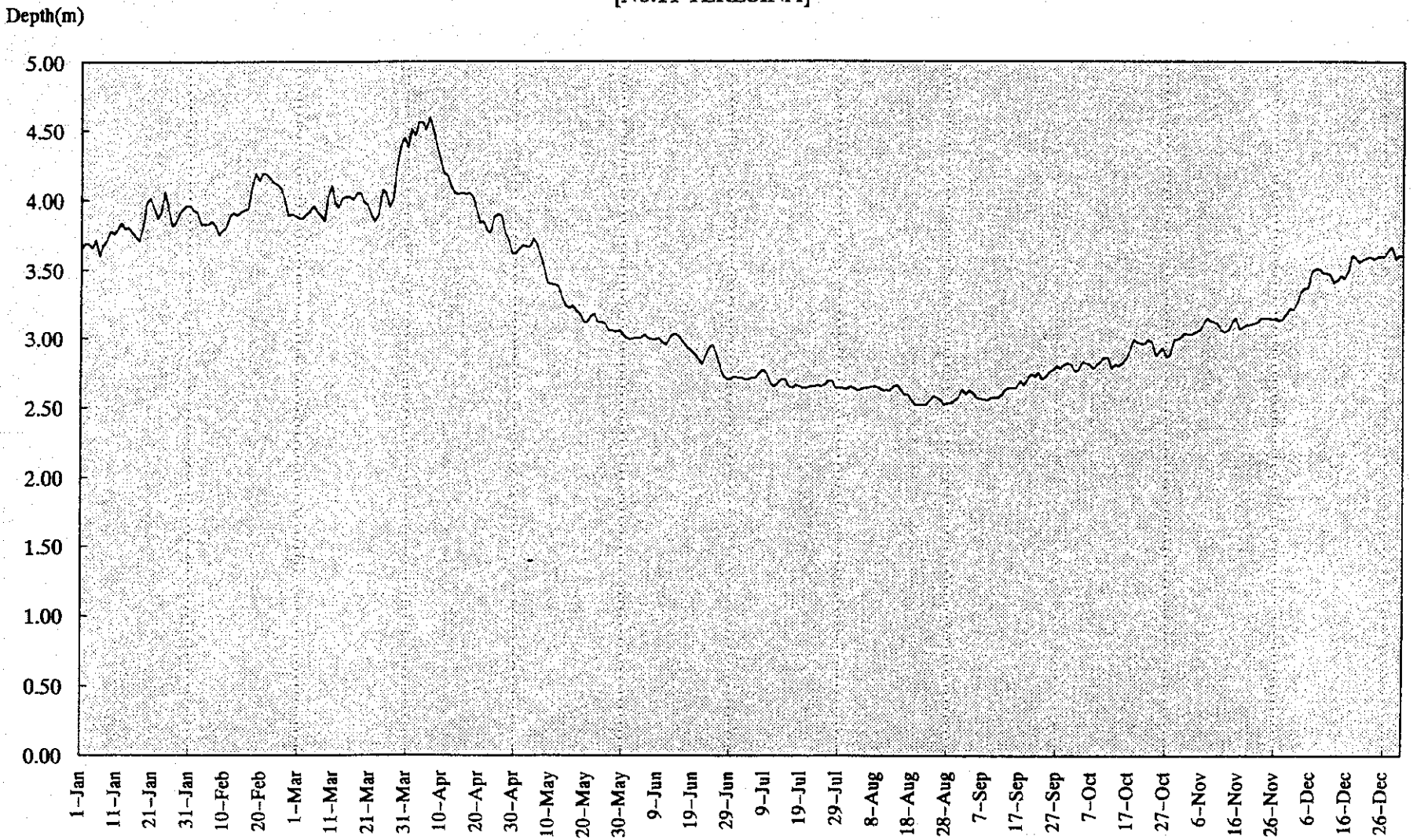
Parnaiba River Depth Data

[No.11 TERESINA]

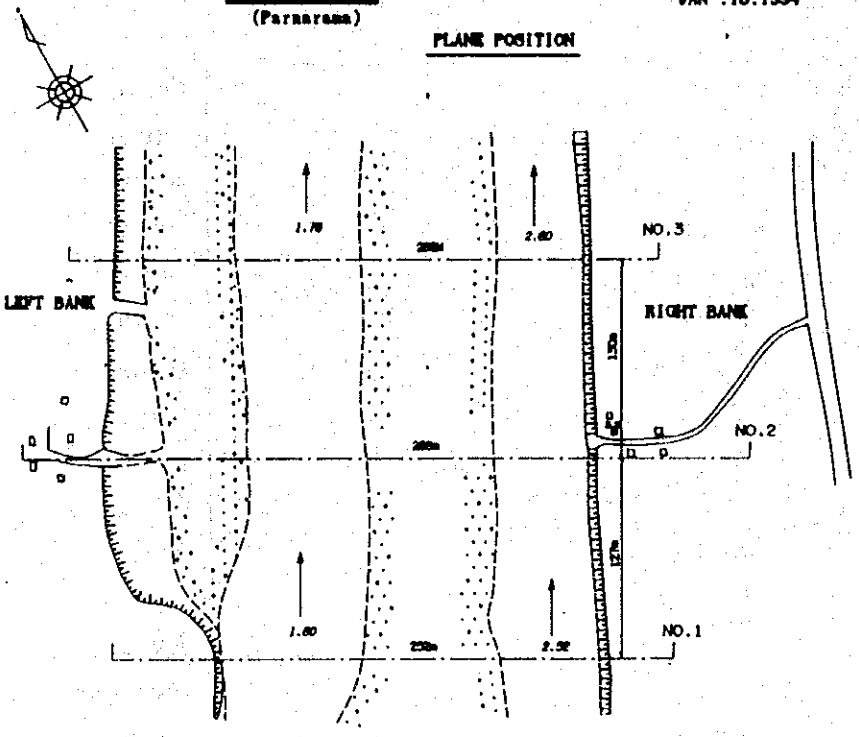


NO.12

(Panarama)

