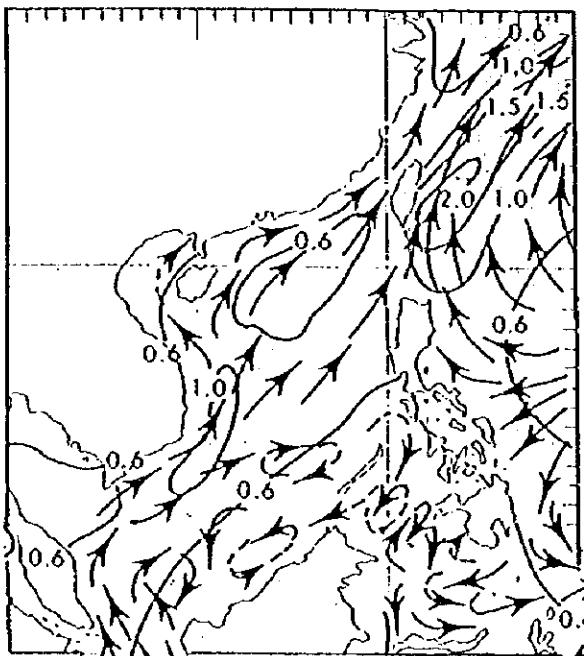
Source: JICA Study Team



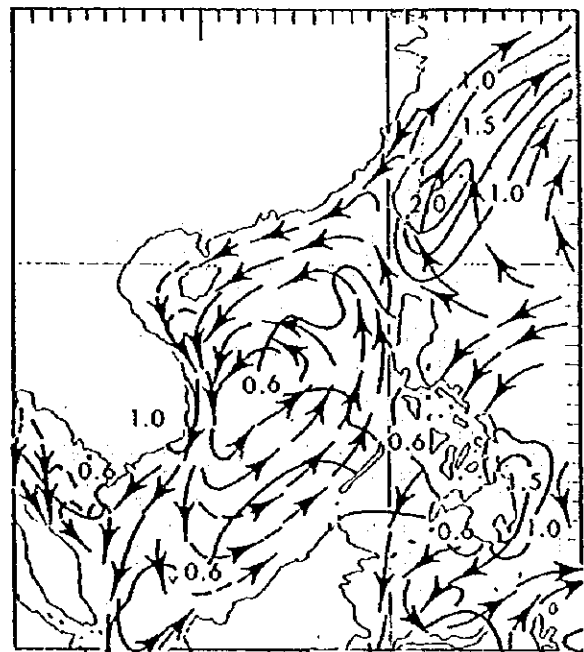
(1) January (North-east monsoon)



(2) April (Transition)



(3) July (South-west monsoon)



(4) October (Transition)

Figure A 4.4.1 Surface Current in the South China Sea

Source : US Navy "Marine Climate Atlas of the World, Vol III, Indian Ocean" March, 1976

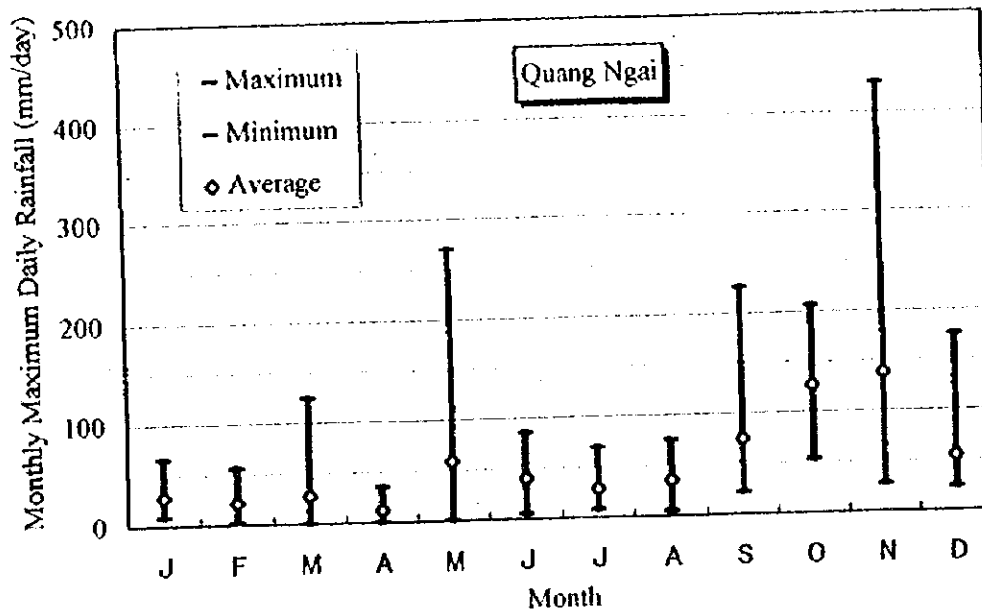


Figure A 4.6.1 Monthly Maximum Daily Rainfall at Quang Ngai (1986-1995)

Data source: Hydro-meteorological Data Center

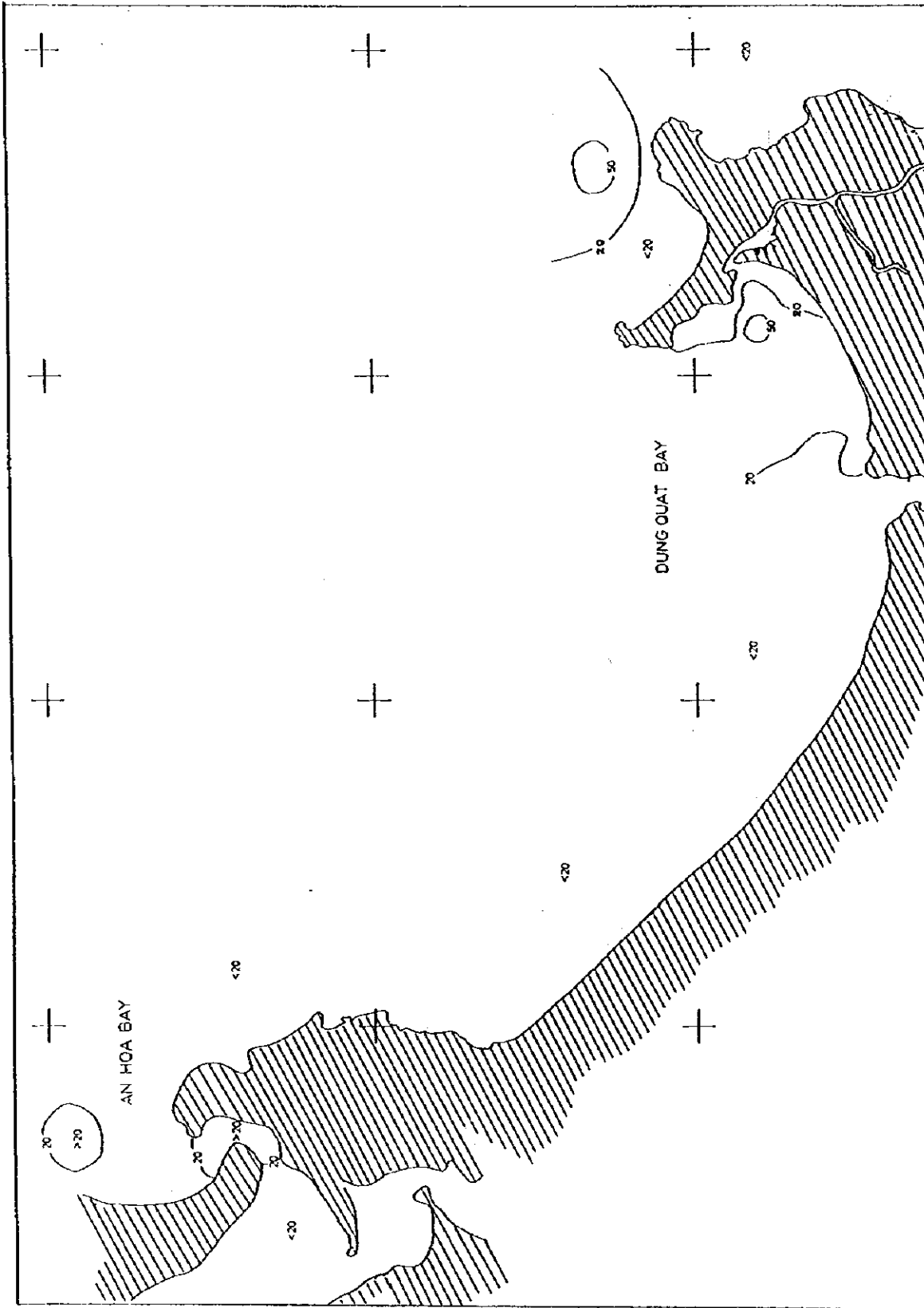


Figure A 4.7.1 Percentage Distribution of Silt/Clay of Bottom Sediment in Dung Quat

Source : JICA Study Team

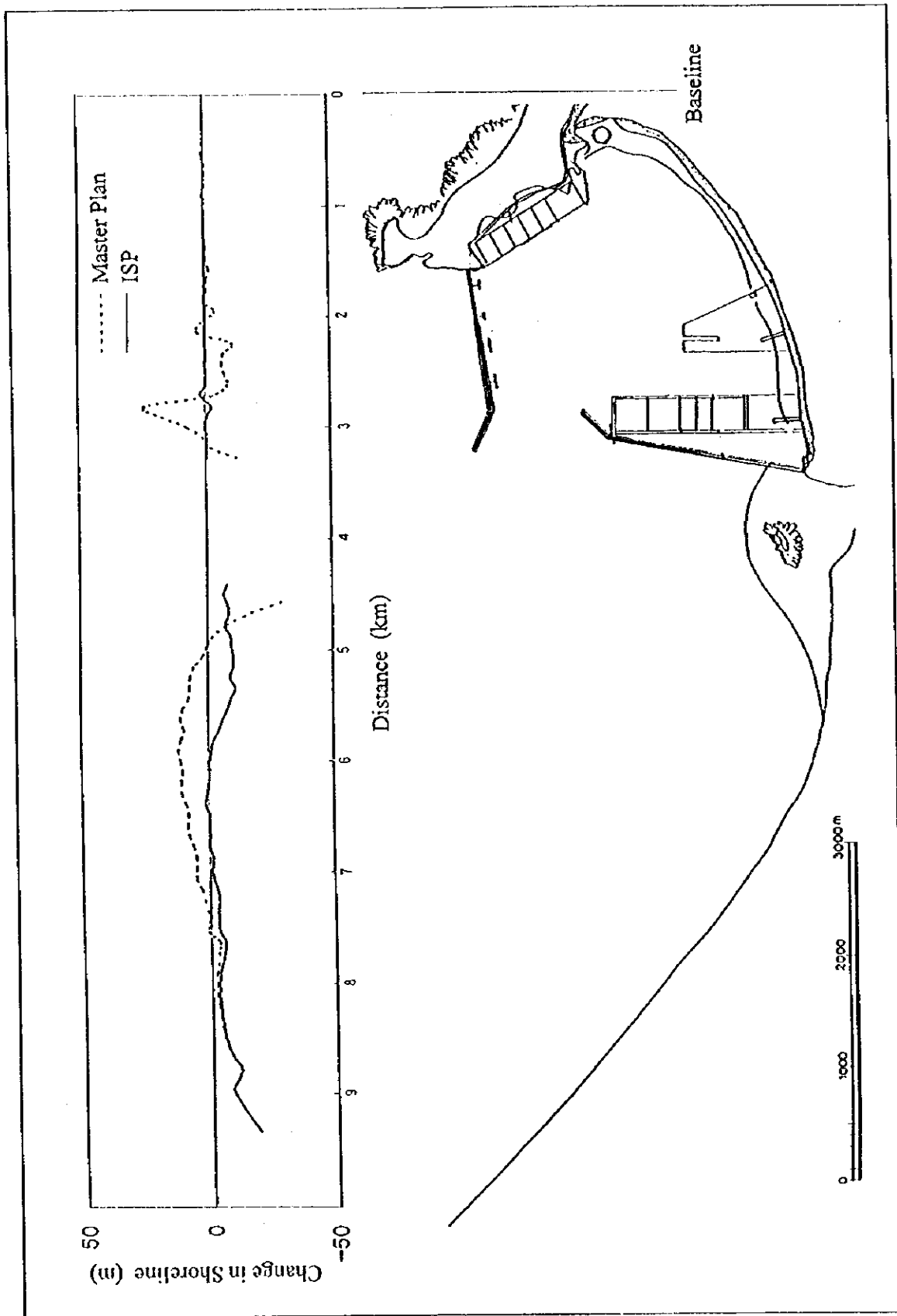


Figure A 4.7.2 Prediction of the Change in Shoreline by One Line Theory in Dung Quat Bay

Table A 6.3.1 Historical Trend of Cargo Handling Volume of Main Port in Vietnam

Port	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Hai Phong	Export	177.5	162.0	193.5	211.6	333.7	751.0	524.4	408.9	381.5	415.6	440.8	635.0	
	Import	1131.7	1299.6	1627.6	1452.9	1498.8	1068.2	621.2	848.9	1176.1	1702.2	2362.0	2500.0	
	Domestic	1139.3	1048.0	783.7	910.6	1249.4	905.3	1015.2	1403.2	1147.7	1114.6	1106.8	1660.0	1670.0
	Total	2448.5	2509.6	2604.8	2575.1	3081.9	2724.5	2516.0	2433.3	2378.1	2706.3	3249.8	4516.0	4805.0
Danang	Export	53.0	84.9	92.7	67.0	71.6	175.1	107.5	69.6	62.7	69.4	119.5	212.7	
	Import	264.0	303.2	370.5	400.7	345.1	327.4	255.7	127.0	163.5	211.0	489.8	560.0	
	Domestic	204.4	159.9	181.0	160.1	168.3	64.4	67.1	63.8	87.1	91.5	57.4	77.3	
	Total	521.4	548.0	644.2	627.8	585.0	566.9	430.3	260.4	313.3	371.9	666.7	830.3	850.0
Saigon	Export	473.0	496.0	589.1	593.8	661.9	2015.7	2085.6	1625.8	2495.9	2359.6	2551.7	2308.0	2540.0
	Import	906.0	869.0	1240.9	1402.9	1640.8	1543.7	1789.9	1883.0	1911.5	2727.8	3468.2	4259.0	4060.0
	Domestic	541.0	561.0	461.6	500.5	772.6	488.9	471.7	650.8	596.5	421.2	418.6	644.0	600.0
	Total	1920.0	1926.0	2291.6	2497.2	3075.3	4048.3	4347.2	4159.6	5003.9	5508.6	6438.5	7211.0	7200.0
Quang Ninh	Export	174.0	143.0	157.6	142.9	133.9	90.2	47.5	21.1	80.4	2.7	26.0	133.0	
	Import	44.0	85.0	81.6	64.4	69.6	57.5	92.6	34.7	19.5	1.2	1.4	174.0	
	Domestic	218.0	228.0	239.2	207.3	203.5	214.8	298.2	424.6	718.8	683.1	520.0	647.0	
	Total	200.0	210.0	22.8	10.4	12.2	40.9	21.7	48.1	55.8	72.3	73.4	63.0	96.0
Nghe Tinh	Export	60.0	48.0	50.9	36.6	37.2	28.5	1.6	2.0	5.0	10.9	16.3	86.0	
	Import	108.7	100.4	101.3	141.3	120.8	53.7	56.5	76.0	72.1	98.9	116.5	161.0	
	Domestic	188.7	169.4	175.0	188.3	170.2	123.1	79.8	126.1	132.9	182.1	206.2	310.0	
	Total	31.8	33.1	60.6	60.6	82.8	189.1	242.6	241.7	225.8	276.9	152.5	171.0	
Qui Nhon	Export	29.3	15.2	49.9	54.4	64.9	34.6	8.8	6.7	9.0	30.5	89.2	152.0	
	Import	98.4	103.2	93.8	104.1	117.2	46.3	48.8	51.9	100.2	104.4	161.3	124.0	
	Domestic	159.5	151.5	204.3	219.1	264.9	270.0	300.2	300.3	335.0	411.8	403.0	447.0	
	Total	53.0	72.8	96.3	84.1	67.9	119.4	144.3	81.9	28.1	24.9	28.3	16.5	
Nha Trang	Export	28.6	22.3	56.4	27.2	80.2	57.5	27.6	7.4	25.5	14.8	59.3	214.5	
	Import	108.9	91.7	92.4	99.2	114.5	61.7	49.3	58.6	100.9	141.5	126.3	112.0	
	Domestic	190.5	186.8	245.1	210.5	262.6	238.6	221.2	147.9	154.5	181.2	213.9	343.0	
	Total	Export	26.2	34.3	43.8	47.0	30.6	44.1	66.0	88.3	17.0	13.6	23.6	
Can Tho	Import	52.5	25.2	43.8	55.0	6.2	6.2	4.7	22.6	8.1	36.3	68.5		
	Domestic	52.4	18.1	5.1	4.7	22.6	59.4	0.0	65.8	125.9	173.8			
	Total	0.0	0.0	0.0	77.6	92.7	106.7	3897.9	3902.9	3715.0	4283.0			
	Export	808.3	869.8	1055.0	1027.5	1256.3	3392.6	2891.8	3899.3	3897.9	3902.9	3715.0	4283.0	
Total	Import	2593.6	2700.3	3553.8	3517.6	3853.3	3175.3	2723.4	3050.0	4173.8	5864.6	7914.7	7936.0	
	Domestic	2244.7	2149.2	1795.4	1980.2	2664.8	1695.9	2343.7	2146.6	1973.3	1996.4	2800.5	3032.8	
	Total	5646.6	5719.3	6404.2	6525.3	7774.5	8263.8	7958.9	9095.9	10045.0	11763.9	14430.2	15251.8	

Source: Ministry of Transport

Table A 6.5.1 (1) Annual Growth Rate of GDP in Thailand from 1986-1995

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Growth Rate (%)	4.95	4.35	10.26	4.39	4.94	9.15	9.46	10.40	5.03	5.04

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Growth Rate (%)	5.94	5.23	5.54	5.75	4.69	5.58	9.60	13.29	12.17	11.75

Year	1991	1992	1993	1994	1995
Growth Rate (%)	8.04	8.11	8.34	8.79	8.68

Table A 6.5.1 (2) Growth Rates of Socioeconomic Data in Thailand

Year	Growth rate of Population	Growth rate of GDP	Growth rate of AgricultureGDP	Growth rate of Industry GDP	Growth rate of Service GDP
1996-2000	0.99	8.4	3.5	10.0	8.0
2001-2010	0.75	7.7	3.5	9.0	7.0
2011-2020	0.48	6.9	3.5	8.0	6.0

Source :Statistical Yearbook Thailand 1995

Northeast Thailand (Mukdahan Area) - R-9 Hinterland

Year	Growth rate of Population	Growth rate of GDP	Growth rate of AgricultureGDP	Growth rate of Industry GDP	Growth rate of Service GDP
1996-2000	0.99	7.2	4.0	9.0	8.0
2001-2010	0.75	7.4	4.0	9.0	8.0
2011-2020	0.48	7.6	4.0	9.0	8.0

Northeast Thailand (Ubon Ratchathani Area) - R-16.18 Hinterland

Year	Growth rate of Population	Growth rate of GDP	Growth rate of AgricultureGDP	Growth rate of Industry GDP	Growth rate of Service GDP
1996-2000	0.99	7.3	4.0	9.0	8.0
2001-2010	0.75	7.5	4.0	9.0	8.0
2011-2020	0.48	7.7	4.0	9.0	8.0

Table A 6.5.1 (3) Target Value of Socioeconomic Data in Lao PDR

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	4,581,000	380	1,760	971 55	326 19	463 26
2000	5,267,000 (5,200,000)	490 (500)	2,581	1,242 48	575 22	764 30
2010	6,845,000	830	5,705	2,020 35	1,705 30	1,980 35
2020	8,648,000	1,500	13,030	3,290 25	4,840 37	4,900 38

Note : () indicates that GDP per capita is approximately 500 US\$ when population is 5.2 million.