JAN .18.1994

PLANE POSITION



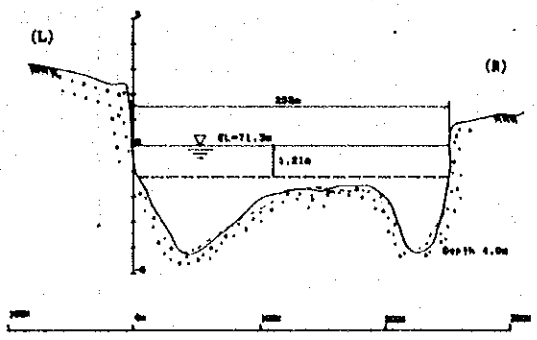
Legend : Survey Date

—— : Jan–Mar. 1994

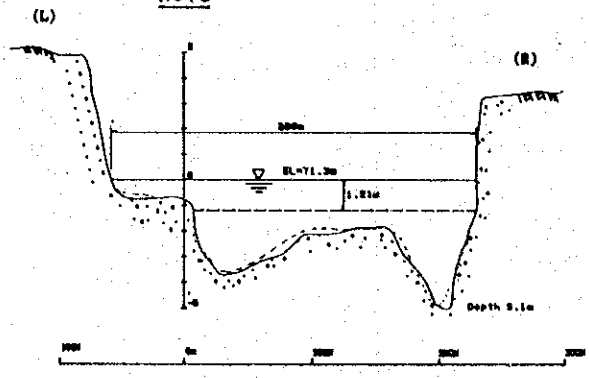
- - - - - : Jun–Aug. 1993

CROSS SECTION

NO.1

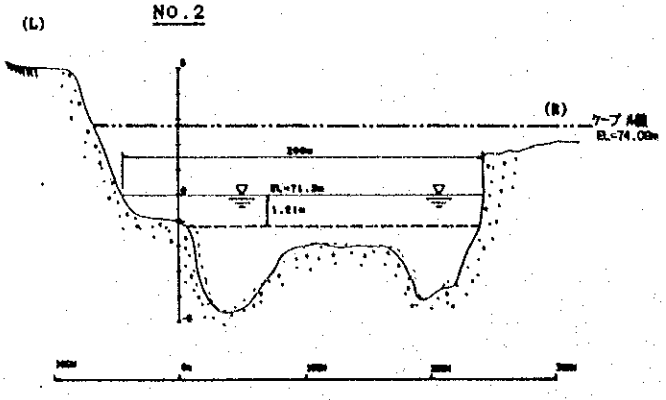


NO.3



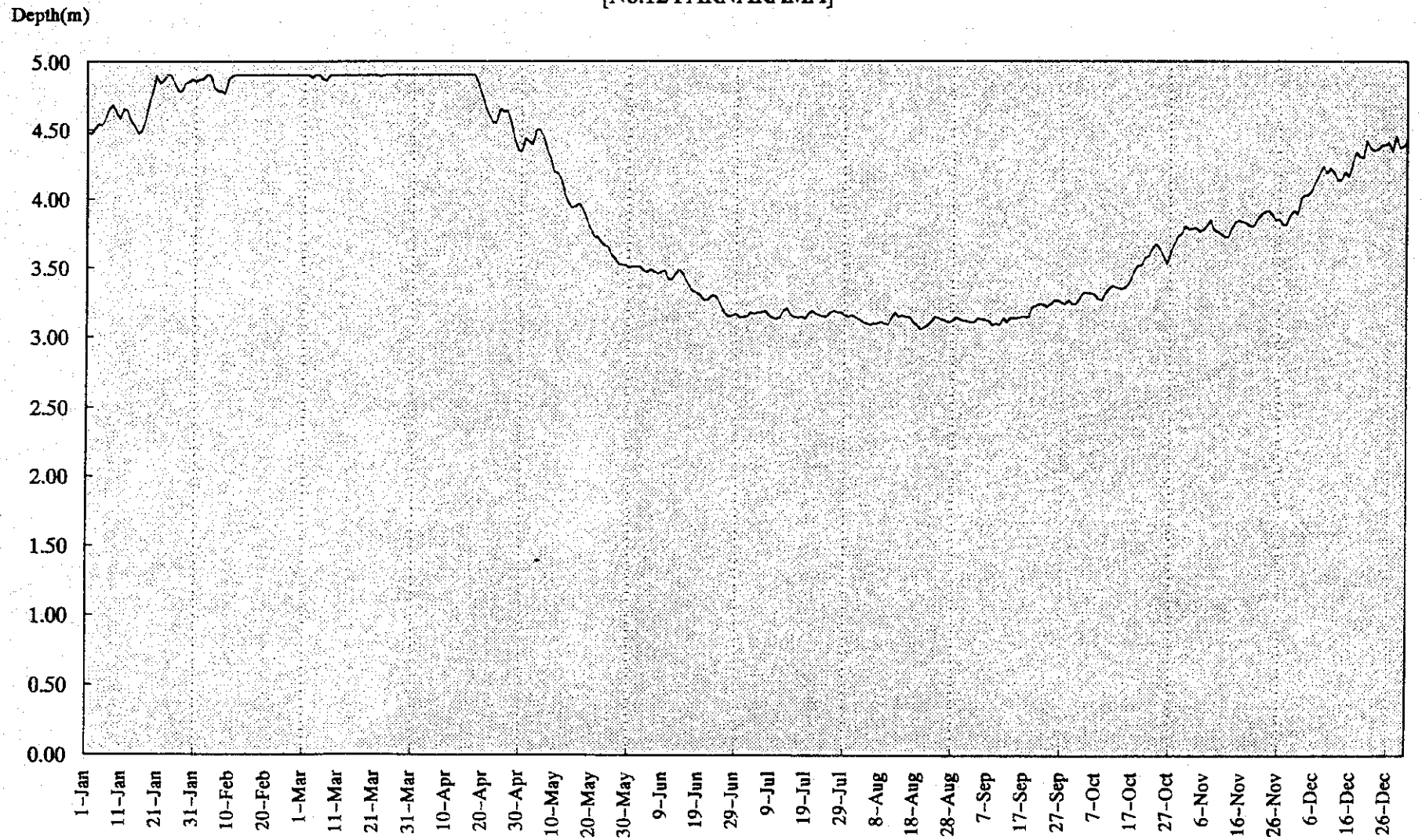
: Water Level

NO.2



Parnaiba River Depth Data

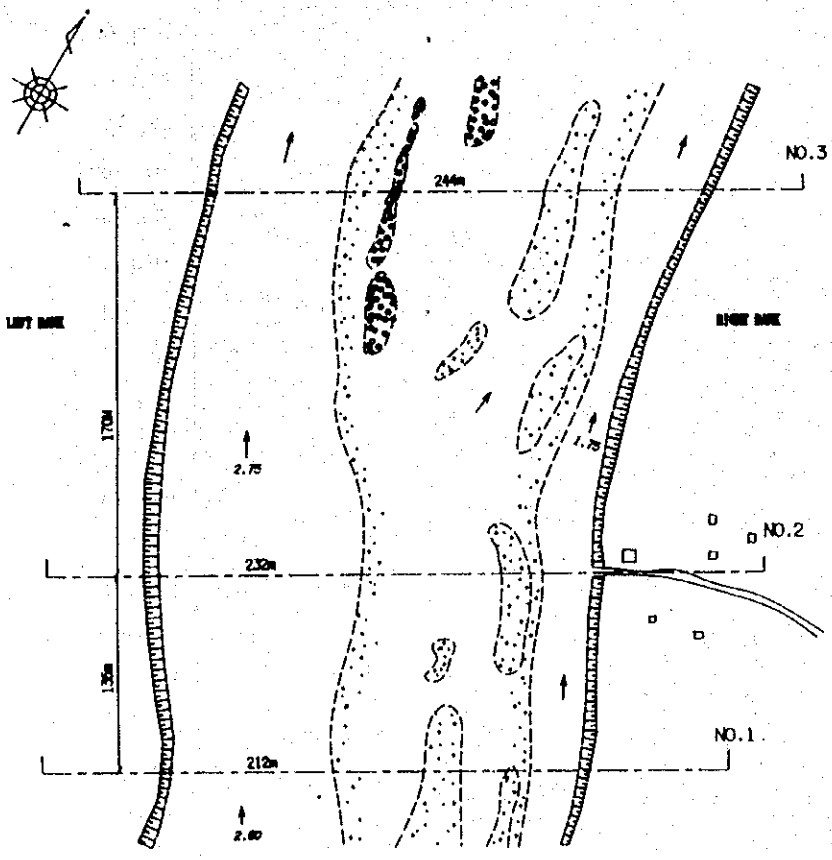
[No.12 PARNARAMA]



NO.13
(Palmeirais)

JAN .21.1994

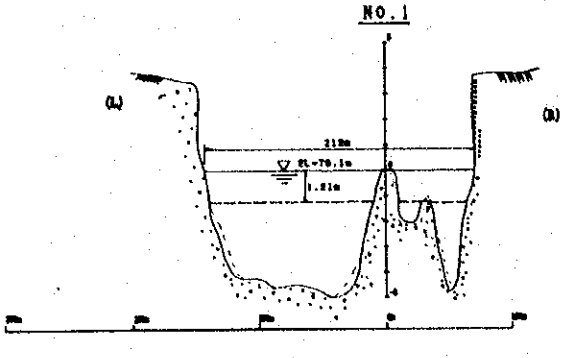
PLANE POSITION



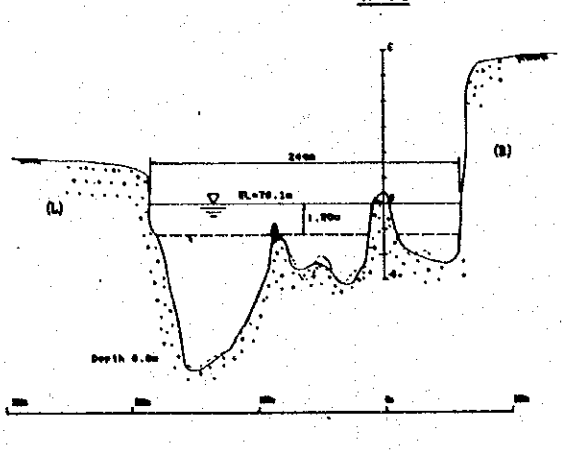
Legend : Survey Date
—— : Jan–Mar. 1994
----- : Jun–Aug. 1993

CROSS SECTION

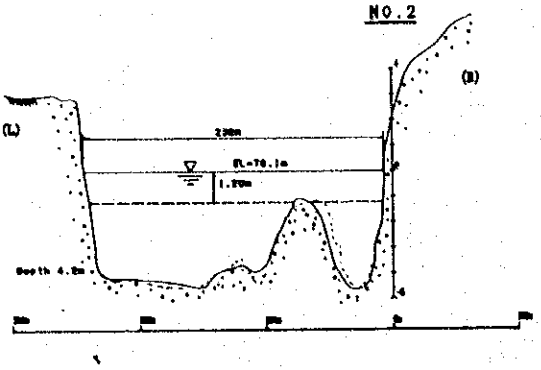
NO.1



NO.3

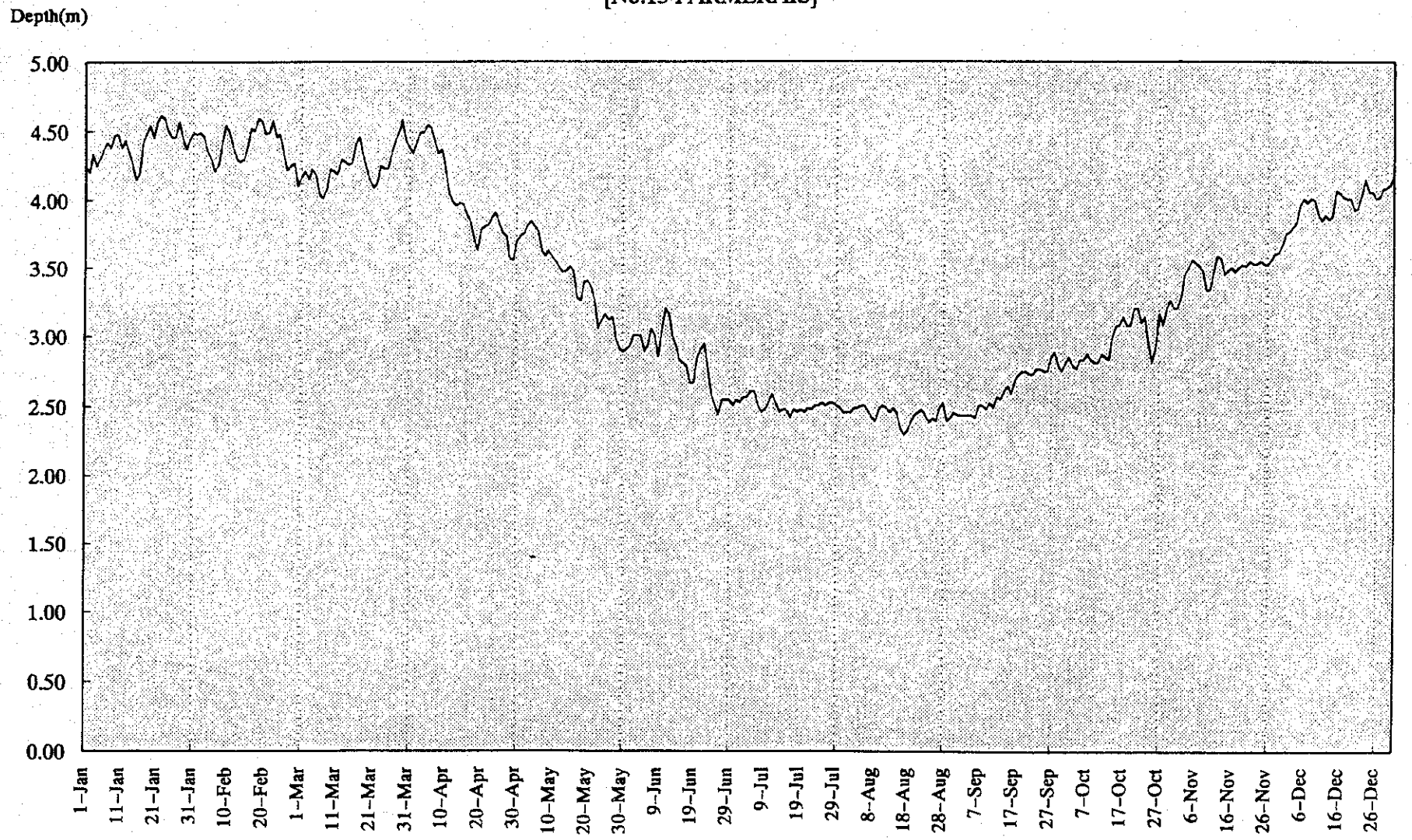


NO.2



: Water Level

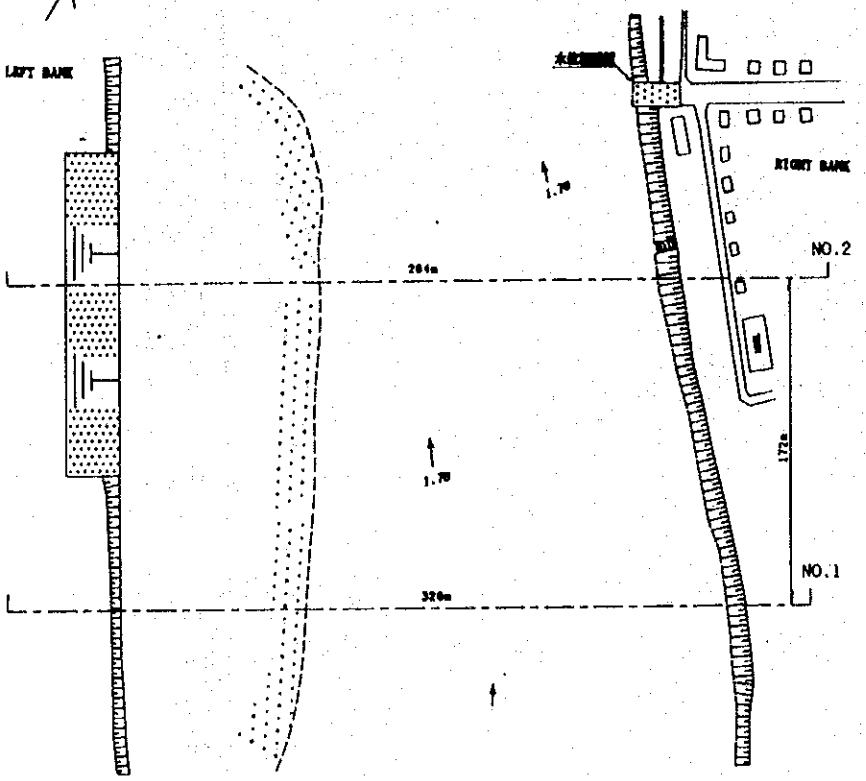
Parnaiba River Depth Data
[No.13 PARMERAIS]



NO . 14
(Amaranto)