Central-Southern Lao (Savannakhet Area) - R-9 Hinterland

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	832,000	380	320	177 55	59 19	84 26
2010	1,243,000	830	1,040	368 35	310 30	360 35
2020	1,570,000	1,500	2,370	599 25	881 37	892 38

Southern Lao (Pakse Area) - R-16.18 Hinterland

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	748,000	380	286	158 55	53 19	75 26
2010	1,118,000	850	930	329 35	278 30	323 35
2020	1,413,000	1,500	2,120	536 25	789 37	799 38

Table A 6.5.1 (4) Target Value of Socioeconomic Data in Thailand

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	59,401,000	2,810	167,100	18,300 11	66,600 40	82,200 49
2010	67,230,000	7,350	522,000	30,600 6	254,000 49	238,000 46
2020	70,503,000	14,400	1,017,000	43,200 4	548,000 54	425,000 42

Northeast Thailand (Mukdahan Area) - R-9 Hinterland

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	3,303,000	760	2,520	620 25	358 14	1,540 61
2010	3,739,000	1,950	7,300	1,120 15	1,300 18	4,880 67
2020	3,921,000	3,890	15,200	1,660 11	3,080 20	10,500 69

Northeast Thailand (Ubon Ratchathani Area) - R-16.18 Hinterland

Year	Population	GDP/ capita (US\$)	GDP (million US\$)	A-GDP (million US\$) and Share(%)	I-GDP (million US\$) and Share(%)	S-GDP (million US\$) and Share(%)
1995	3,850,000	750	2,900	701 24	474 16	1,720 59
2010	4,357,000	1,940	8,450	1,260 15	1,730 20	4,970 65
2020	4,569,000	3,880	17,800	1,660 11	4,080 23	11,800 66

Table A 6.5.1 (S) GDP, Export cargo and Import cargo in Thailand

Year	GDP (million US\$ in 1995 price)	Export Cargo (000 ton)	Import Cargo (000 ton)
1971	28,445	7,836	9,787
1972	29,682	9,191	12,684
1973	32,727	8,349	12,809
1974	34,165	9,905	11,578
1975	35,852	7,811	11,532
1976	39,132	12,665	13,087
1977	42,835	15,310	17,009
1978	47,288	12,866	17,582
1979	49,668	12,867	18,243
1980	52,170	13,206	18,86
1981	55,270	15,795	17,013
1982	58,162	20,001	15,555
1983	61,382	16,626	14,518
1984	64,909	19,377	18,504
1985	67,950	19,459	18,753
1986	71,742	21,067	16,488
1987	78,629	21,353	16,313
1988	89,077	25,451*	22,908*
1989	99,912	29,946*	28,544*
1990	111,652	27,659*	26,170*
1991	120,630	28,674*	39,782*
1992	130,410	32,123*	43,528*
1993	141,283	36,419*	39,450*
1994	153,707	39,431*	42,701*
1995	167,060	42,667*	46,200*

Source : Foreign Trade Statistics of Thailand /Department of Customs Bangkok
Transport Statistics /MOTC

Note : * mark means modified data by Bangkok Port statistics

Table A 6.5.3 (1) Forestry Products in Lao PDR

Year	Logs	Sawn Timbers	Plywood
1991	301,000 m3	110,000 m3	347,000 sheets
1992	218,000 m3	246,000 m3	304,000 sheets
1993	516,000 m3	271,000 m3	1,508,000 sheets
1994	595,000 m3	n.a.	1,800,000 sheets

Source: CPC basic Statistics

Table A 6.5.3 (2) Forest Product Export in Lao PDR

year	Logs Volume(m3)	Sawn timber Volume(m3)
1985	14,000	8,000
1989	26,000	94,000
1990	39,000	100,000
1993	32,000	130,000

Source: CPC basic Statistics

Table A 6.5.3 (3) Forest Plantation in Lao PDR

Total	8,828 ha
R-9 Hinterland	824 ha (9%)
Savannakhet(100%)	645 ha
Saravane(50%)	112 ha
Sekong(50%)	67 ha
R-16/18 Hinterland	950 ha (11%)
Saravane(50%)	112 ha
Sekong(50%)	67 ha
Champasack(100%)	726 ha
Attapeu(100%)	5 ha

Source: Department of Forestry, MAF

Table A 6.5.3 (4) Distribution of wood shops in Thailand

Region	Sawn Timber Shop	Wood Products Shop
Bangkok	844 (29%)	1,035 (38%)
Central Region	1,147 (39%)	715 (26%)
North Region	243 (8%)	586 (22%)
North East Region	413 (14%)	336 (12%)
South Region	259 (9%)	48 (2%)
Total	2,906 (100%)	2,724 (100%)

Source :Forestry Statistics 1990

Table A 6.5.3 (5) Export of Rice from Thailand to Northeast Asia

	1993	1994	Average
Japan	273,000	512,000	392,500
China	130,000	553,000	341,500
Hong Kong	241,000	238,000	239,500
Northeast Asian Economies	644,000	1,303,000	973,500
World	4,987,000	4,858,000	4,922,500

Source :Statistical Yearbook Thailand 1995

Table A 6.5.3 (6) Current Productivity and Fertilizer Consumption

Area	Yield (kg/ha)	Current Fertilizer Consumption (kg/ha)	Future Fertilizer Consumption (kg/ha)
Lao PDR	2700	6	100
Thailand	2340	55	100
Asian Average	3780	129	129

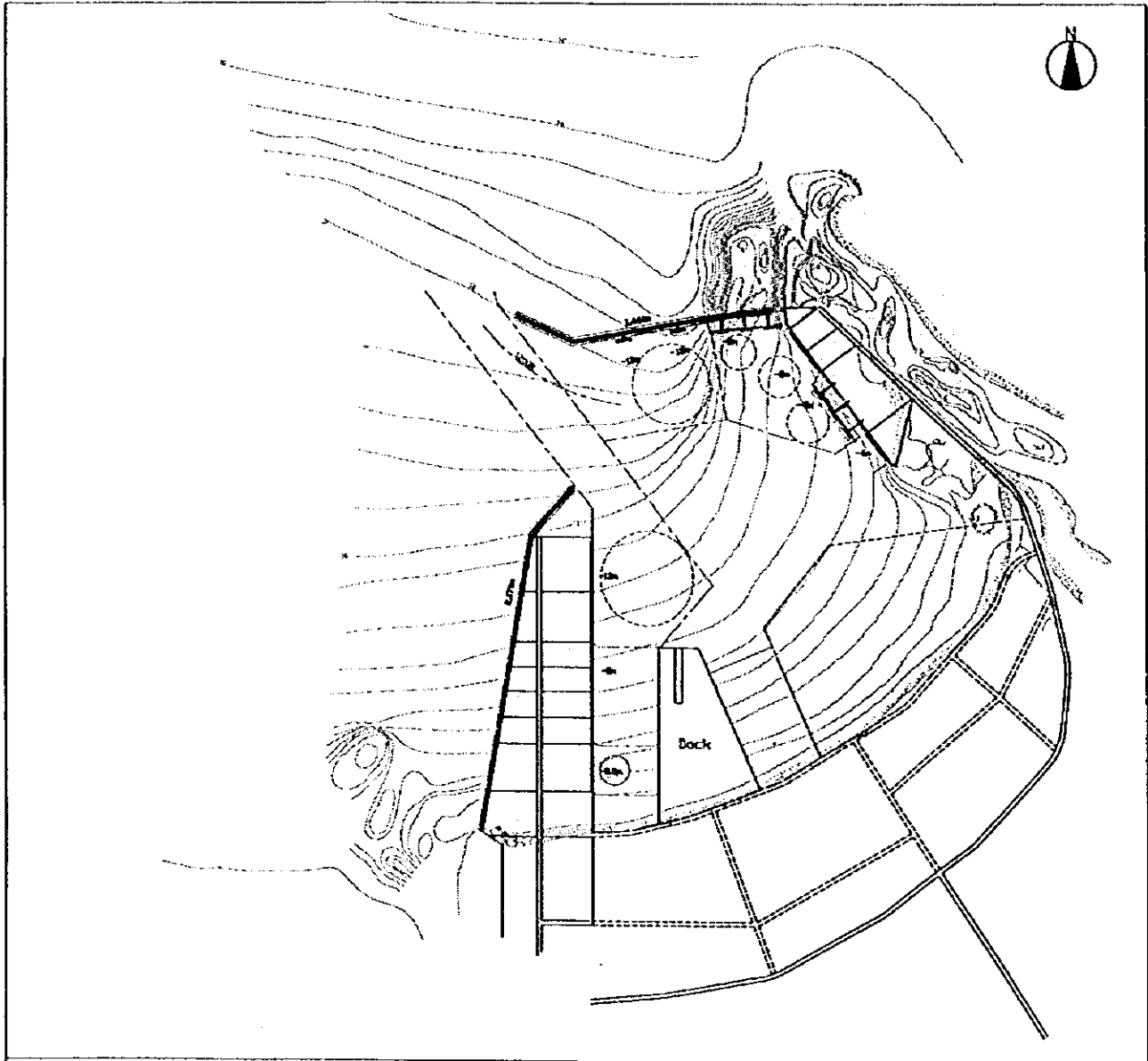
Table A7.3.1 Standard Size of Ships

(units in m)

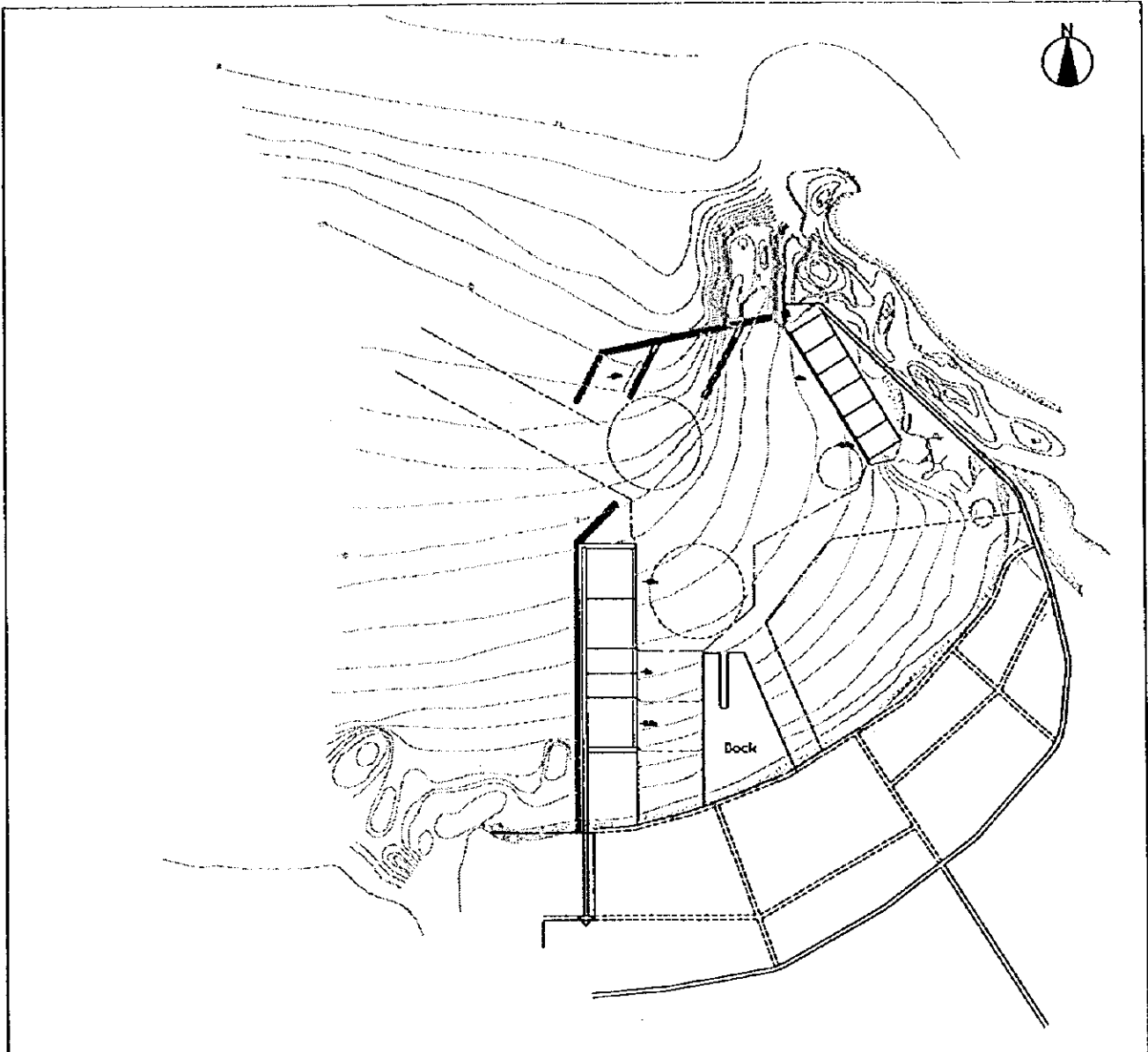
Type	Tonnage	Overall length	Moulded breadth	Moulded depth	Full load draft	Type	Tonnage	Overall length	Moulded breadth	Moulded depth	Full load draft
Passenger ship	G.T					Container ship	D.W				
	2,000	88	13.2	6.4	4.0		40,000	263	33.5	20.7	12.4
	3,000	99	14.7	7.6	4.5		50,000	280	35.8	22.6	13.0
	5,000	120	16.9	9.5	5.2	Oil tanker	D.W				
	8,000	142	19.2	11.6	5.8		1,000	61	9.8	4.4	4.0
	10,000	154	20.4	12.9	6.2		2,000	77	12.2	5.6	5.0
	15,000	179	22.8	14.7	6.8		3,000	88	13.8	6.5	5.6
	20,000	198	24.7	16.1	7.5		5,000	104	16.2	7.8	6.5
30,000	230	27.5	18.3	8.5	10,000		130	20.1	10.1	8.0	
					15,000		148	22.8	11.7	9.0	
					20,000	162	24.9	13.0	9.8		
Ferryboat	G.T					Oil tanker	30,000	185	28.3	15.2	10.9
	1,000	73	14.3	9.4	3.7		40,000	204	30.9	16.6	11.8
	2,000	69	17.1	10.7	4.4		50,000	219	33.1	17.5	12.7
	3,000	113	18.9	11.5	4.9		60,000	232	35.0	18.4	13.6
	4,000	127	20.2	12.2	5.3		70,000	244	36.7	19.2	14.3
	6,000	138	22.4	13.2	5.9		80,000	255	38.3	19.9	14.9
	10,000	170	25.4	14.5	6.5						
	13,000	188	27.1	15.3	6.7						
15,000	200	28.1	15.7	6.9							
Cargo ship	D.W					Pure car carrier	G.T				
	700	58	9.7	5.5	3.7		700	77	12.8	6.9	4.3
	1,000	64	10.4	5.8	4.2		1,000	86	14.1	8.0	4.7
	2,000	81	12.7	6.8	4.9		2,000	105	17.1	10.7	5.5
	3,000	92	14.2	7.7	5.7		3,000	117	19.1	12.7	6.0
	5,000	109	16.4	9.0	6.8		5,000	136	22.0	15.8	6.8
	8,000	126	18.7	10.3	8.0		6,000	144	23.1	17.1	7.1
	10,000	137	19.9	11.1	8.5		10,000	166	26.6	21.2	8.0
	15,000	153	22.3	12.5	9.3	15,000	187	29.8	25.1	8.8	
	30,000	186	27.1	15.2	10.9	20,000	203	32.2	28.4	9.5	
	40,000	201	29.4	16.5	11.7	Gas tanker	G.T				
	50,000	216	31.5	17.5	12.4		1,000	70	11.7	5.7	5.0
	70,000	235	33.8	19.2	13.4		2,000	87	14.3	7.3	5.9
	90,000	252	37.2	20.6	14.2		3,000	99	16.1	8.5	6.6
100,000	259	38.7	21.2	15.8	5,000		117	18.6	10.2	7.5	
150,000	290	45.0	23.7	17.5	10,000		145	22.7	13.1	9.0	
Container ship	D.W					15,000	165	25.5	15.2	10.2	
	20,000	201	27.1	15.6	10.6	20,000	181	27.7	16.9	11.0	
	30,000	237	30.7	18.4	11.6	30,000	206	31.2	19.6	12.0	
						50,000	242	36.1	23.6	13.5	

G.T: gross Tonnage

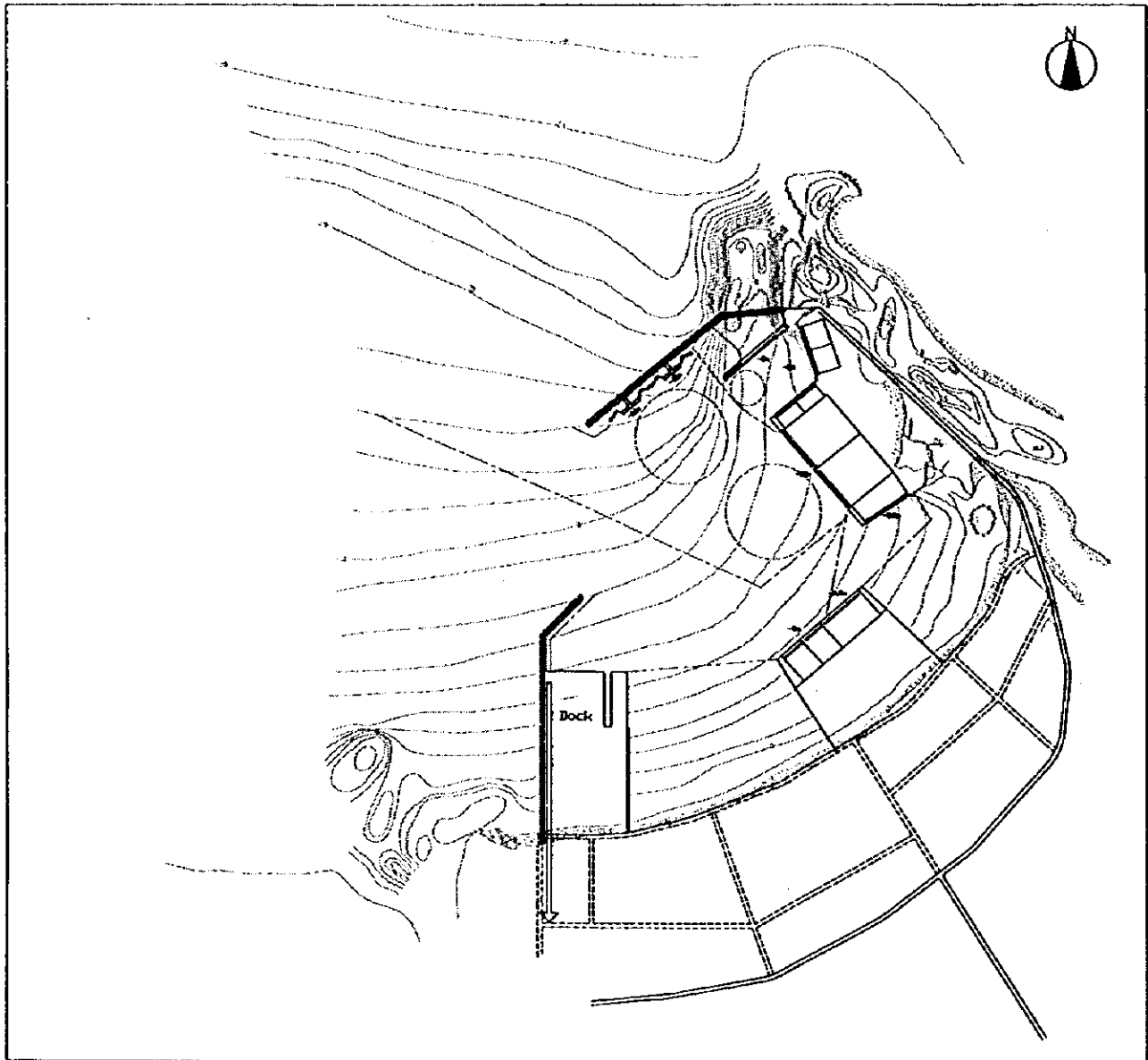
D.W: Dead Weight Tonnage



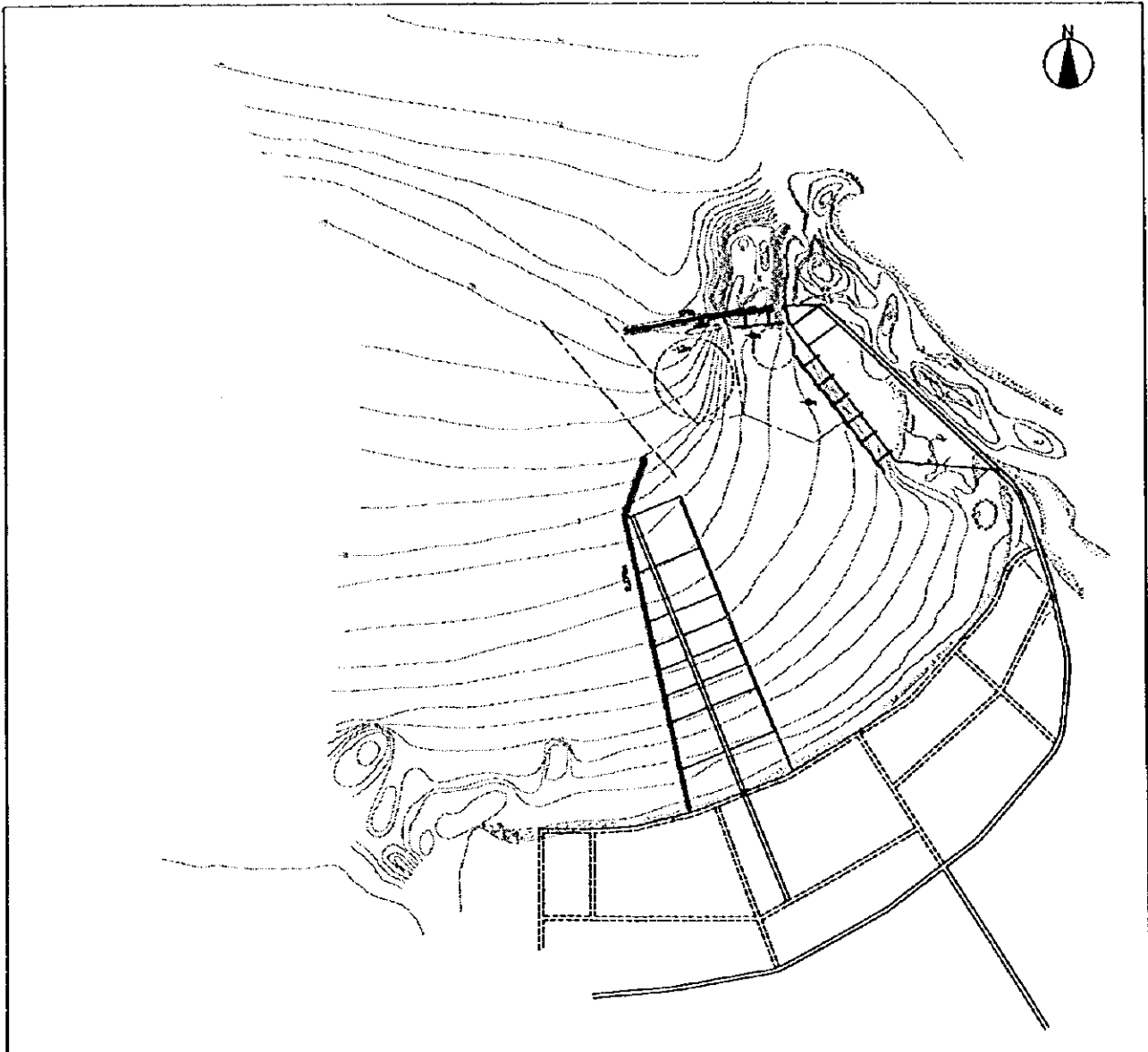
<p>JICA Port Development Study in Central Region</p>	<p>Figure A7.4.1</p>
<p>Dung Quat Port Development Option 1</p>	<p>0 200 400 600 800 1,000 m</p>
<p>FILE DQ-DF-A1</p>	<p>Final Report 1998</p>



<p>JICA Port Development Study in Central Region</p>	<p>Figure A7.4.2</p>
<p>Dung Quat Port Development Option 2</p>	<p>0 200 400 600 800 1,000 m</p>
<p>FILE DQ-DF-A2</p>	<p>Final Report 1998</p>



<p>JICA Port Development Study in Central Region</p>	<p>Figure A7.4.3</p>
<p>Dung Quat Port Development Option 3</p>	<p>0 200 400 600 800 1,000 ft</p>
<p>FILE DQ-DF-A3</p>	<p>Final Report 1998</p>



JICA Port Development Study in Central Region	Figure A7.4.4
Dung Quat Port Development Option 4	0 200 400 600 800 1,000 m
FILE DQ-DF-A4	Final Report 1998

TABLE A7.5.2 Direction-wise Offshore Wave Heights Occurrence

Quang Ngai Offshore (N15° E110°)

Wave Height	0.00-0.49 m	0.50-0.99 m	1.00-1.49 m	1.50-1.99 m	2.00-2.49 m	2.50-2.99 m	3.00-3.99 m	4.00-4.99 m	5.00 m-	Total
NNE		8 0.27%	57 1.95%	57 1.95%	35 1.20%	33 1.13%	30 1.03%	1 0.03%		221 7.57%
NE		42 1.44%	146 5.00%	67 2.29%	25 0.86%	10 0.34%	5 0.17%			295 10.10%
ENE	2 0.07%	623 21.34%	465 15.92%	167 5.72%	45 1.54%	26 0.89%	23 0.79%	1 0.03%		1352 46.30%
E		2 0.07%	3 0.10%	4 0.14%	3 0.10%	2 0.07%	1 0.03%			15 0.51%
ESE	1 0.03%	2 0.07%	4 0.14%							7 0.24%
SE		42 1.44%	28 0.96%	3 0.10%						73 2.50%
SSE		118 4.04%	184 6.30%	15 0.51%	1 0.03%					318 10.89%
S		147 5.03%	159 5.45%	9 0.31%	1 0.03%					316 10.82%
SSW		68 2.33%	70 2.40%	4 0.14%	1 0.03%					143 4.90%
SW		39 1.34%	44 1.51%	8 0.27%						91 3.12%
WSW		2 0.07%	8 0.27%	1 0.03%						11 0.38%
W		2 0.07%								2 0.07%
WNW		1 0.03%								1 0.03%
NW		1 0.03%	2 0.07%	1 0.03%						4 0.14%
NNW		1 0.03%	2 0.07%	2 0.07%						5 0.17%
N			10 0.34%	17 0.58%	16 0.55%	10 0.34%	8 0.27%	5 0.17%		66 2.26%
Total	3 0.10%	1098 37.60%	1182 40.48%	355 12.16%	127 4.35%	81 2.77%	67 2.29%	7 0.24%		2920 100.00%

Upper column: Estimated number of occurrences of the wave height

Lower column: Frequency of occurrences of the wave height

Data: 1 Jan. 1993 - 31 Dec. 1994

Site: N15° E110°

Estimated from wind data obtained by European Center for Medium Range Weather Forecast

Table A 7.5.4 Port Access Traffic

Unit: Vehicles per day

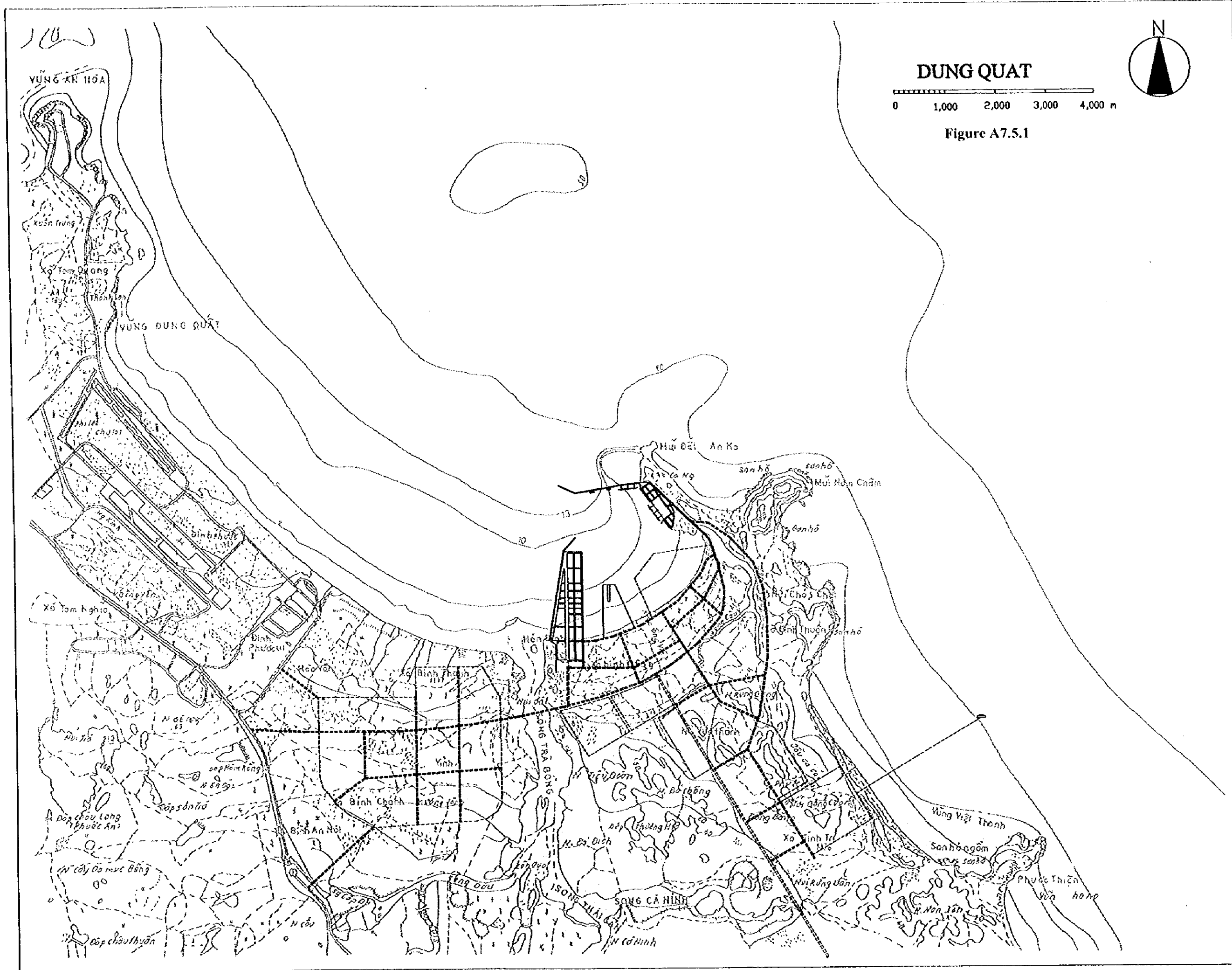
Type of Vehicle	2010	2020
Container Truck	0	64
Truck for Bulk Cargo	61	267
Truck for Break Bulk Cargo	166	728
Lorry for Petroleum	61	194
Car for Passenger	143	626
Total	430	1,879

Formula of Traffic Volume Estimation

$$Q = V \times \frac{\alpha}{\omega} \times \frac{\beta}{12} \times \frac{\gamma}{30} \times \frac{1 + \delta}{\varepsilon} \times \sigma$$

where

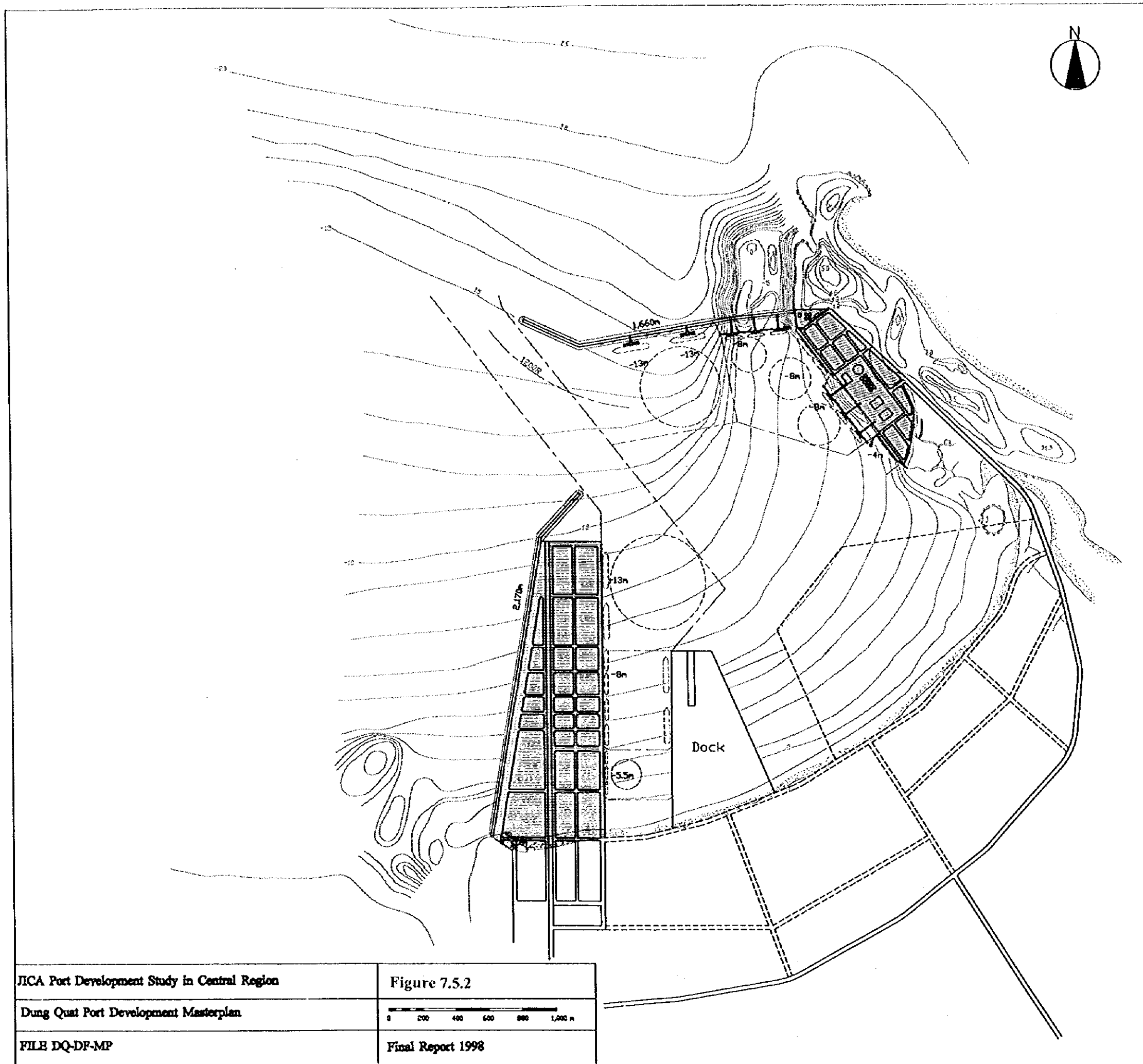
- α : 1.0
- β : 1.2
- γ : 1.3
- δ : 0.5
- ε : 0.5
- σ : 0.14
- ω : 1.0TEU(Container)
- : 4.0(Break Bulk)
- : 5.0(Bulk)
- : 10.0(Liquid)



DUNG QUAT

0 1,000 2,000 3,000 4,000 m

Figure A7.5.1

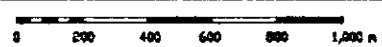


JICA Port Development Study in Central Region

Dung Quat Port Development Masterplan

FILE DQ-DF-MP

Figure 7.5.2



Final Report 1998

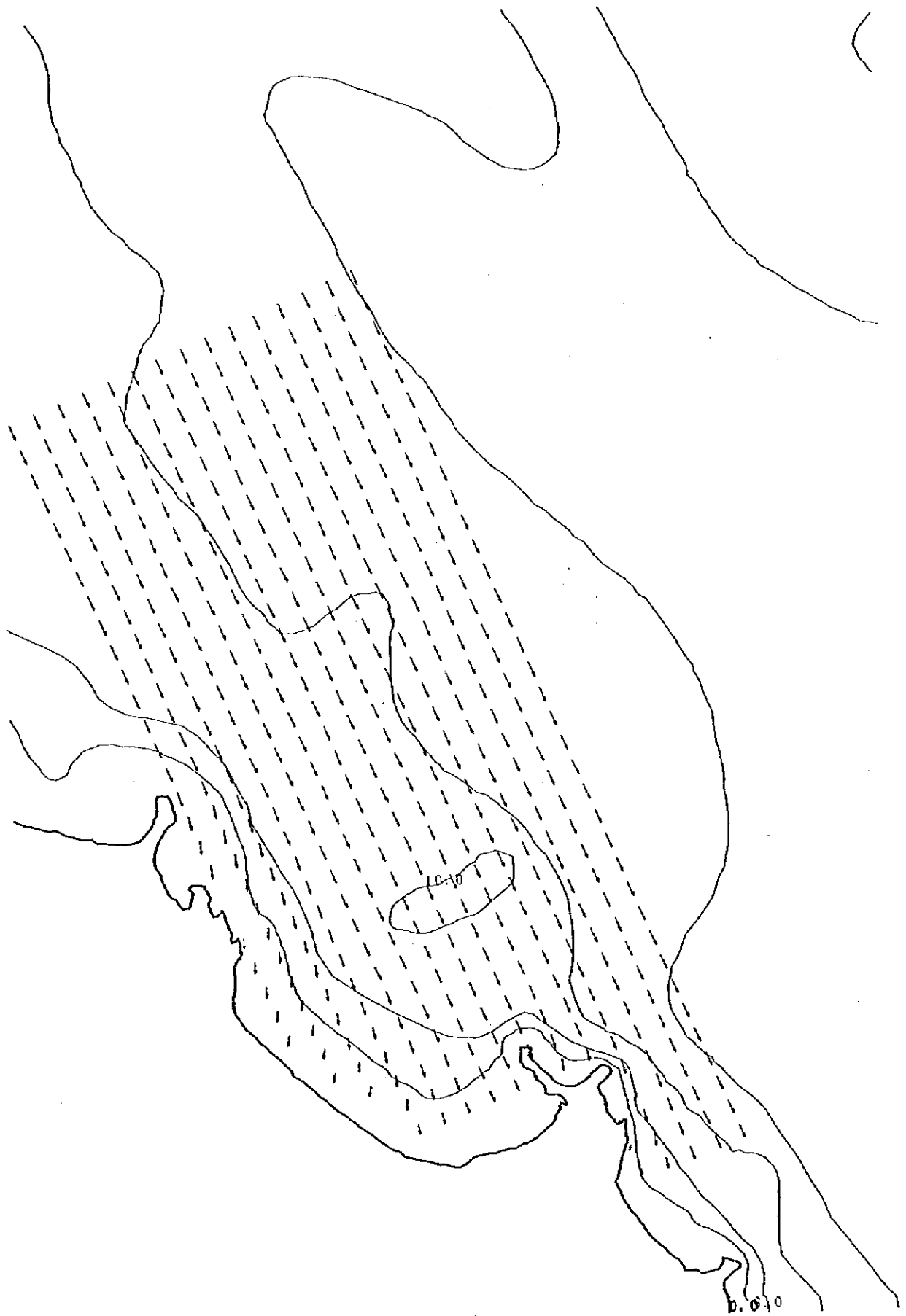


Figure A7.5.3 Wave Refraction and Shoaling (NNN)