JAN .26.1994

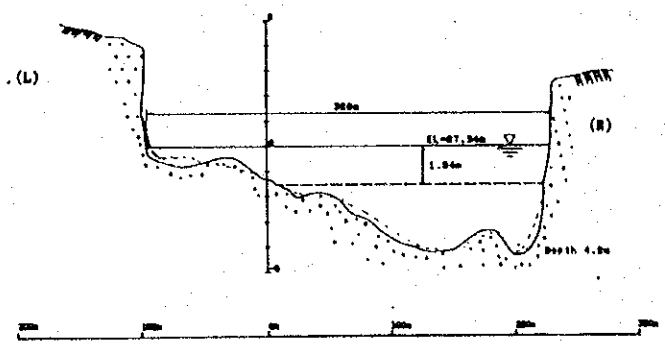
PLANE POSITION



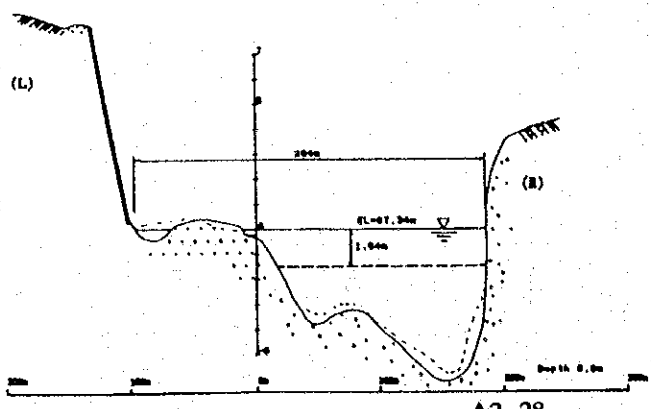
CROSS SECTION

Legend : Survey Date
—— : Jan–Mar. 1994
- - - - - : Jun–Aug. 1993

NO . 1



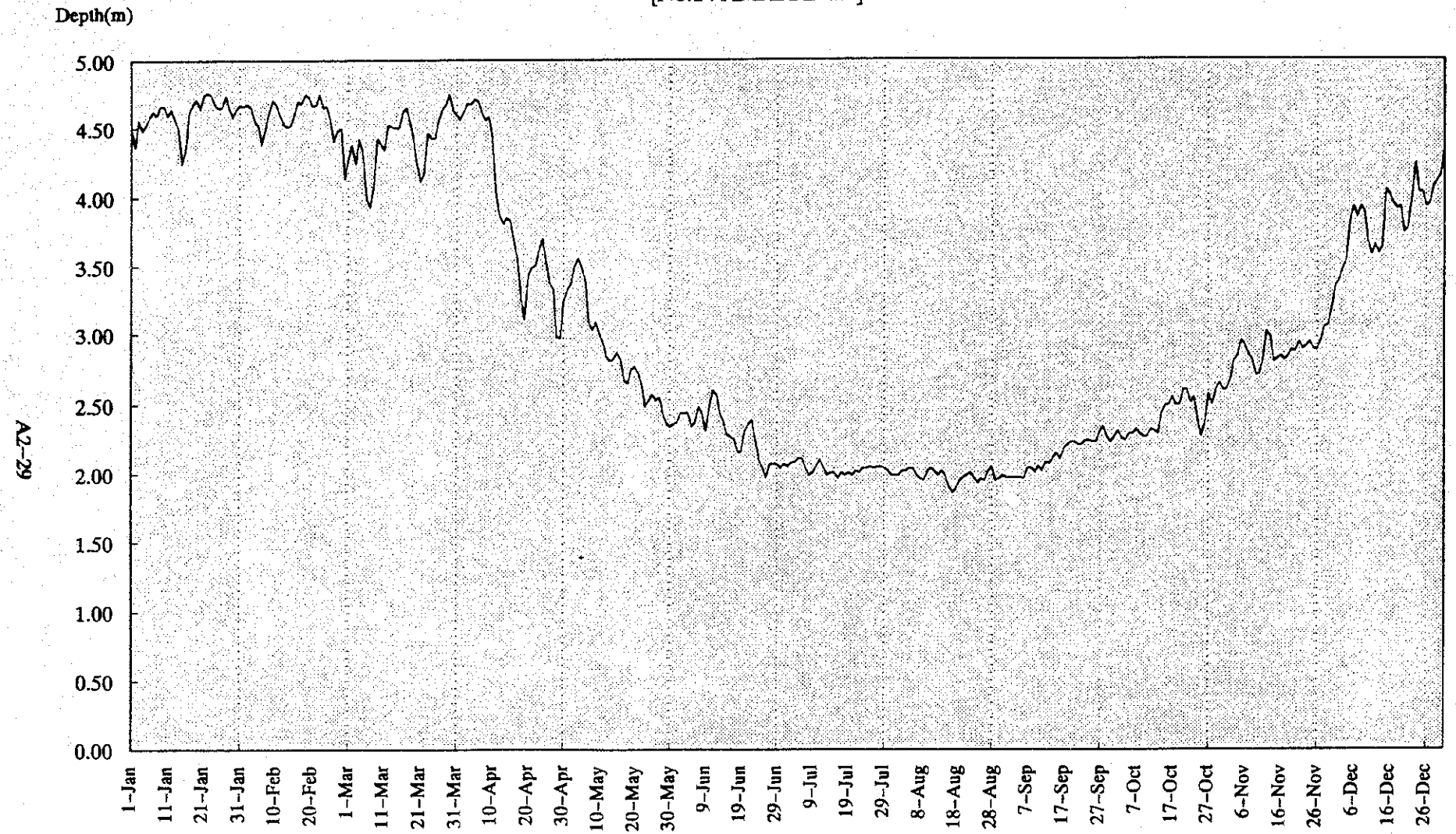
NO . 2



: Water Level

Parnaiba River Depth Data

[No.14 AMARANTE]

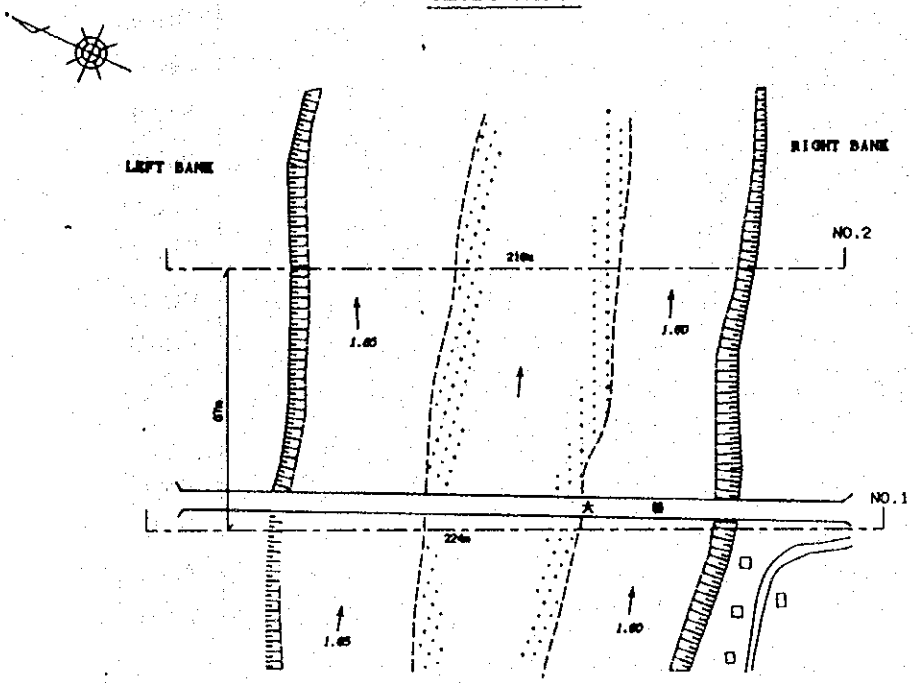


A2-29

NO.15
(Florano)