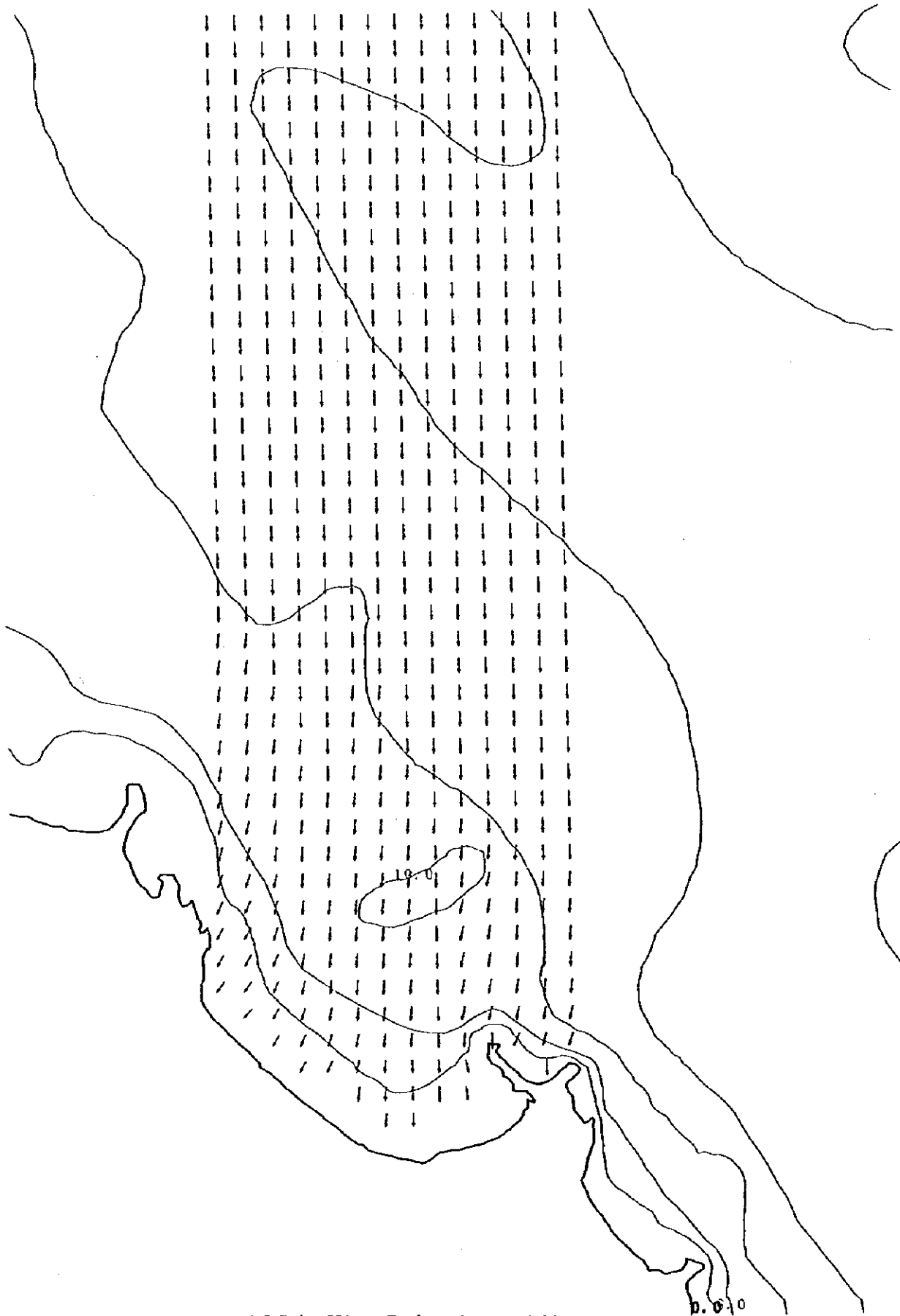


Figure A7.5.4 Wave Refraction and Shoaling (N)

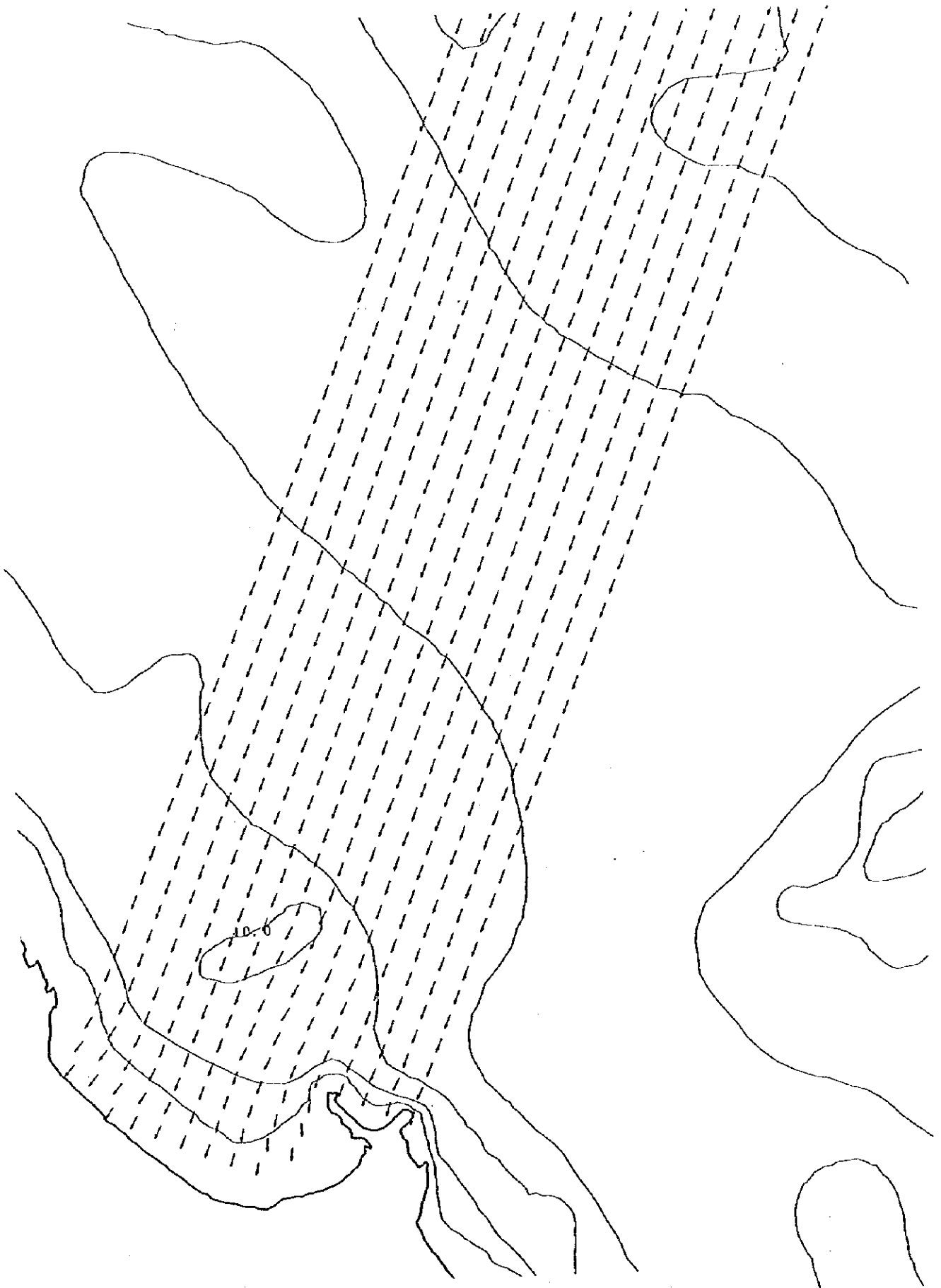


Figure A7.5.5 Wave Refraction and Shoaling (NNE)

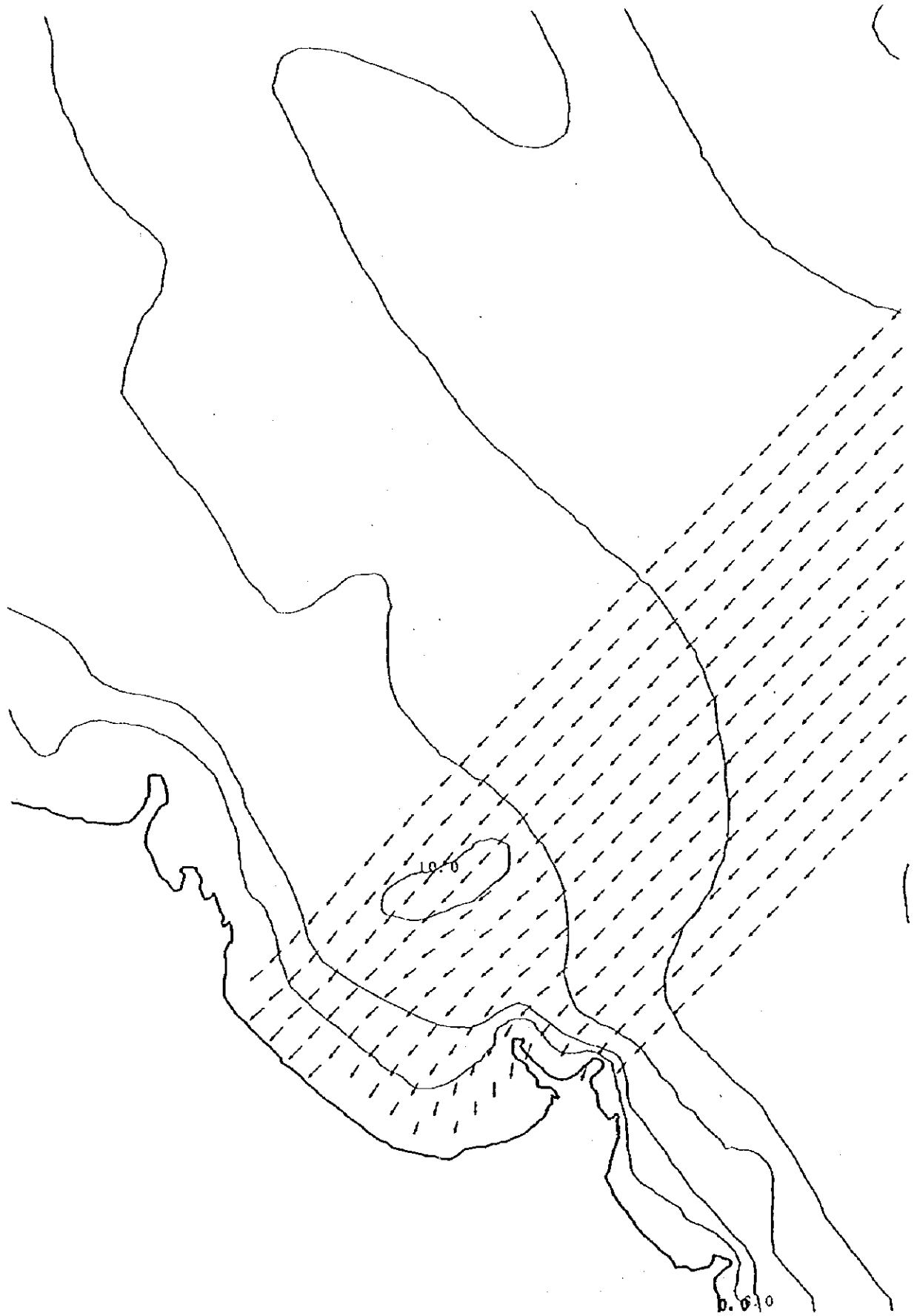


Figure A7.5.6 Wave Refraction and Shoaling (NE)

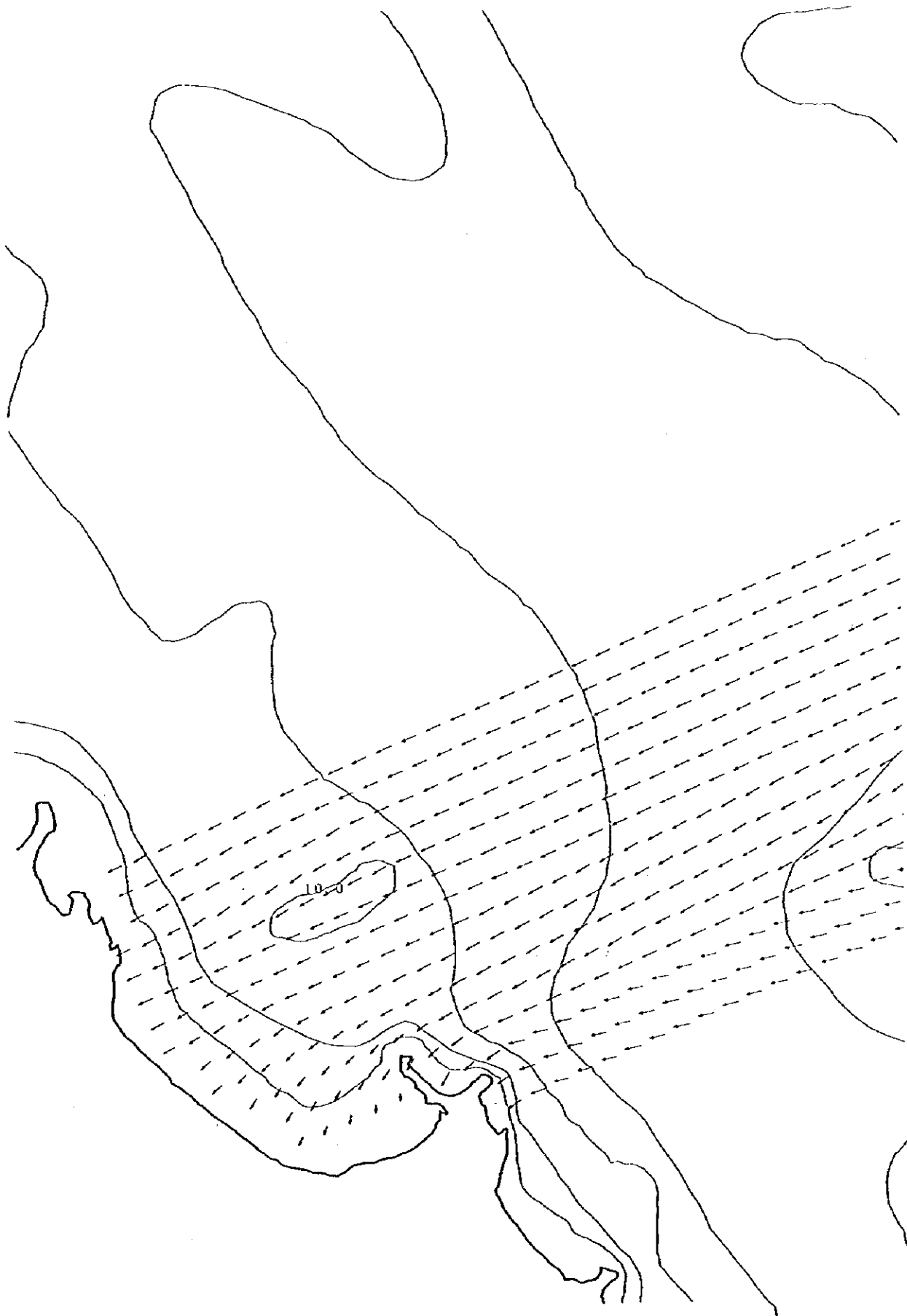


Figure A7.5.7 Wave Refraction and Shoaling (ENE)

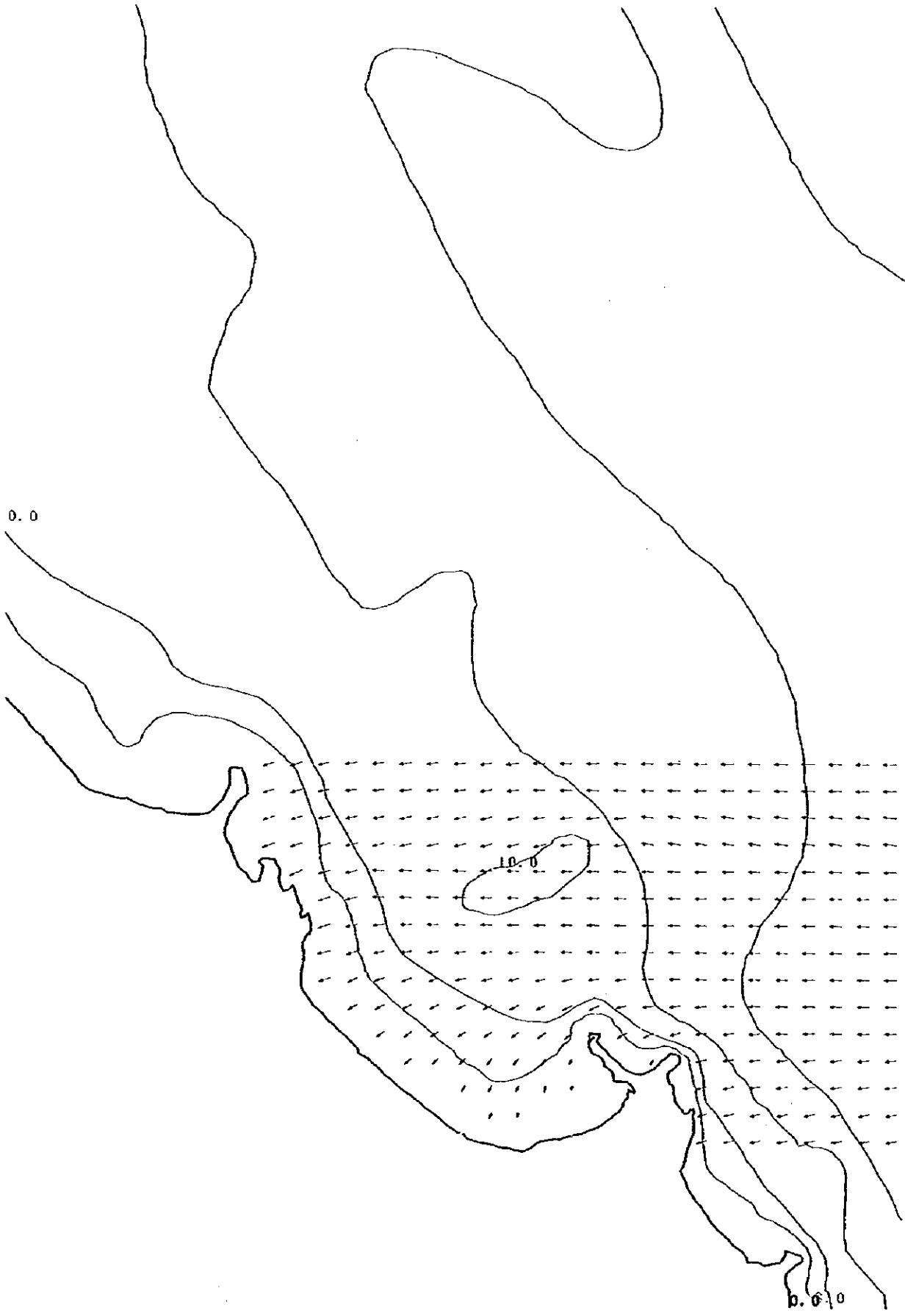


Figure A7.5.8 Wave Refraction and Shoaling (E)

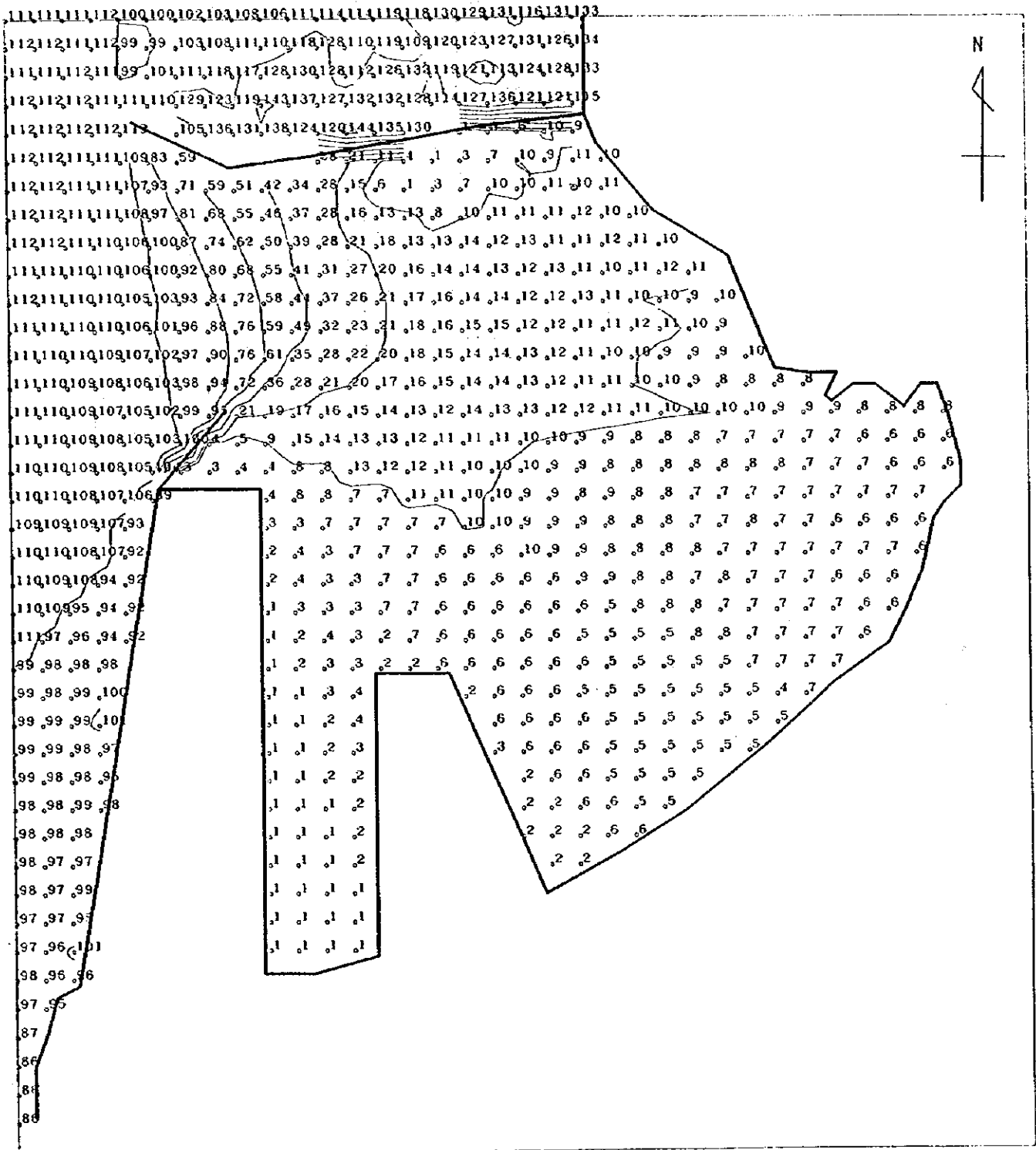


Figure A7.5.9 Wave Diffraction in Harbor (NNW)

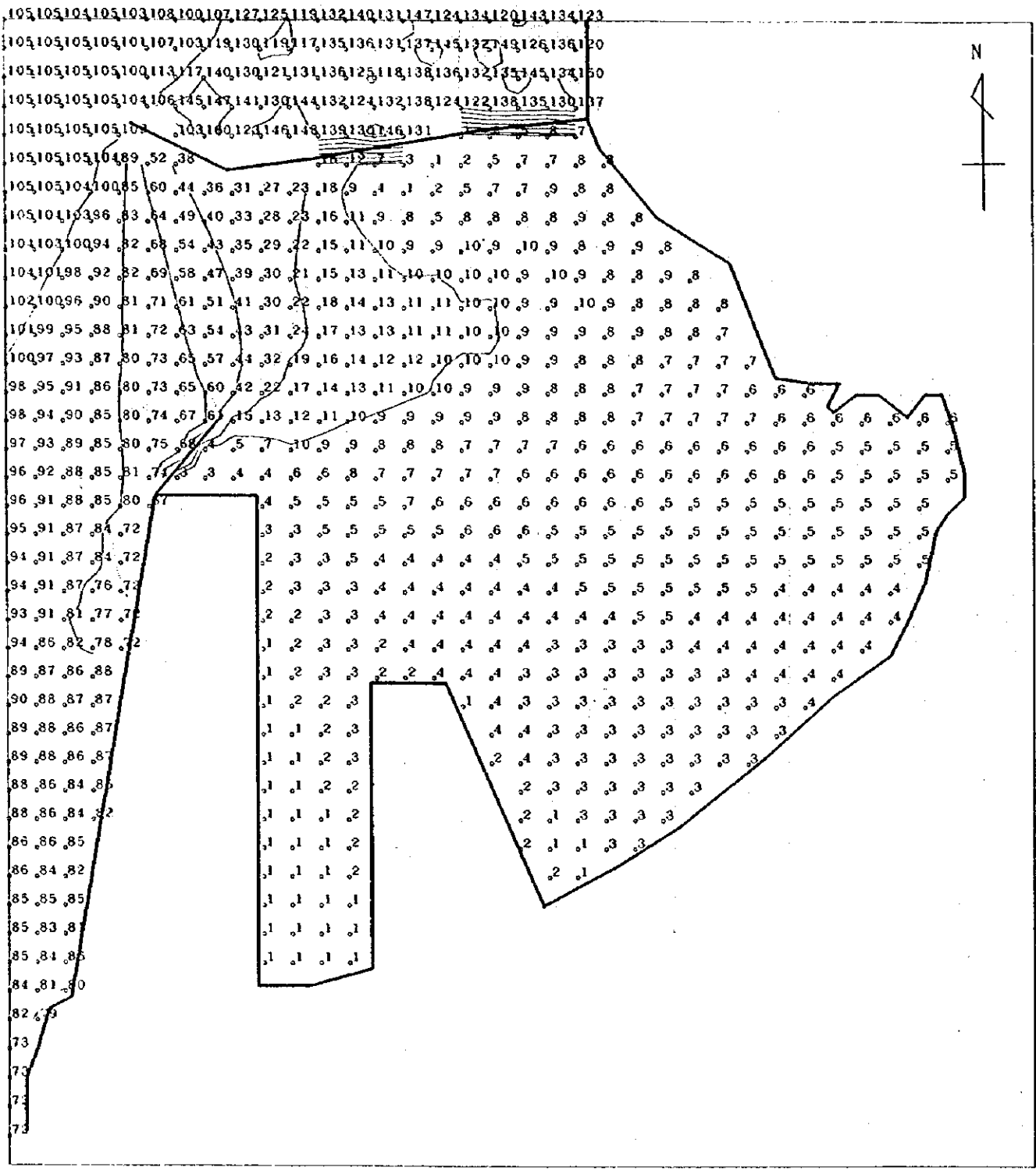


Figure A7.5.10 Wave Diffraction in Harbor (N)

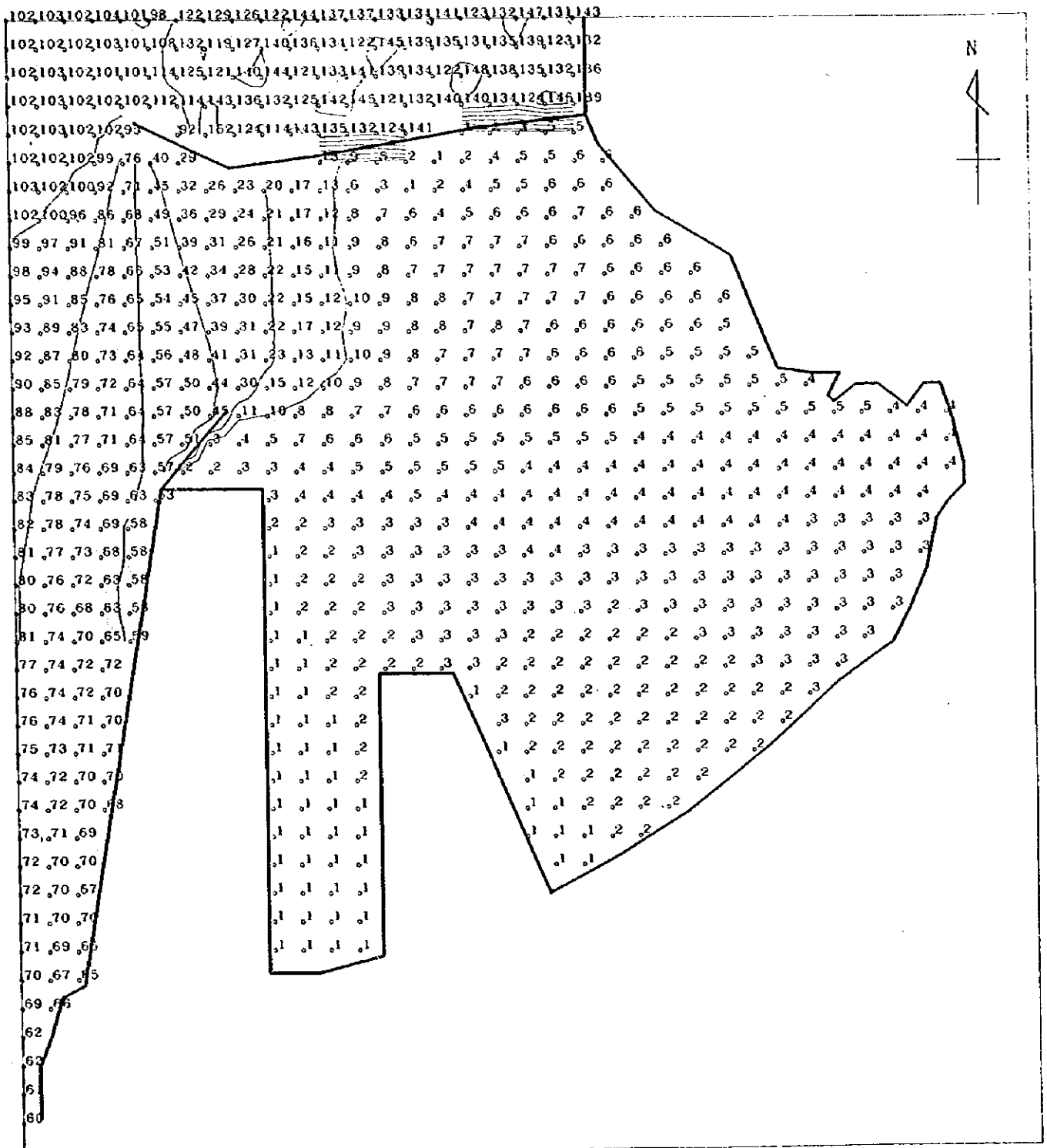
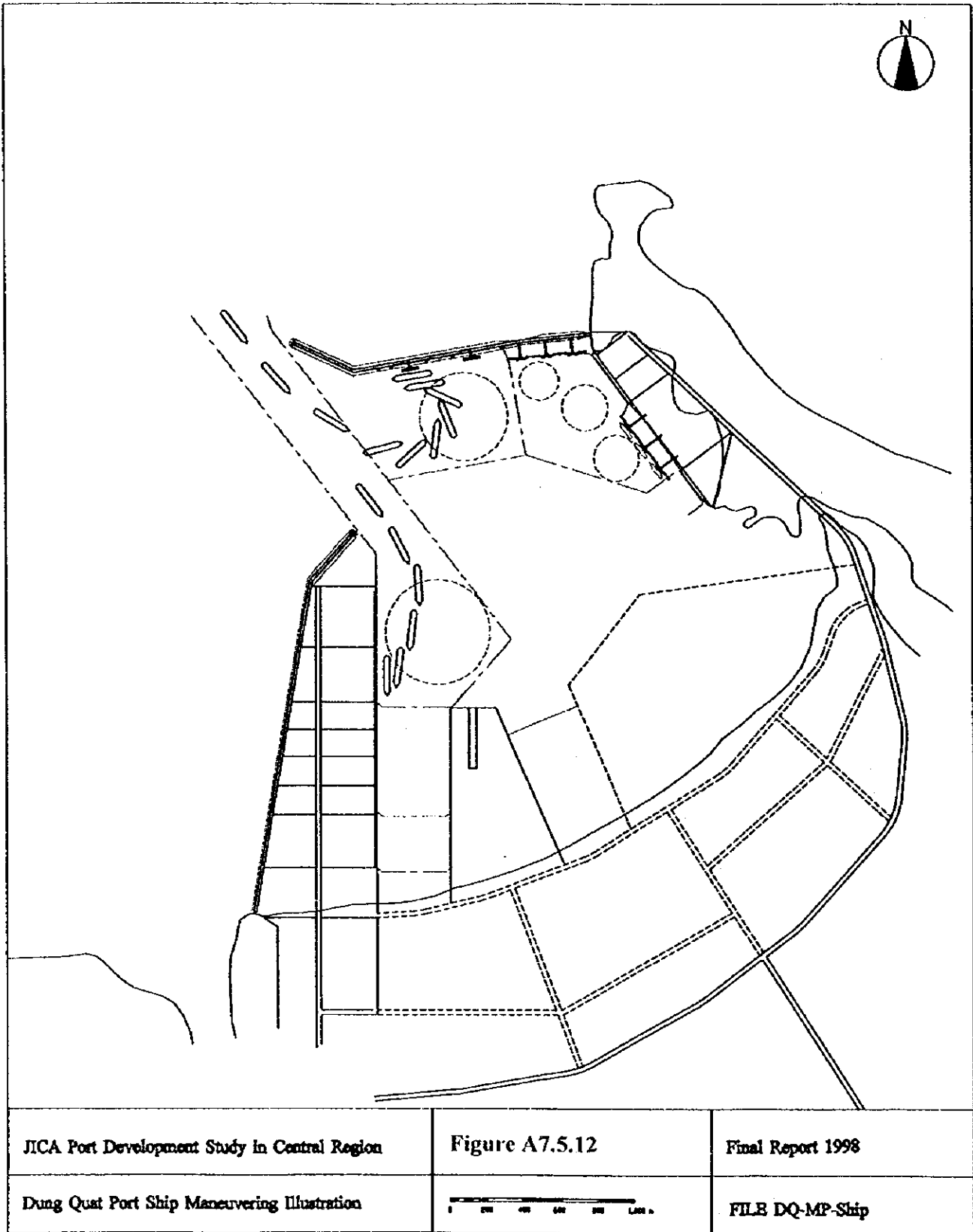
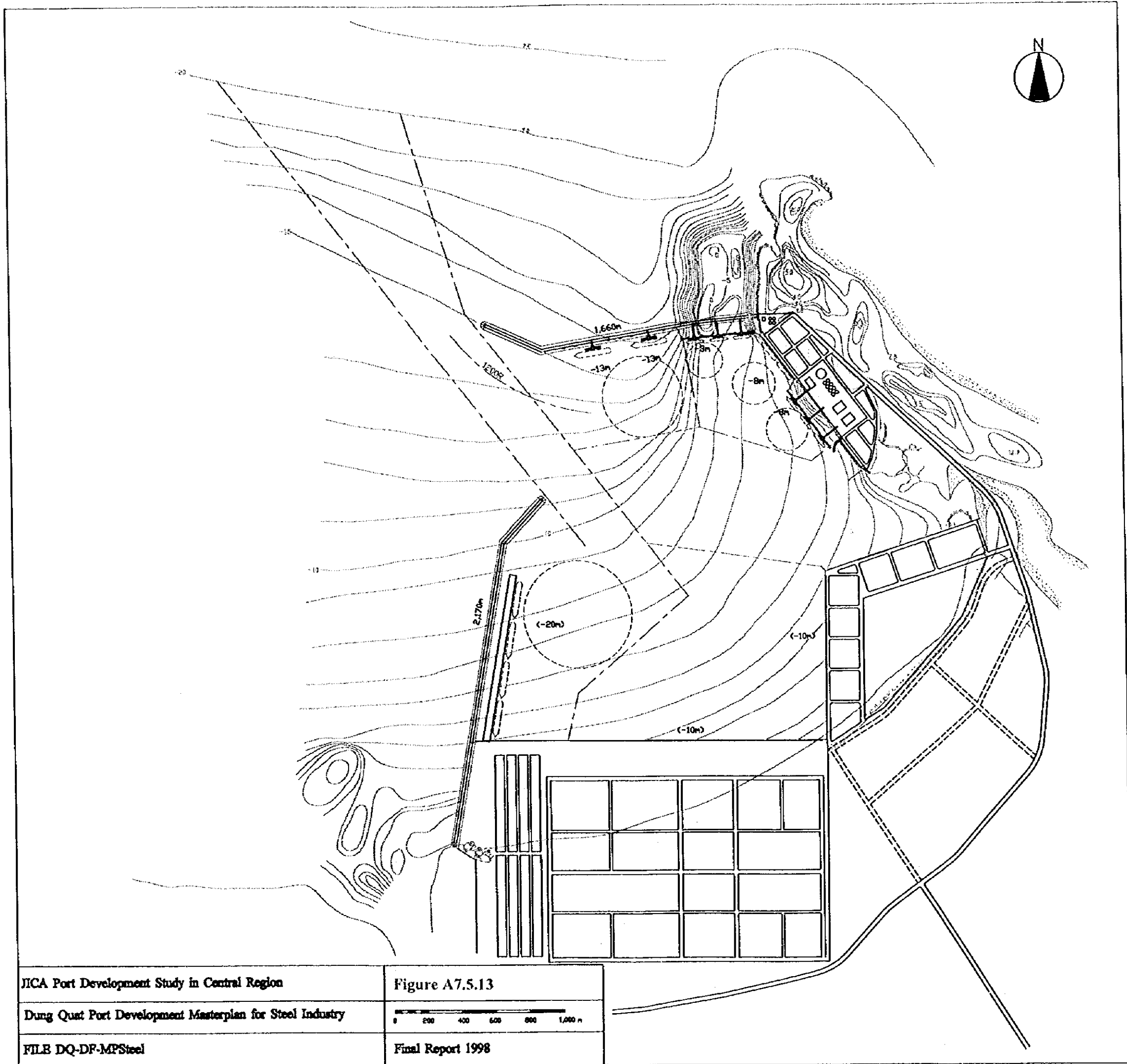


Figure A7.5.11 Wave Diffraction in Harbor (NNE)





JICA Port Development Study in Central Region

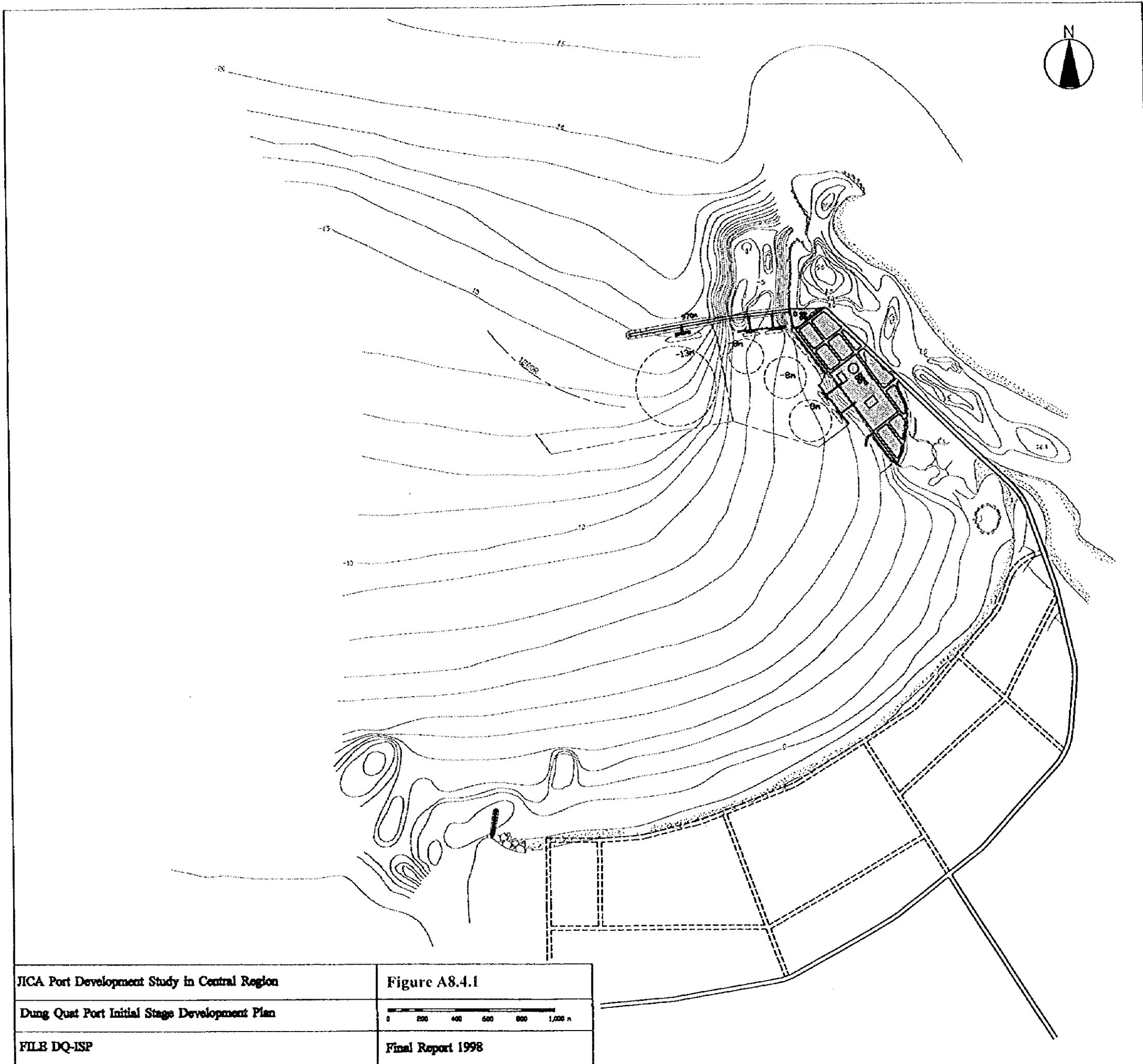
Dung Quat Port Development Masterplan for Steel Industry