JAN .27.1994

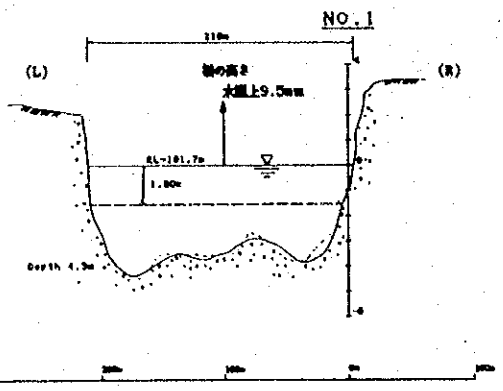
PLANE POSITION



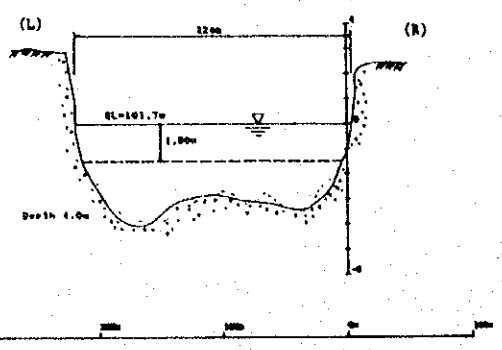
CROSS SECTION

Legend : Survey Date
—— : Jan–Mar. 1994
- - - - - : Jun–Aug. 1993

NO.1



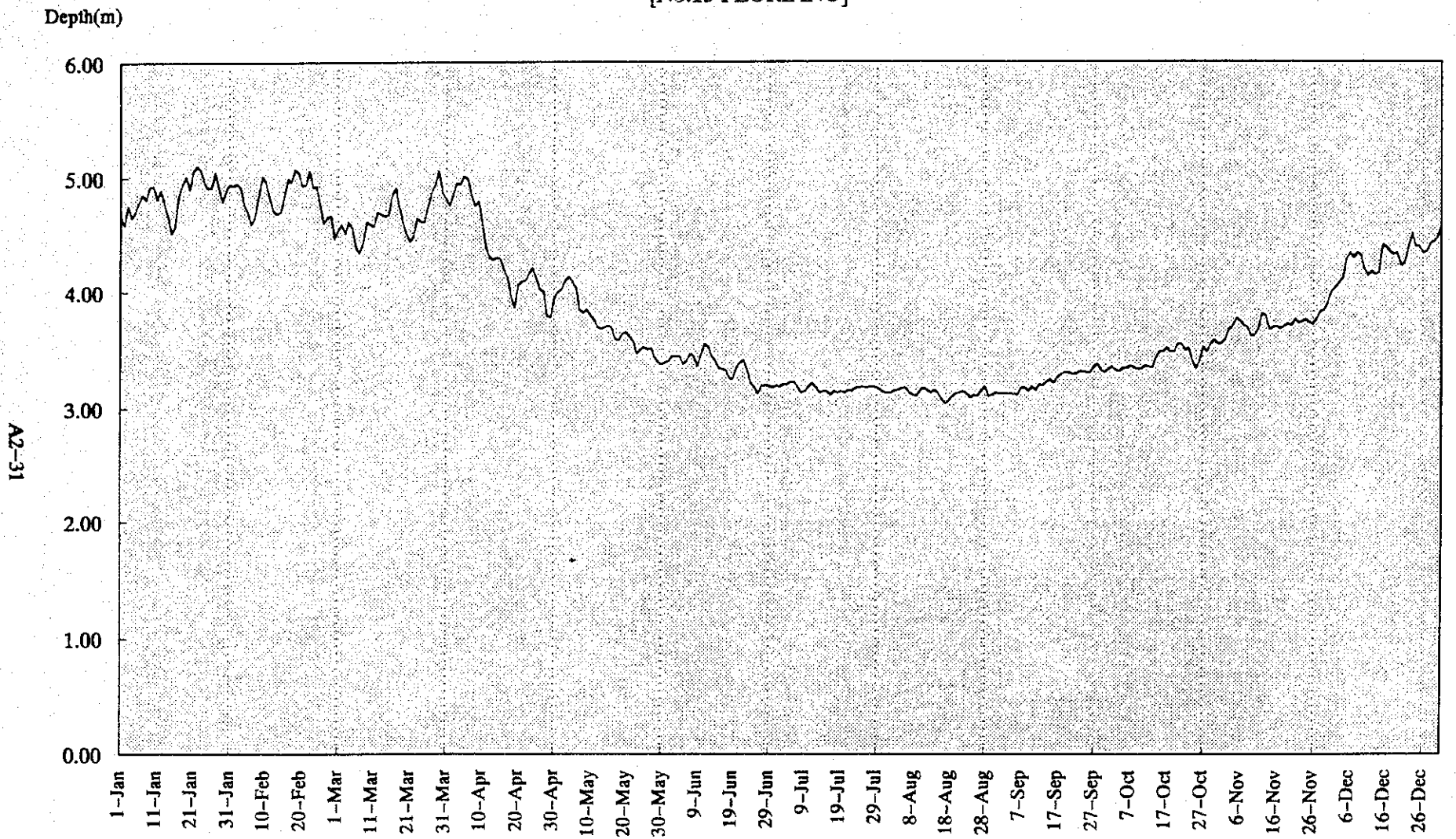
NO.2



: Water Level

Parnaiba River Depth Data

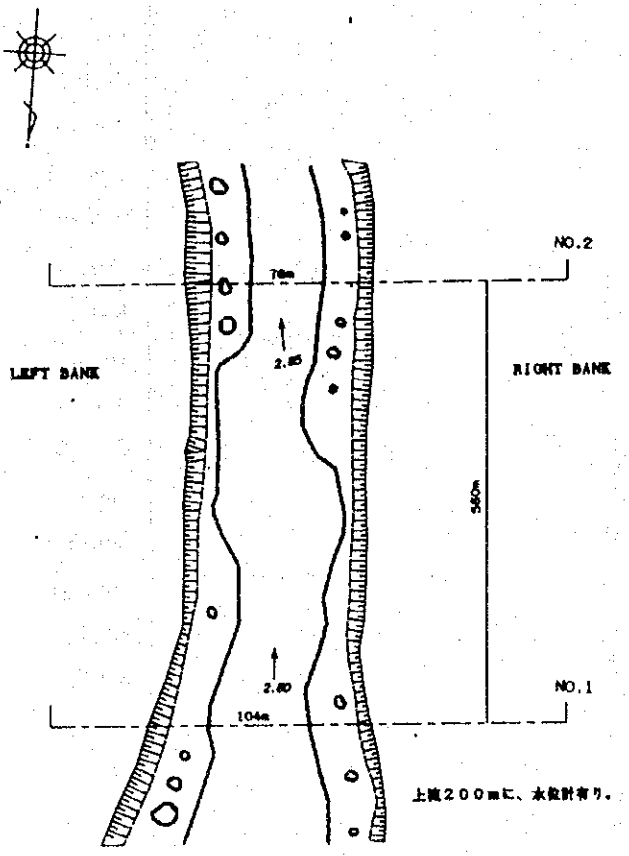
[No.15 FLORIANO]



NO.16
(Guadalupe)

FEB .23.1994

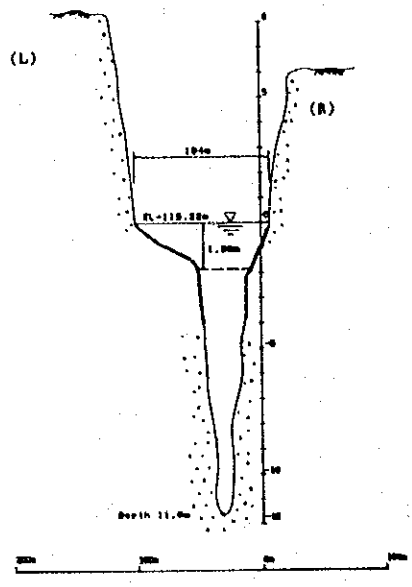
PLANE POSITION



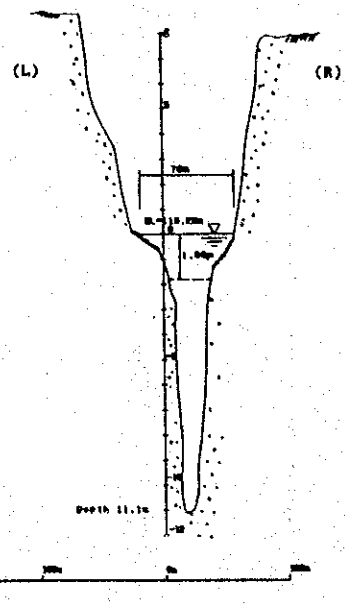
Legend : Survey Date
—— : Jan–Mar. 1994
----- : Jun–Aug. 1993

CROSS SECTION

NO.1



NO.2

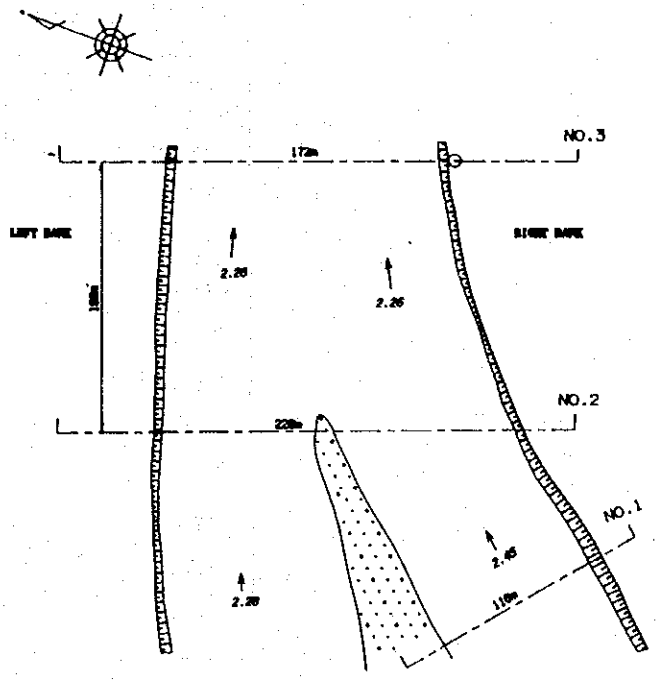


: Water Level

NO. 17
(Uracui)

FEB .22.1994

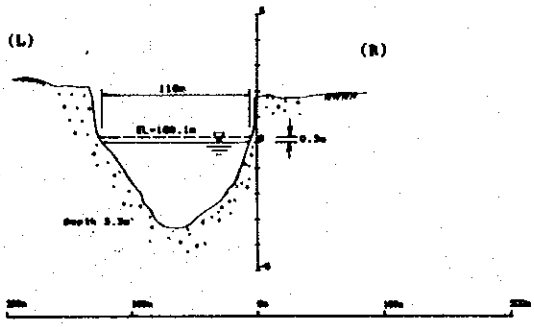
PLANE POSITION



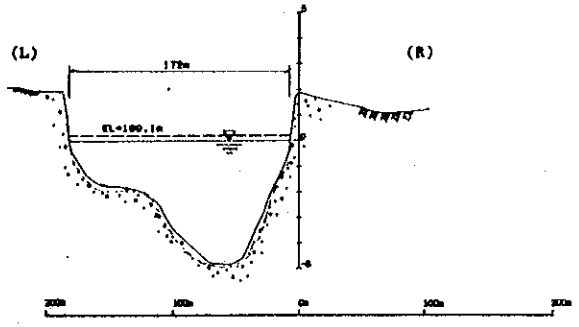
Legend : Survey Date
—— : Jan-Mar. 1994
- - - - - : Jun-Aug. 1993