FILE DQ-DF-MPSteel

Figure A7.5.13

0 200 400 600 800 1,000 m

Final Report 1998



JICA Port Development Study in Central Region
 Dung Quat Port Initial Stage Development Plan
 FILE DQ-ISP

Figure A8.4.1
 0 200 400 600 800 1,000 m
 Final Report 1998

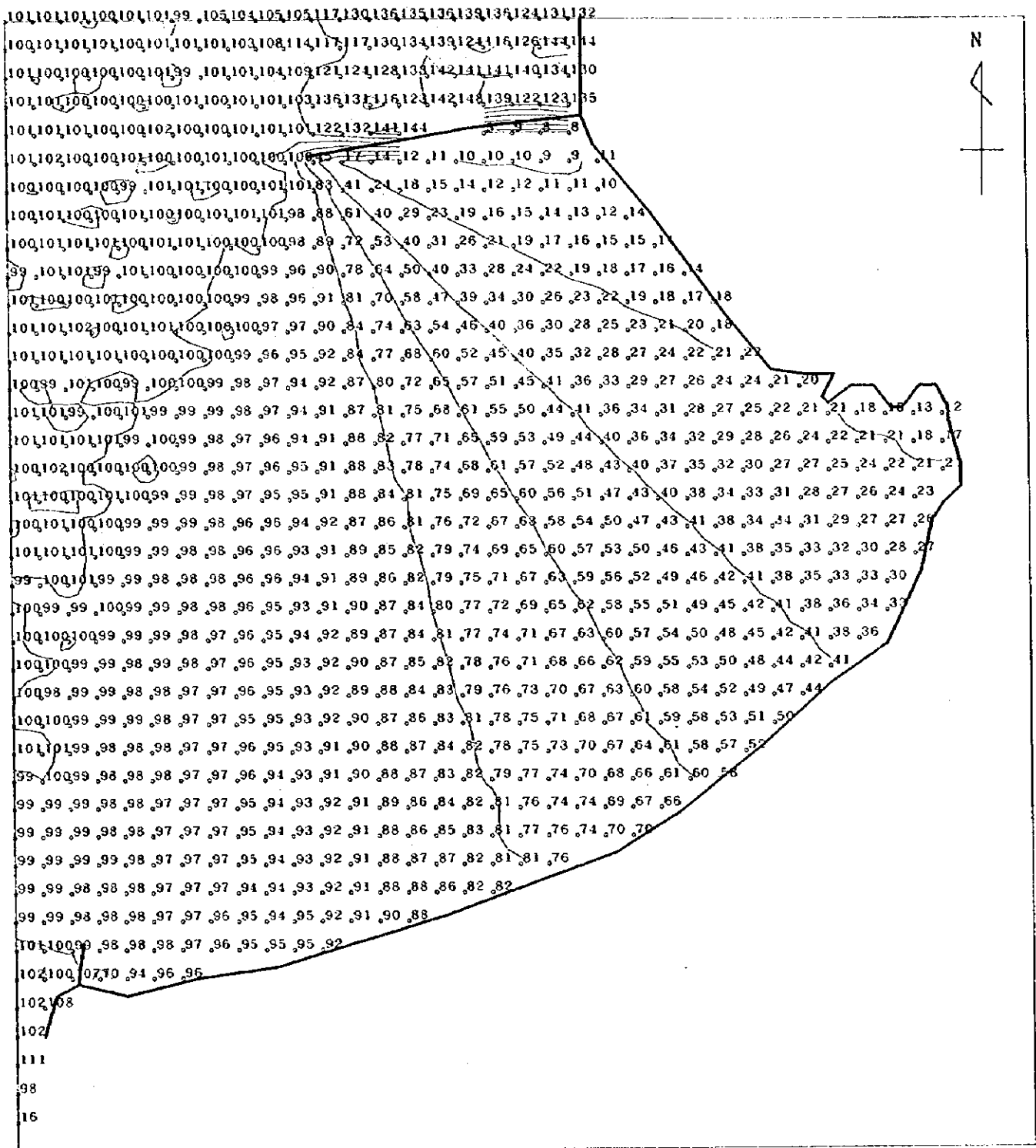


Figure A8.4.2 Wave Diffraction at the Stage of ISP (NNW)

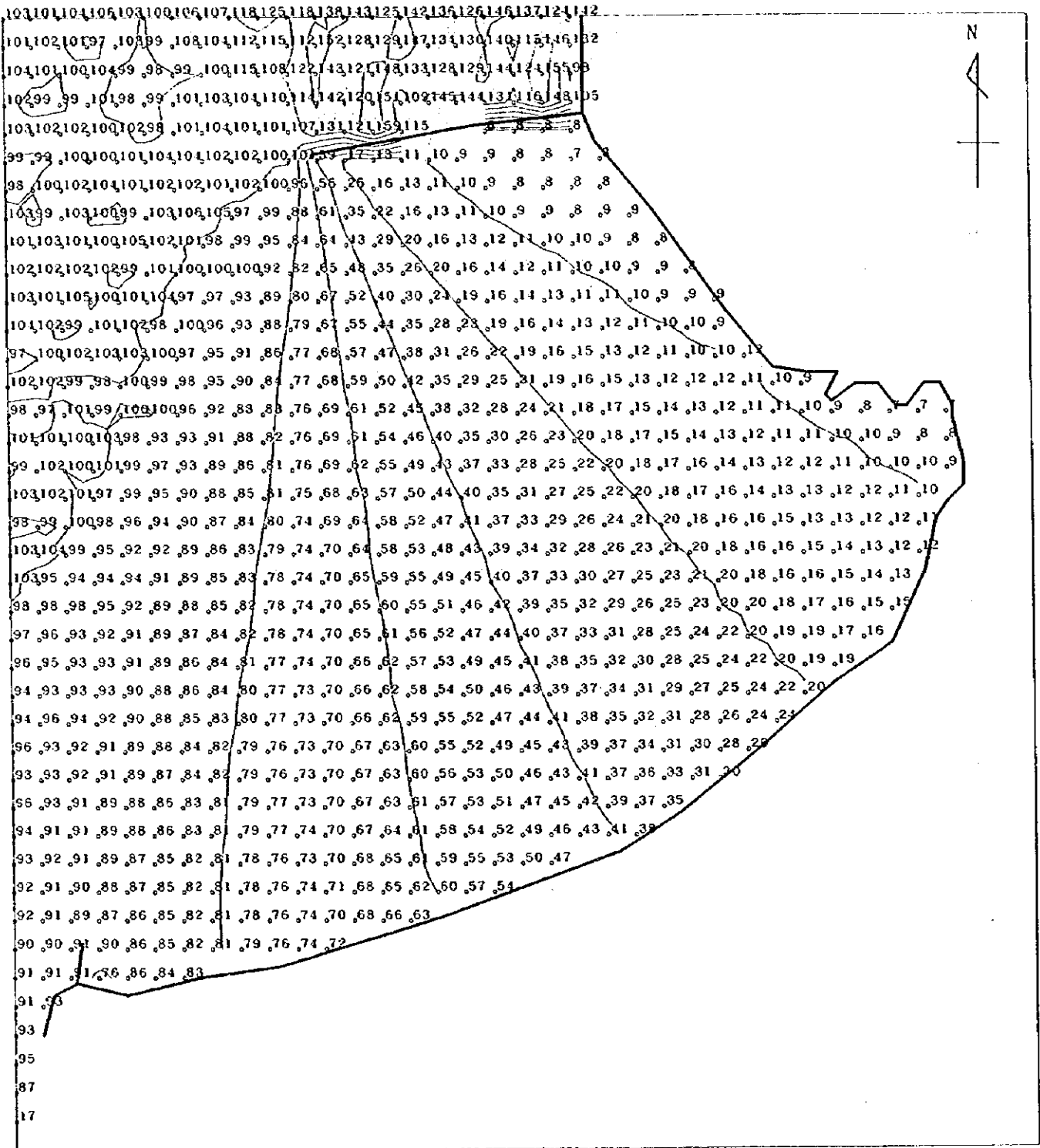


Figure A8.4.3 Wave Diffraction at the Stage of ISP (N)

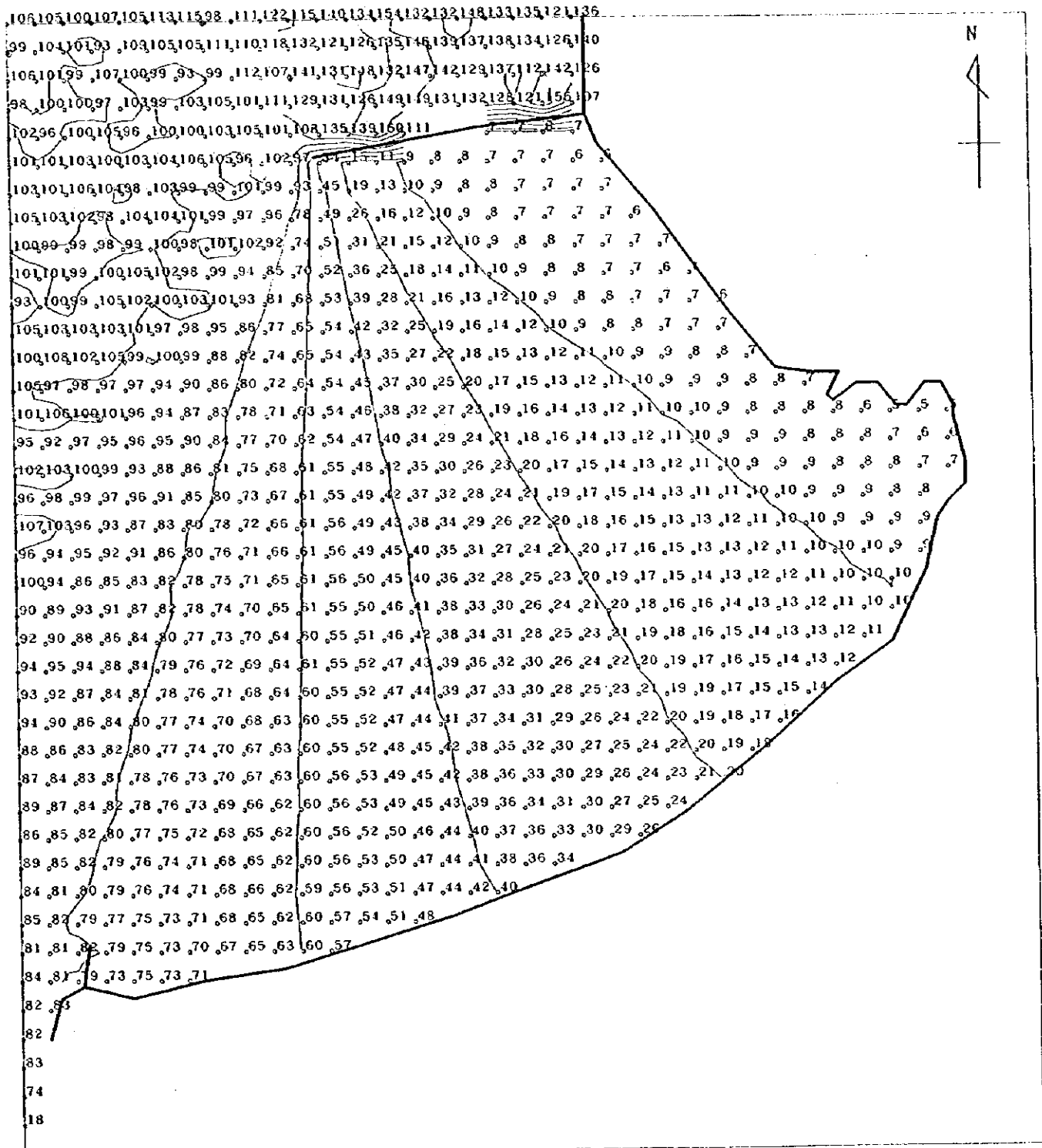


Figure A8.4.4 Wave Diffraction at the Stage of ISP (NNE)

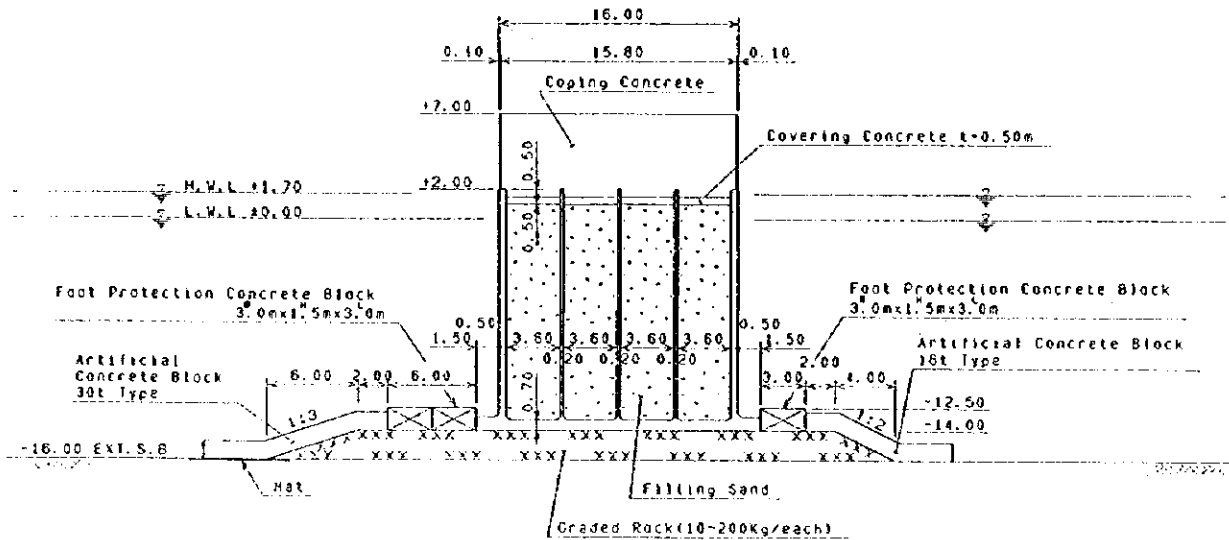


Figure A9.5.1(1) Typical Cross Section of Breakwater 1 (RC Caisson)

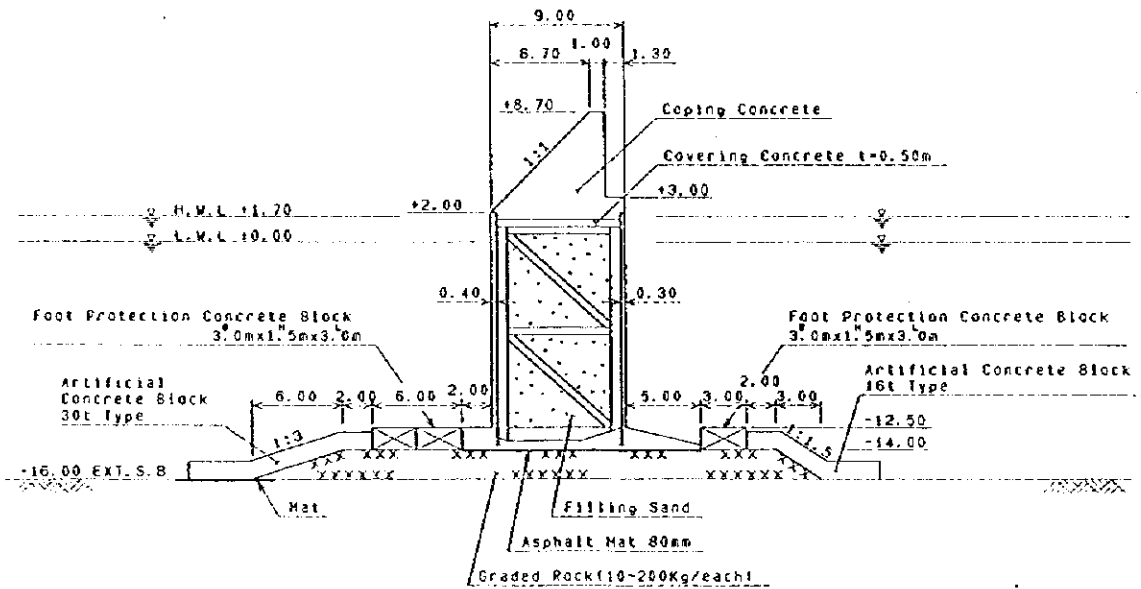


Figure A9.5.1(2) Typical Cross Section of Breakwater 1 (Hybrid Caisson)

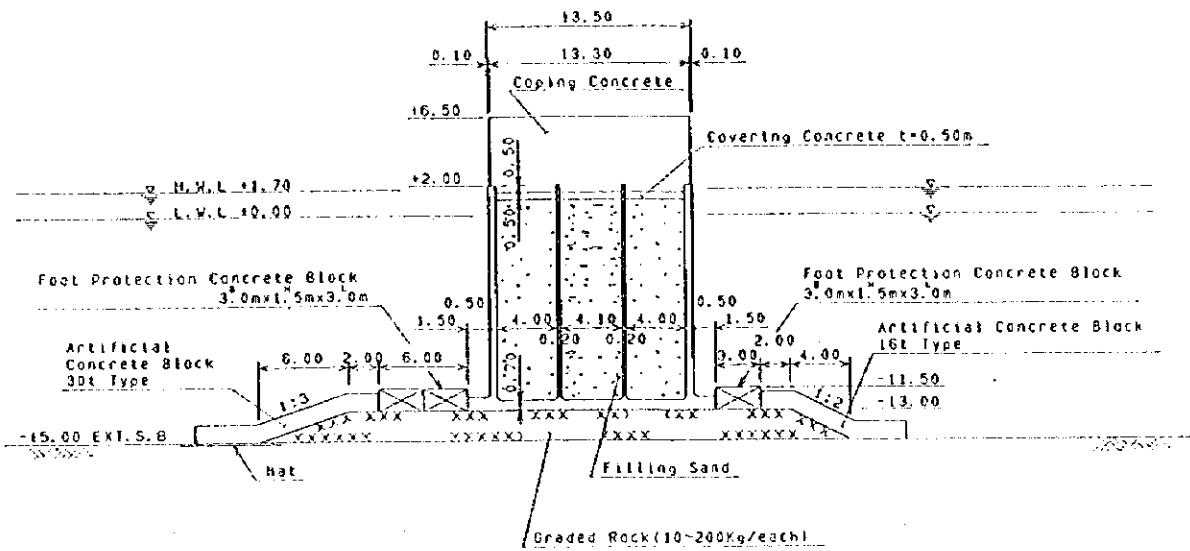


Figure A9.5.1(3) Typical Cross Section of Breakwater 2 (RC Caisson)