CROSS SECTION

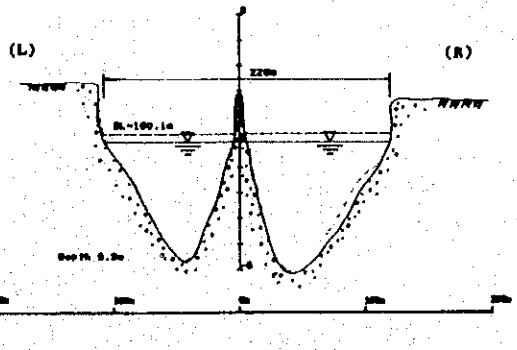
NO.1



NO.3



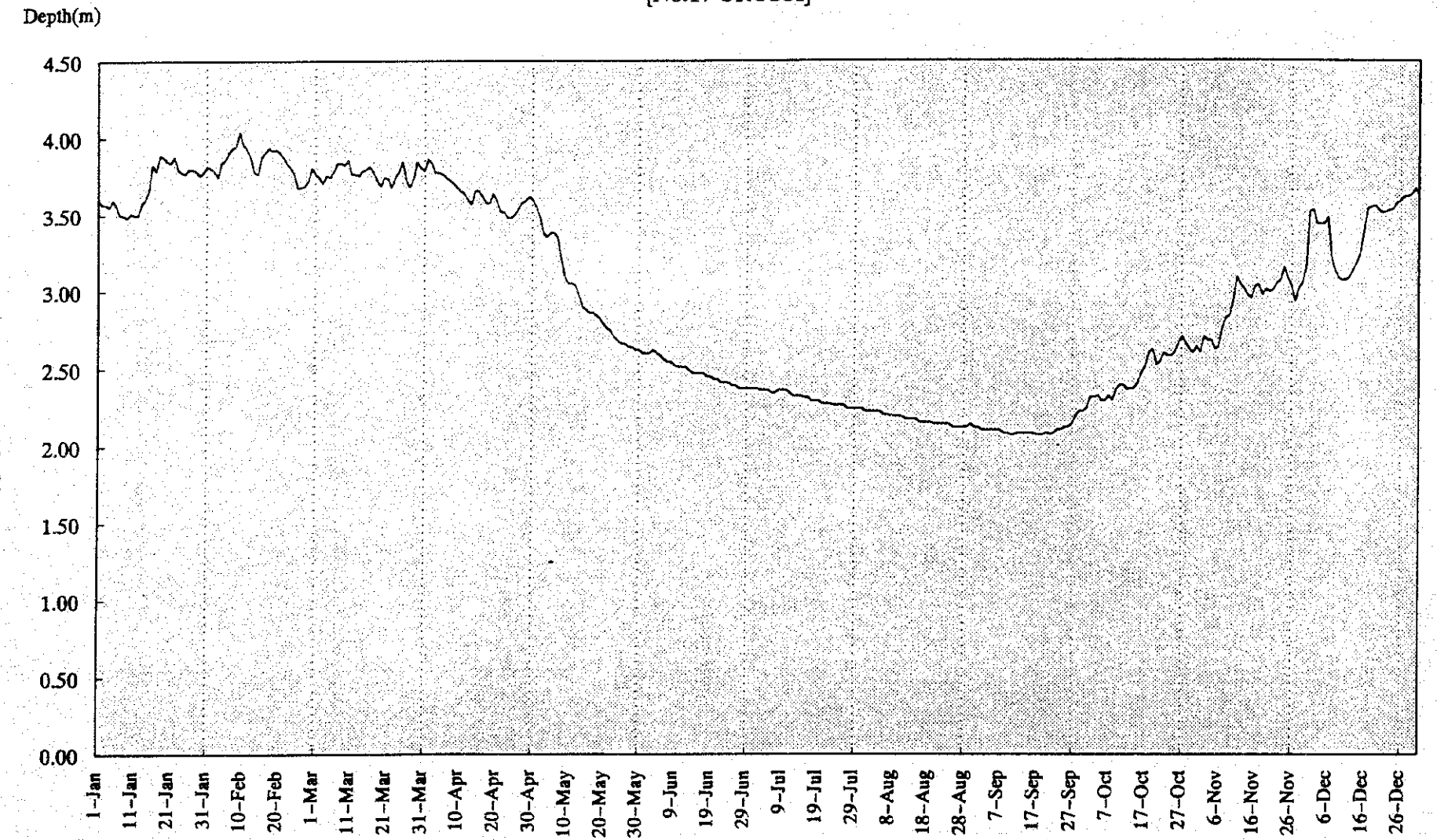
NO.2



: Water Level

Parnaiba River Depth Data

[No.17 URUSSI]

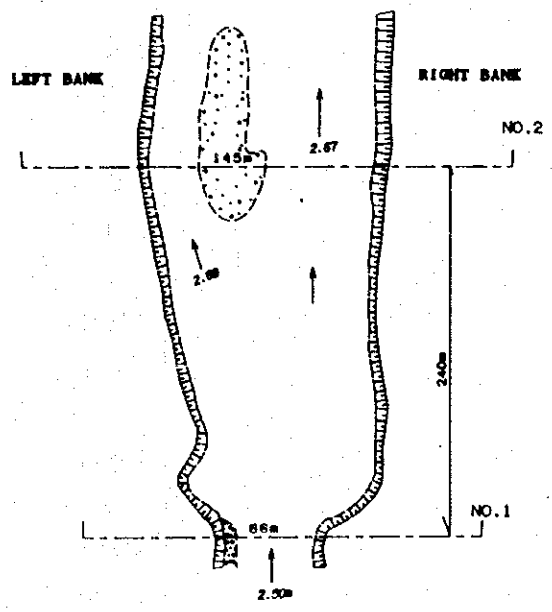


NO.18

(Elbeire Gonzalves)

FEB .21.1994

PLANE POSITION



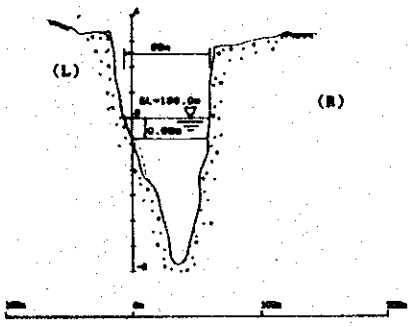
Legend : Survey Date

—— : Jan–Mar. 1994

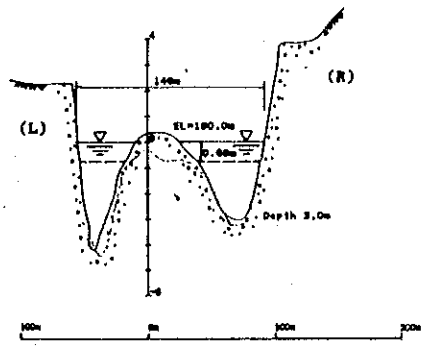
- - - - - : Jun–Aug. 1993

CROSS SECTION

NO.1



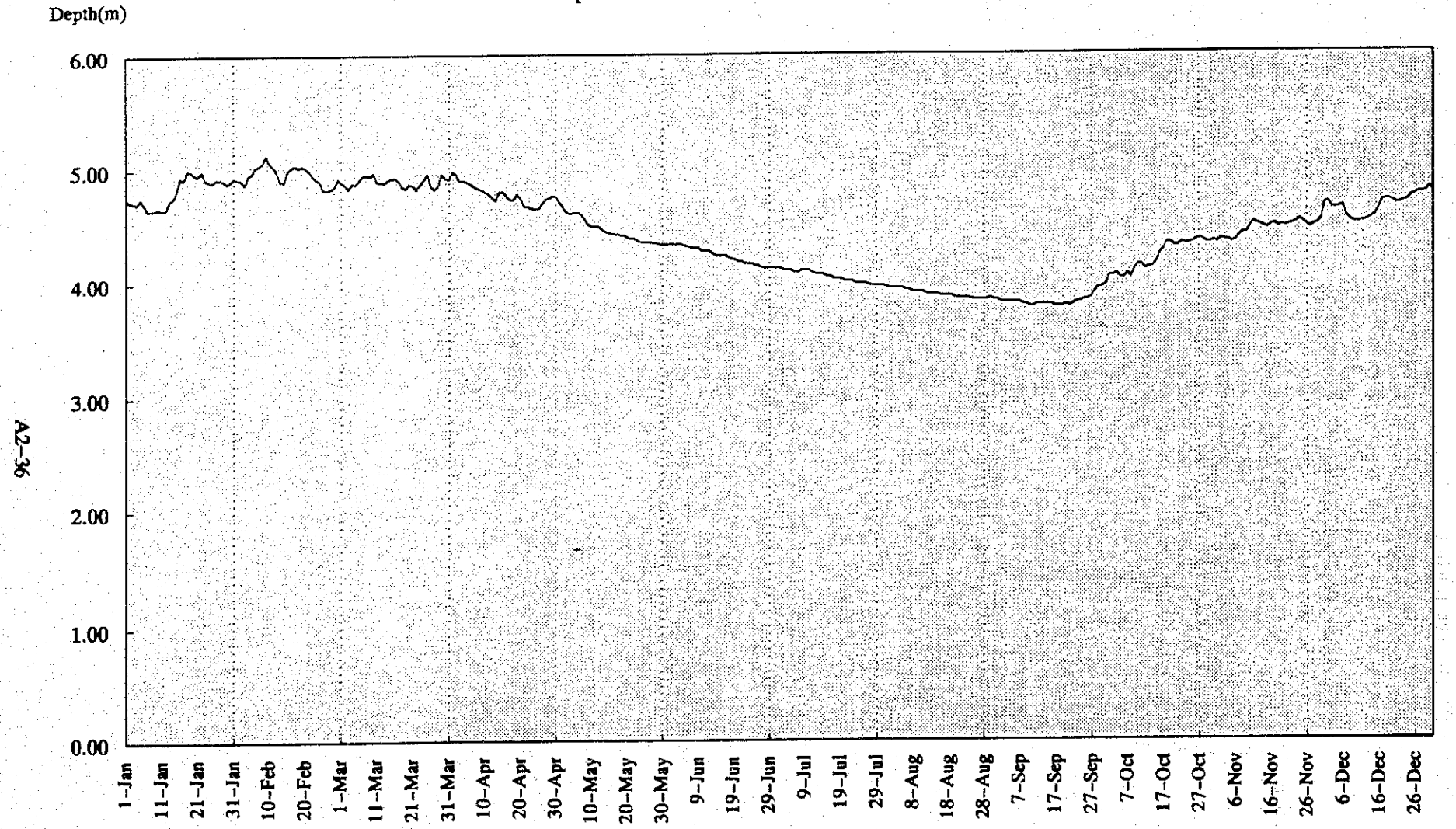
NO.2



: Water Level

Parnaiba River Depth Data

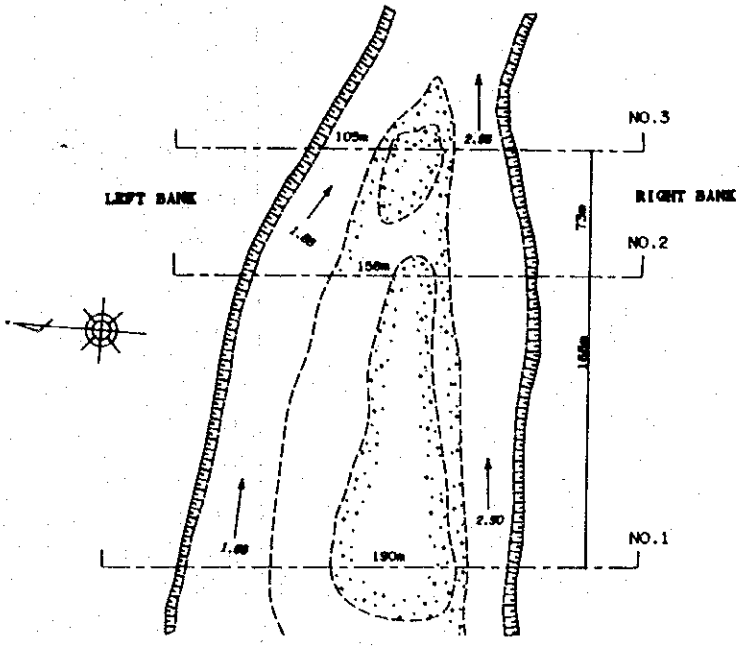
[No.18 RIBEIRO GONCALVES-1]



NO.19
(Ribeira Goncalves)

FEB .21.1994

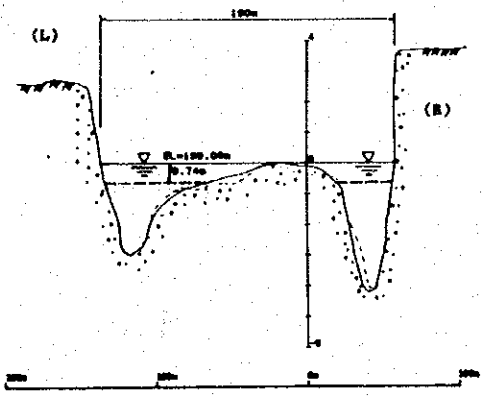
PLANE POSITION



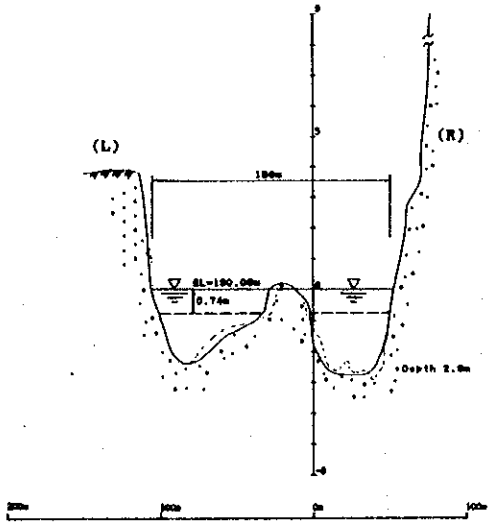
Legend : Survey Date
—— : Jan–Mar. 1994
- - - - - : Jun–Aug. 1993

CROSS SECTION

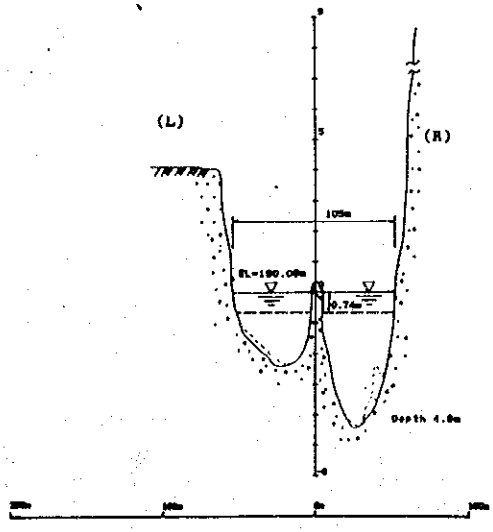
NO.1



NO.2



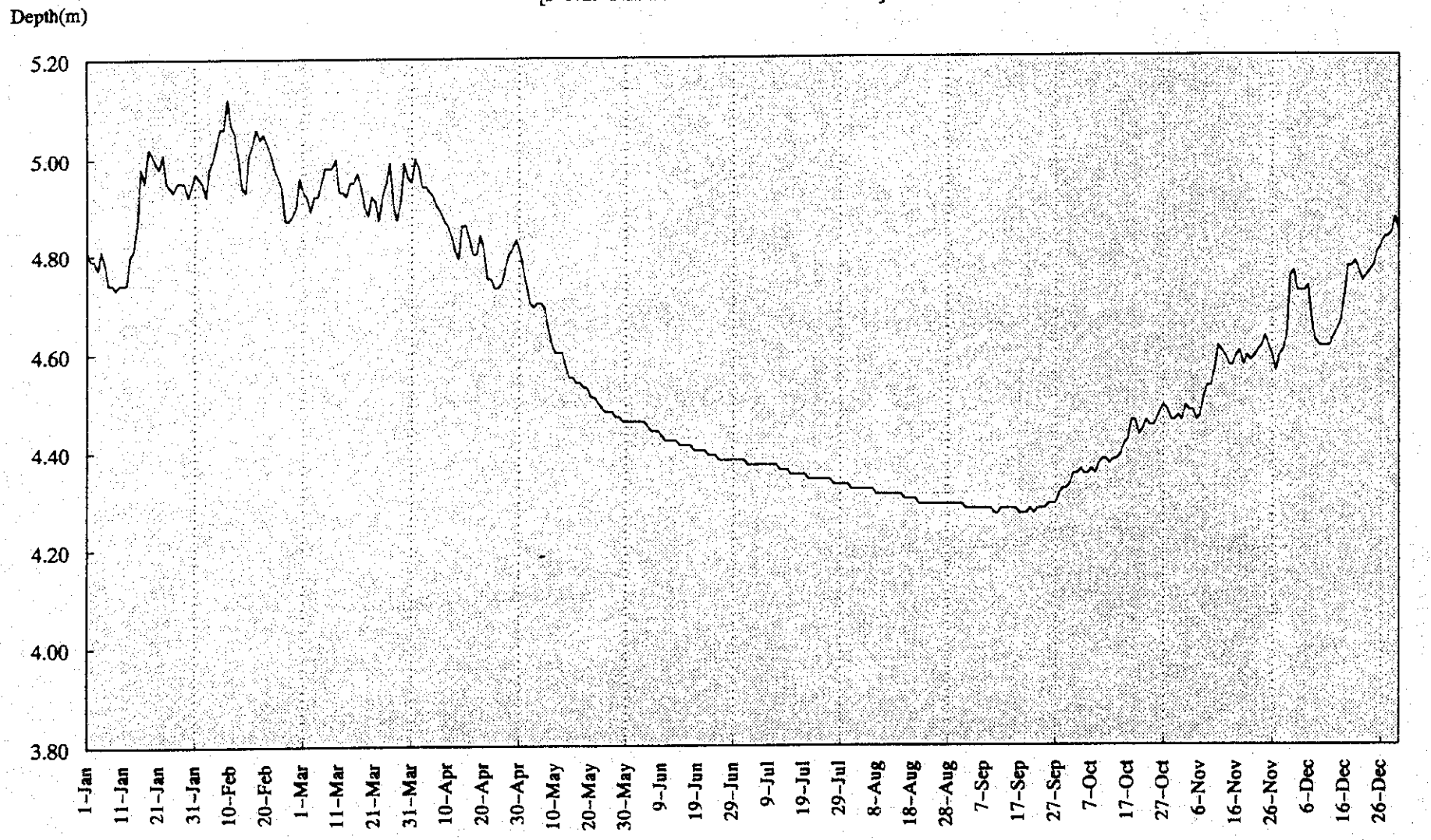
NO.3



: Water Level

Parnaiba River Depth Data

[No.19 RIBEIRO GONCALVES-2]