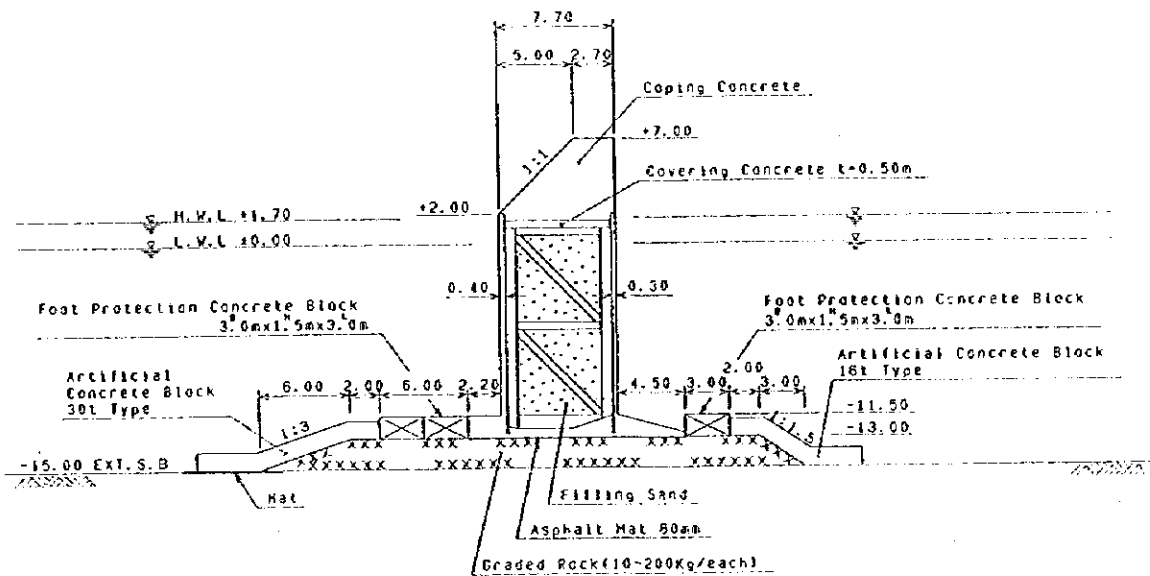


Figure A9.5.1(4) Typical Cross Section of Breakwater 2 (Hybrid Caisson)

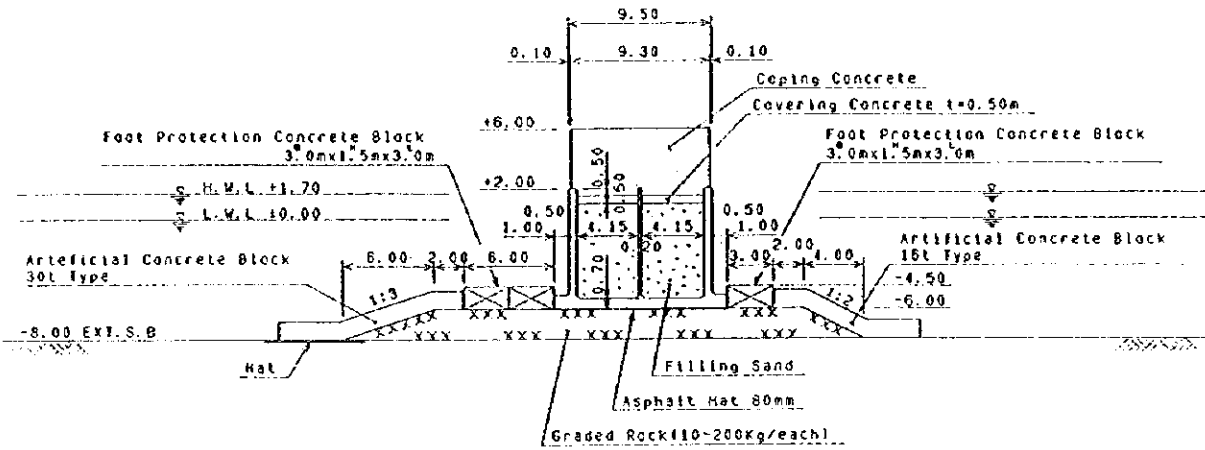


Figure A9.5.1(5) Typical Cross Section of Breakwater 4 (RC Caisson)

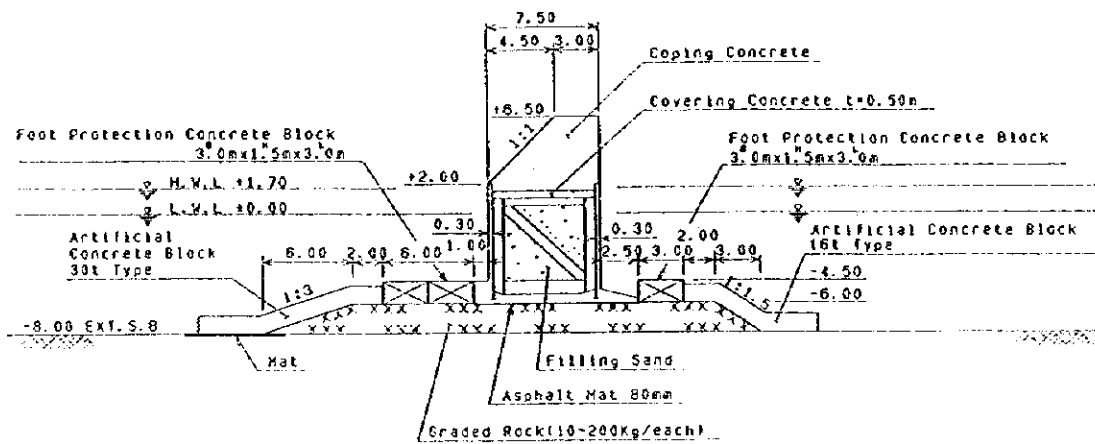


Figure A9.5.1(6) Typical Cross Section of Breakwater 4 (Hybrid Caisson)

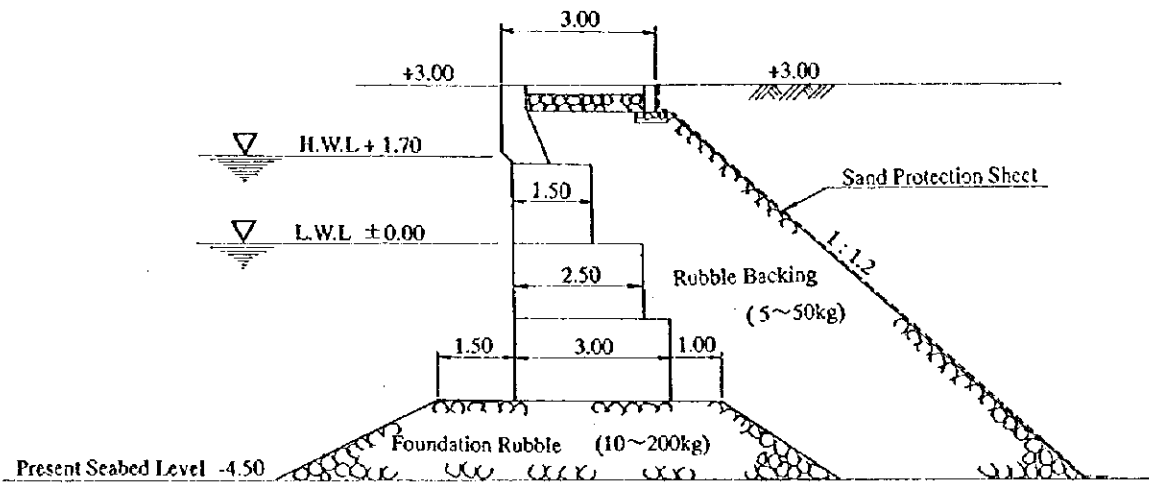


Figure A9.5.2 Typical Cross Section of Revetment (Concrete Block)

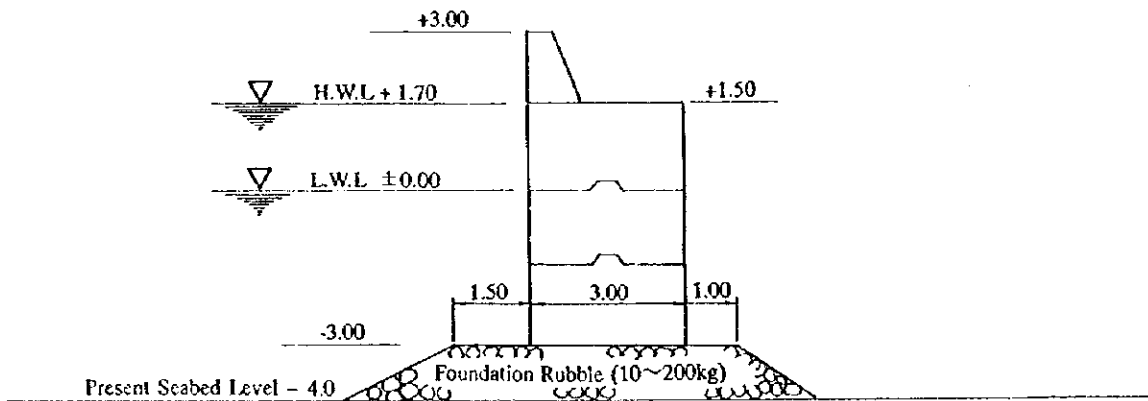


Figure A9.5.3 Typical Cross Section of Inner Breakwater (Concrete Block)

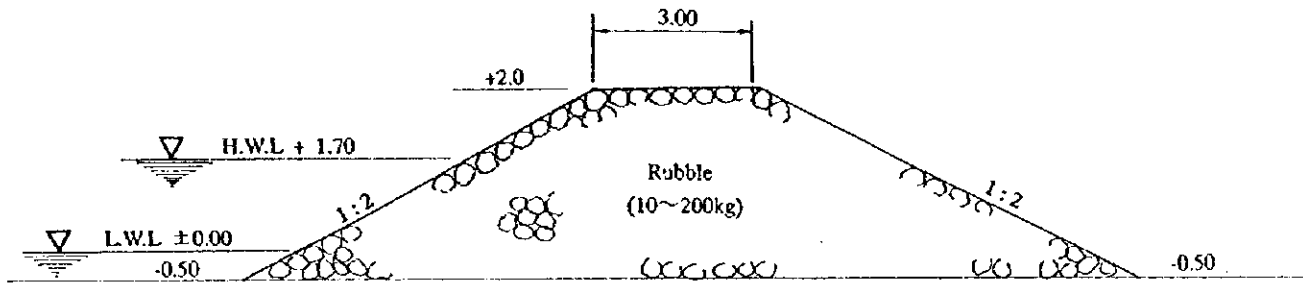


Figure A9.5.4 Typical Cross Section of Training Wall (Rubble Mound)

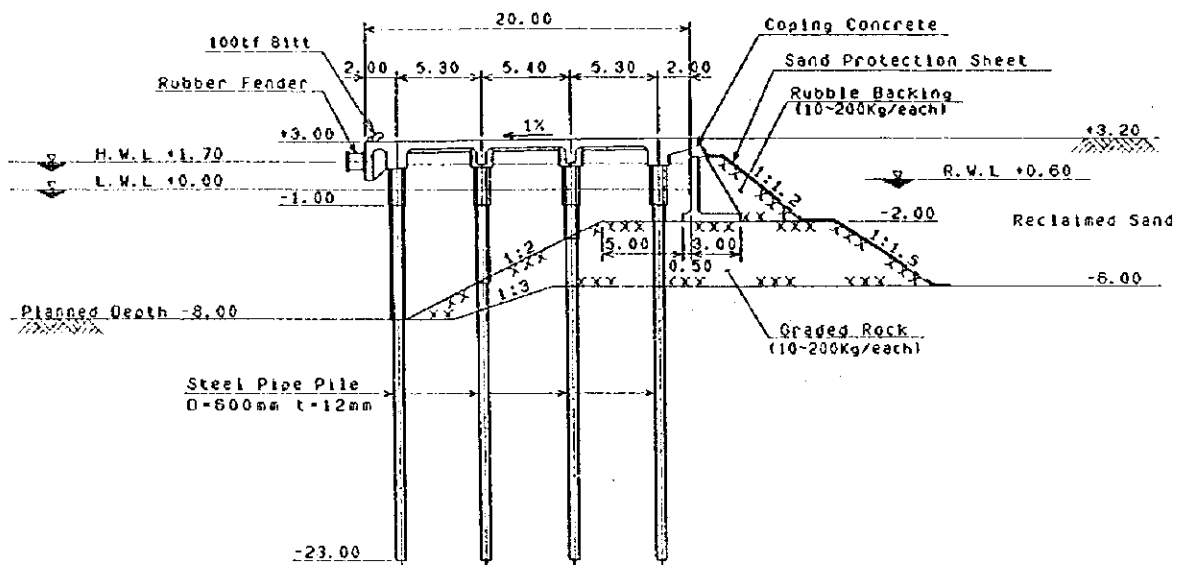


Figure A9.5.5(1) Typical Cross Section of Quaywall E1,E2 (Open Pier with Retaining Wall)

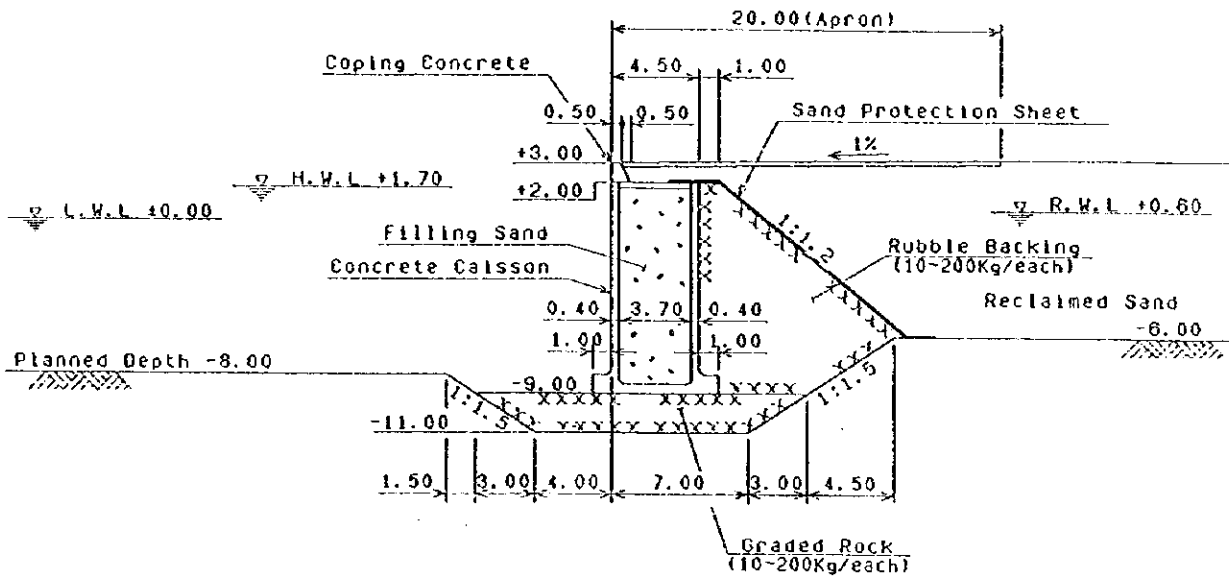


Figure A9.5.5(2) Typical Cross Section of Quaywall E1,E2 (RC Caisson)

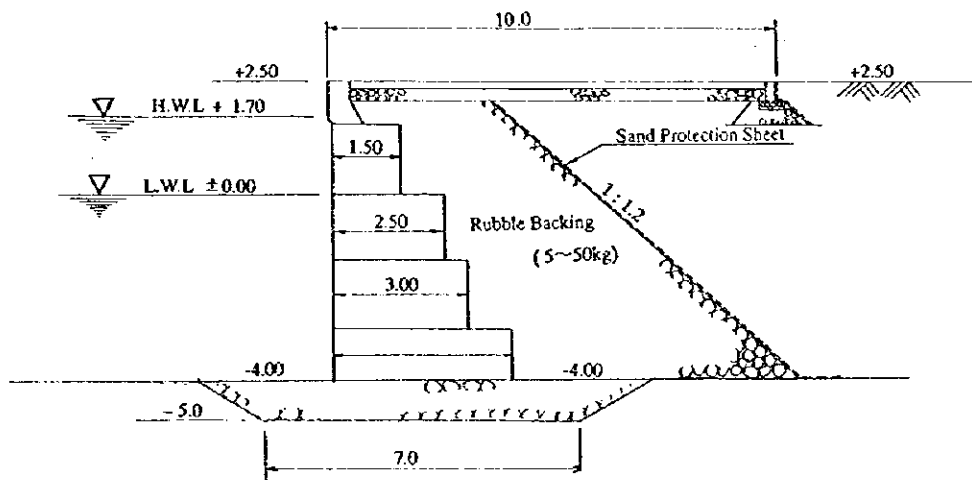


Figure A9.5.5(3) Typical Cross Section of Quaywall (Concrete Block)

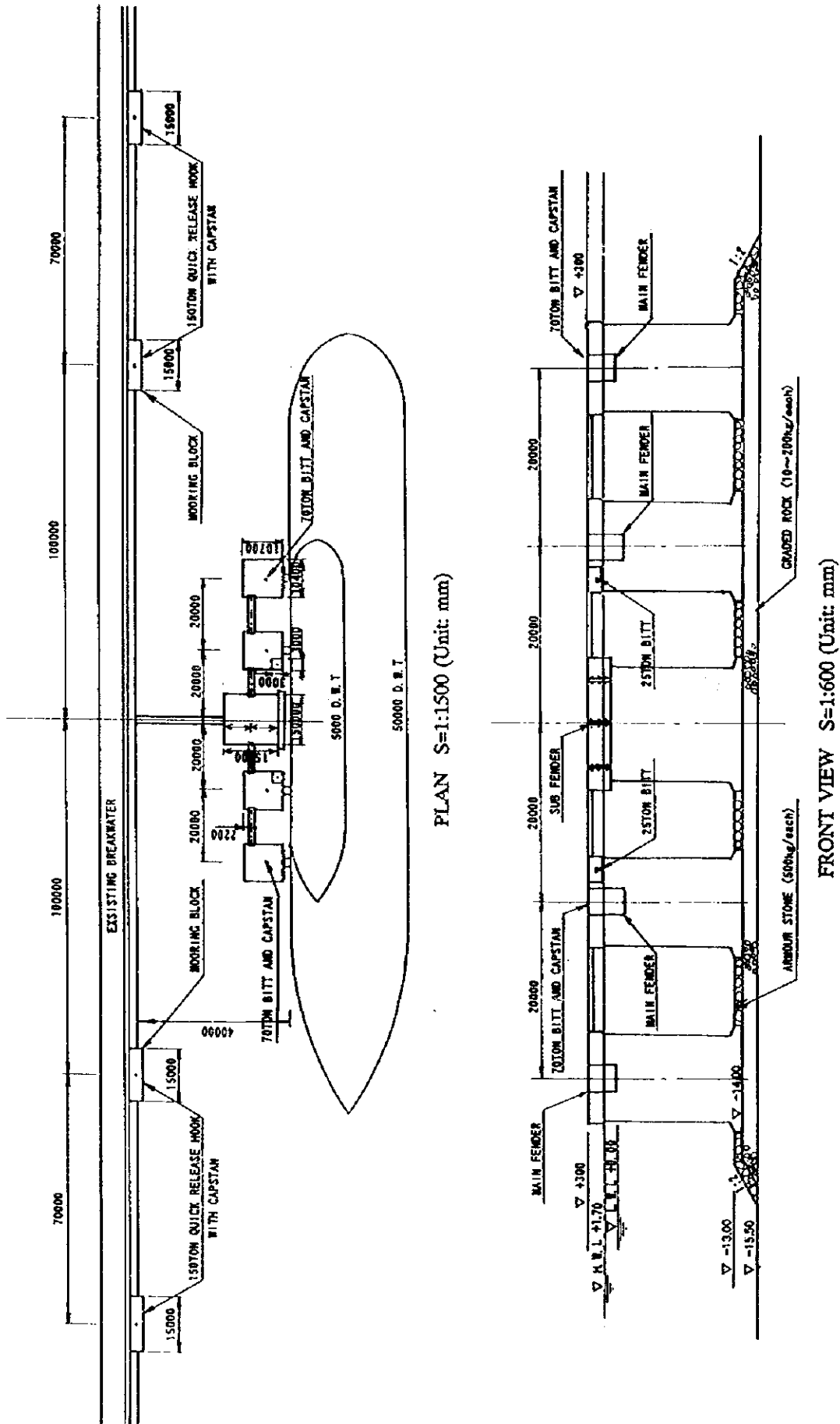


Figure A9.5.6(1) Typical Cross Section of Dolphin D4 (RC Caisson)

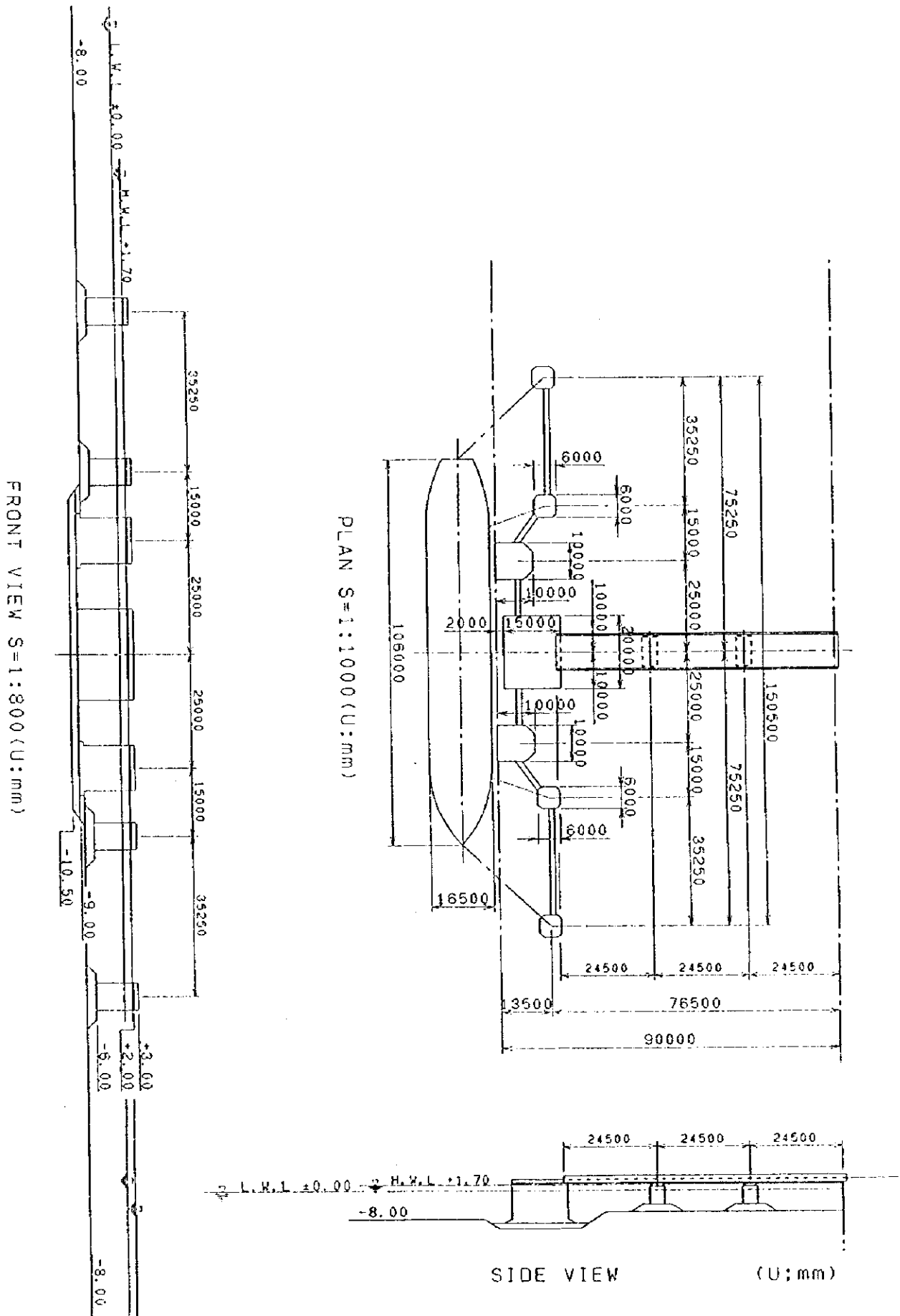


Figure A9.5.6(2) Typical Cross Section of Dolphin D1,D2,E3,E4 (RC Caisson)

PC-BRIDGE

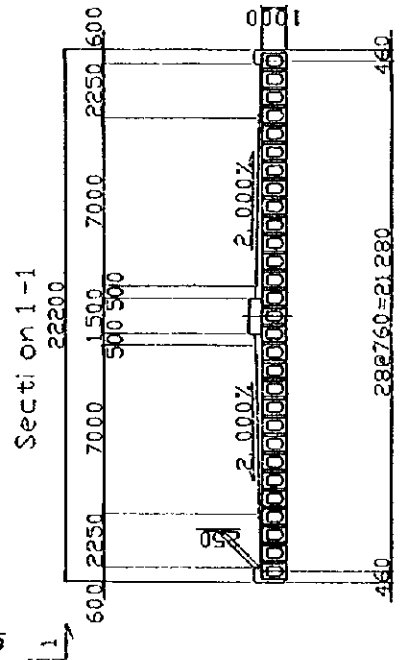
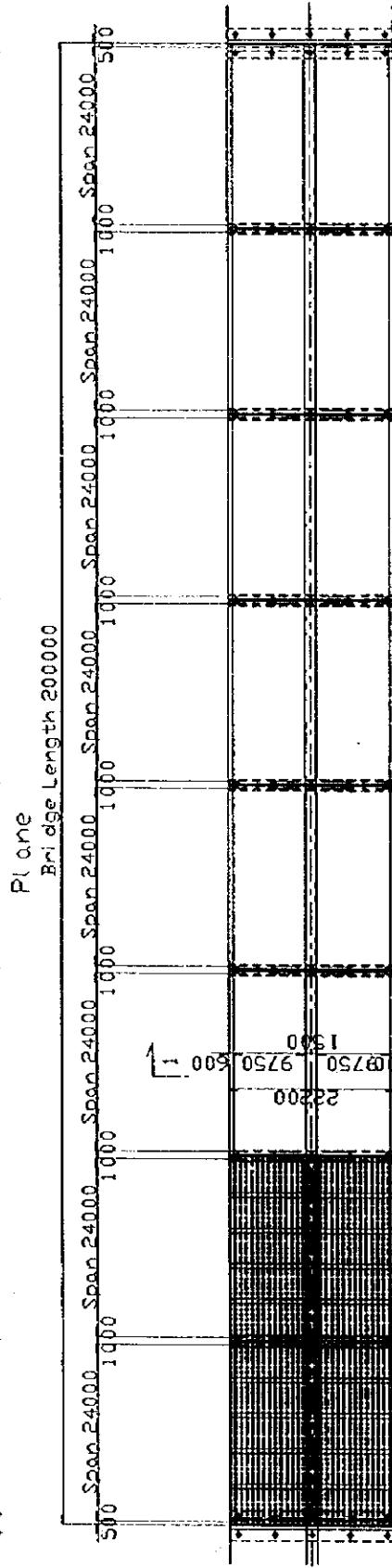
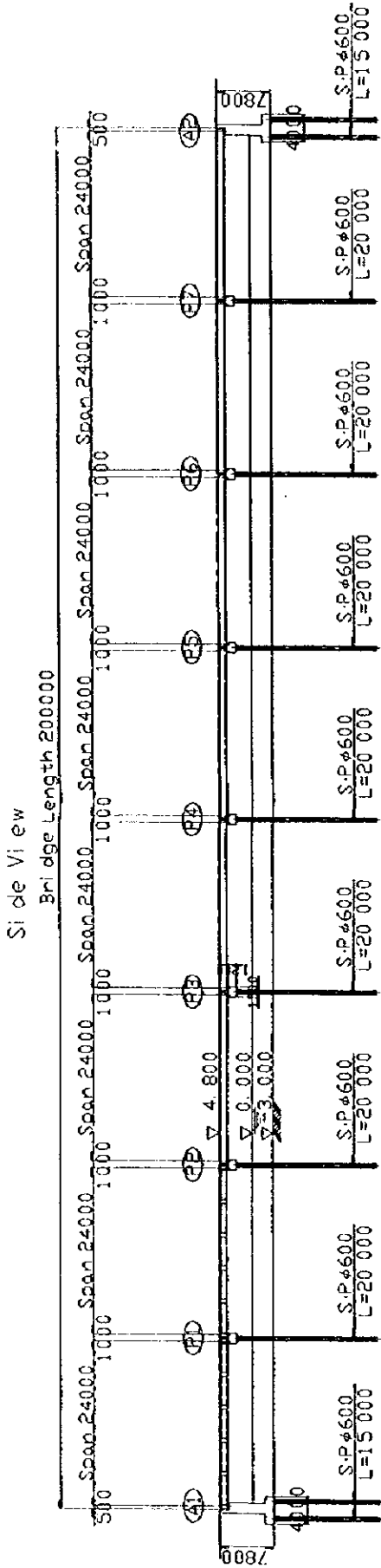


Figure A9.5.7 Typical Cross Section of Bridge (PC Girder)

Table A13.1.1 Port Dues and Charges Tariff

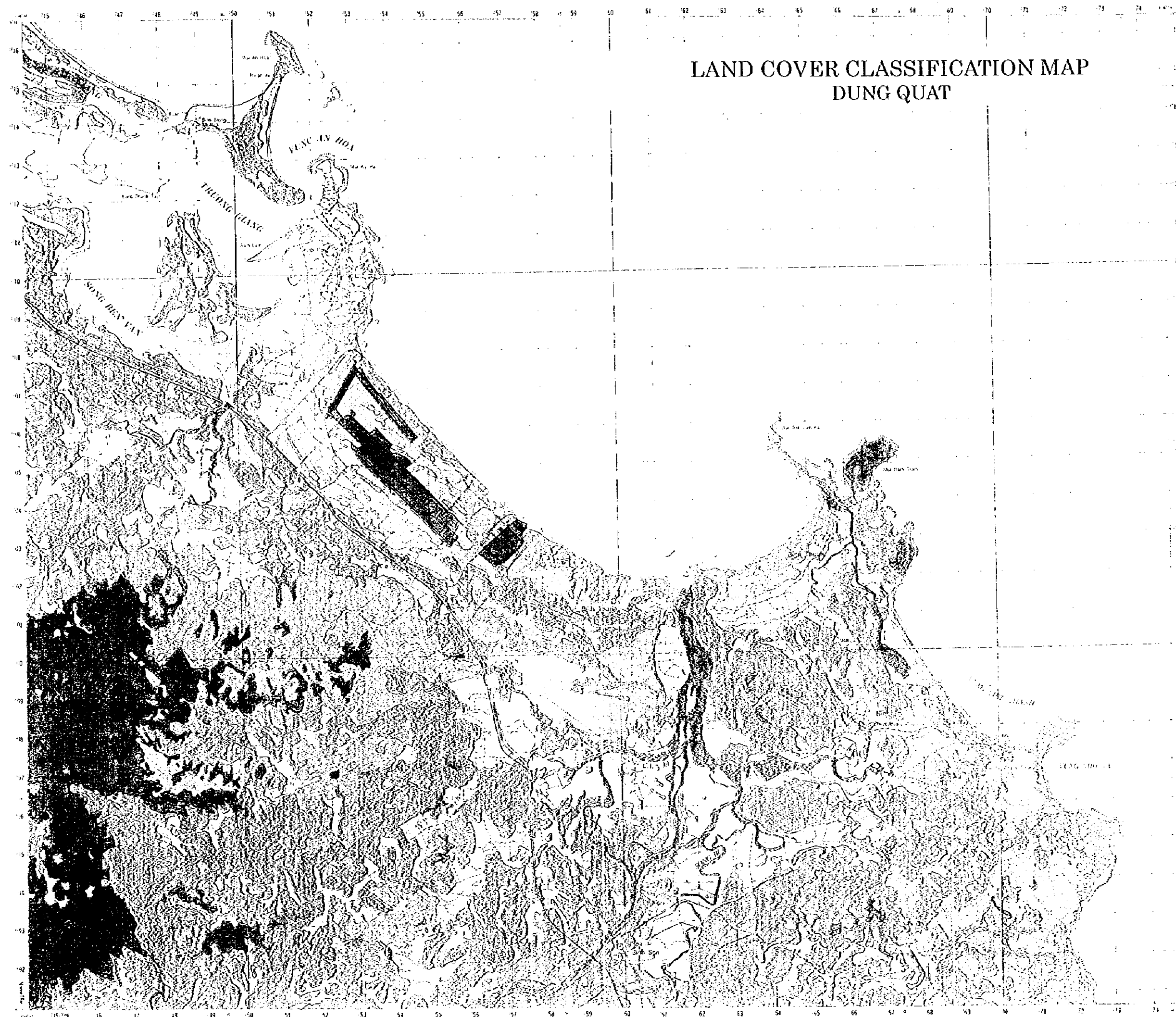
		Port User Charges (Sea Port)									
International or Domestic	Domestic (Unit: VND)					Export/Import (Unit: USD)					
Effective	From May 1, 1998					From January 1, 1998					
Working Time	7:00 - 17:00					7:00 - 17:00					
Overtime Work	5:00 - 7:00 = *1.20 17:00 - 22:00 = *1.20 22:00 - 05:00 = *1.40 Holidays & Sundays (Including night) = *1.50					5:00 - 7:00 = *1.20 17:00 - 22:00 = *1.20 22:00 - 05:00 = *1.40 Holidays & Sundays (Including night) = *1.50					
1. Berthage and Wharfage dues											
(1) On Vessels											
1) Berth	240/GRT/day					0.0035/GRT/hour					
2) Buoy	120/GRT/day					0.0012/GRT/hour					
3) Minimum	100,000/Vessel day (For Sea Going Vessel)										
(2) On Cargoes	At Quay 1,000/ton At Buoy 500/ton					At Quay 0.30/ton At Buoy 0.15/ton					
2. Cargo Handling services	(unit: VND/ton)					(unit: USD/ton)					
(1) Handling at Berth	Ship - Warehouse, Storage area				Ship - Truck, Barge		Ship - Truck Barge			Ship - Warehouse Storage area	
	Cargo Group	Port's Crane	Ship Crane	Port's Crane	Ship Crane	Cargo Group	Ship Crane	Port's Crane	Ship Crane	Port's Crane	
	1	12,070	9,260	9,200	6,070	1	2.00		2.90		
	2	16,270	11,470	12,630	7,830	2	2		3.66		
	3	22,840	15,080	16,510	11,710	3	3.56		4.74		
	4	24,900	16,260	19,660	11,980	4	3.86		5.14		
	5	27,720	20,040	23,300	15,620	5	4.06		5.41		
	6	28,270	20,950	23,640	15,960	6	4.36		5.81		
	7	32,540	24,870	26,970	19,110	7	4.60		6.13		
	8	47,320	37,720	34,500	22,980	8	4.85		6.46		
					9	40/unit 55/unit		50/unit 70/unit 25/unit			
(2) Handling at Buoy	Cargo Group	Loading/Unloading at Buoy				Cargo Group	Loading/Unloading at Buoy				
	1	7,110				1	2.30				
	2	8,950				2	3.08				
	3	12,980				3	4.13				
	4	13,260				4	4.52				
	5	16,240				5	4.78				
	6	17,900				6	5.17				
	7	19,880				7	5.49				
	8	24,700				8	5.81				
						9	45/unit 55/unit				
(3) Warehouse Storage Area ~ Truck, Trailer	Cargo Group	Warehouse, Storage ~ Truck				Cargo Group	Warehouse, Storage ~ Truck				
	1	4,070				1	0.73				
	2	4,590				2	0.90				
	3	5,260				3	1.27				
	4	6,200				4	1.32				
	5	6,340				5	1.47				
	6	6,910				6	1.60				
	7	8,630				7	1.69				
	8	17,620				8	1.79				
						9	30/unit 35/unit				

(4) For Container	20 feet: Empty 42,000/unit (Cargo Group 4) Min. 100,000/unit (Cargo Group 4)		(unit: UDS/UNIT)		
	40 feet: Empty 80,000/unit (Cargo Group 4) Min. 170,000/unit (Cargo Group 8)		ship ~ truck	ship ~ yard, warehouse	yard, warehous ~ truck
	20 feet				
	full	26	50	20	
	empty	16	30	12	
3. Storing Charges	1) 1 - 30 days				
	General		800/d	in warehouse 0.2/ton/d	
	foodstuffs, agricultural prod.		400/d	in open storage 0.1/ton/d	
	Fertilizer, chemical, Cement		600/d	assembled facilities 4.0/pc/d	
	in storage area		500/d	container (unit/d)	
				full	empty
				20'	2.0 1.0
				40'	3.0 1.5
				Reef 20'	22day 1.1/h
				Reef 40'	40day 1.6/h
4. Other Fees (1) Tug Assistant Service Fees	- Tug assistance fees		- Tug assistance fees		
		<500HP	2,500HP/h	<500HP	0.34/HP/hour
		500HP < 1,000	2,000HP/h	500 < 1,000HP	(170+0.26HP)/h
		1,000HP <	1,500HP/h	1,000HP < 1,500	(300+0.15HP)/h
				1,500HP <	(375+0.05HP)/h
(2) Mooring Unmooring	At Berth		At Buoy		
		mooring	unmo.	mooring	unmo.
	< 2,000	60,000	50,000	110,000	70,000
	2,000 < 4,000	70,000	60,000	140,000	100,000
	4,000 < 6,000	85,000	75,000	160,000	130,000
	6,000 <	150,000	140,000	170,000	165,000
(3) Tallying	Bulk cargo : 500/ton		General and Bulk Cargo : 0.35/ton		
	General cargo : 1,500/ton		Container : 1/unit		
	Cars and Container : 10,000/unit				
(4) Others	At Quay		At Buoy		
	1) Dumping service	200,000/time		1) Dumping service	20/vessel 50/vessel
	2) Supplying water	15,000/m ³	22,000/m ³	2) Supplying water	2.5/m ³ 3.5/m ³

		Port Entry Dues (SEAPORT)	
INTERNATIONAL or DOMESTIC		DOMESTIC (UNIT: VND)	EXPORT/IMPORT (UNIT: USD)
Effective		from January 1, 1998	from January 1, 1998
(1) Tonnage Dues	1) Entrance	200/GRT	0.10/GRT
	2) Exit	200/GRT	0.10/GRT
(2) Navigational Maintenance Dues	1) Entrance	< 2,000GRT: 200/GRT	- Conventional Vescel
	2) Exit	- 2,000GRT <: 400/GRT - < 2,000GRT: 200GRT - 2,000 GRT <: 400GRT	Entrance 0.209/GRT Leaving 0.209/GRT
(3) Clearance Fees	Entrance & Exit	< 200GRT : 30,000	< 600 GRT = 20/trip
		200 - 1,000GRT : 50,000	600 < 1,000 GRT = 50/trip
		1,000 - 5,000 : 100,000	1,000 GRT = 100/trip
		5,000GRT : 200,000	
(4) Pilotage Dues	Entrance	15/GRT/sea mile	0.0032/GRT/sea mile
	Exit	15/GRT/sea mile	0.0032/GRT/sea mile
	Minimum	Ent, Exit : 150,000 Intra - port: 100,000	100/vessel

Source: Danang Port

LAND COVER CLASSIFICATION MAP DUNG QUAT



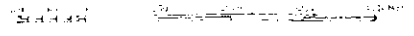
LEGEND	
	Dense Forest
	Clear Forest
	Rice, Grassland
	Farmland, Village
	Paddy Field, Swamp
	Urban Area
	Water Body
	Bare Ground

This map was completed in May 1997, based on the interpretation of SPOT satellite data in the following table:

Scene No.	Date of Data Collection
SPOT 247	1997-05-19
SPOT 248	1997-05-29

CONTOUR INTERVAL - 20 METERS
SUPPLEMENTARY CONTOURS 10 METERS

SPHEROID: Everest
 GRID: UTM METER/MZONE19
 PROJECTION: TRANSVERSE MERCATOR
 VERTICAL DATUM: MEAN SEA LEVEL AT HATON



JAPAN INTERNATIONAL COOPERATION AGENCY
 Overseas Coastal Area Developmental Institute of Japan
 Japan Port Consultants, Ltd
 (May, 1997)



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