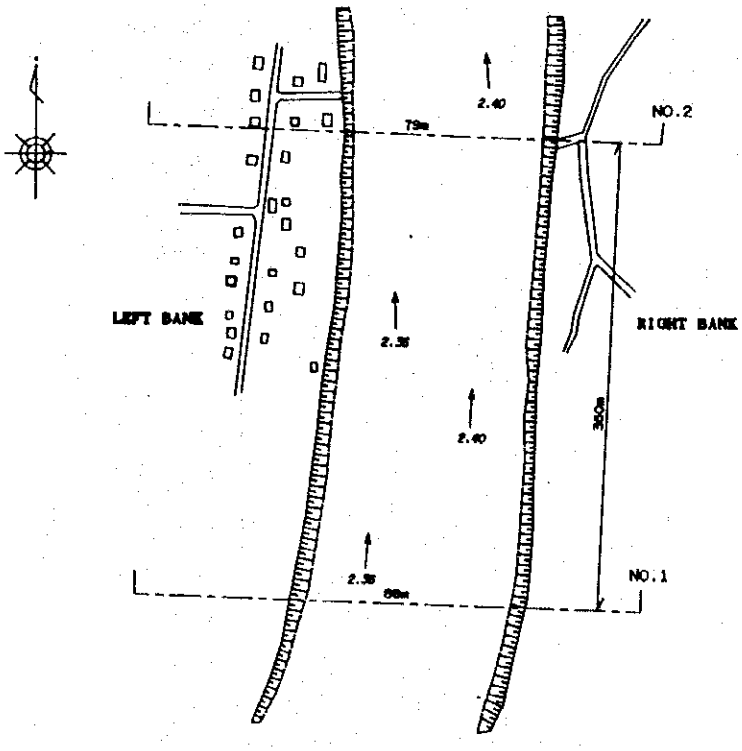


NO.20

(Tasco Fragoso)

FEB .20.1994

PLANE POSITION



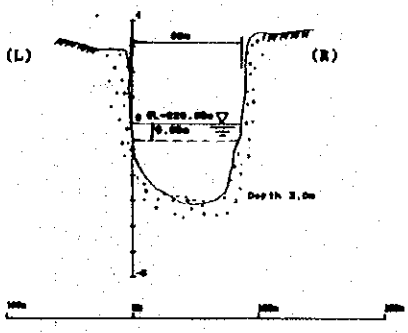
Legend : Survey Date

—— : Jan–Mar. 1994

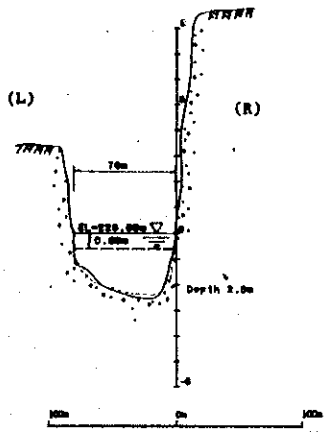
- - - - - : Jun–Aug. 1993

CROSS SECTION

NO.1



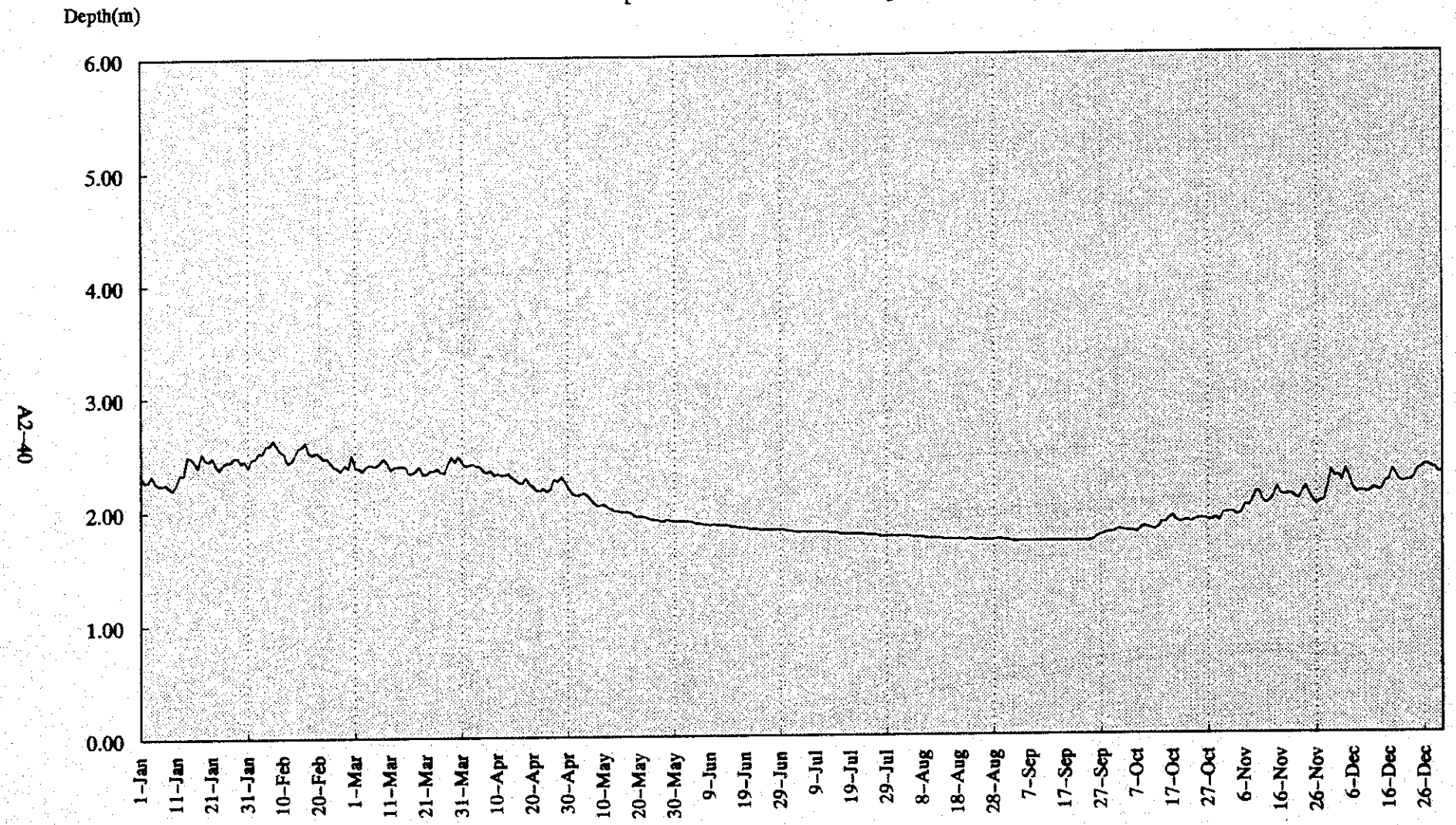
NO.2



: Water Level

Parnaiba River Depth Data

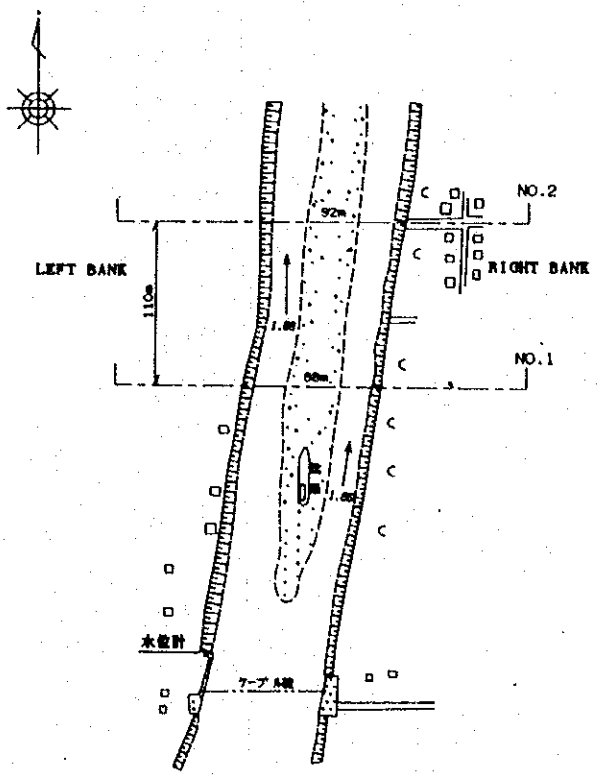
[No.20 TASSO FRAGOSO]



NO.21
(Santa Filomena)

FEB .19.1994

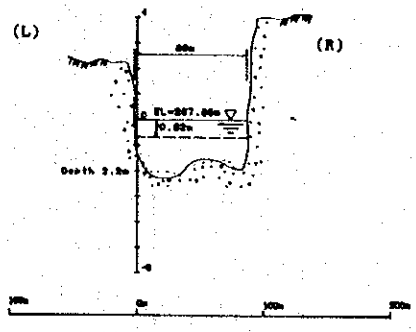
PLANE POSITION



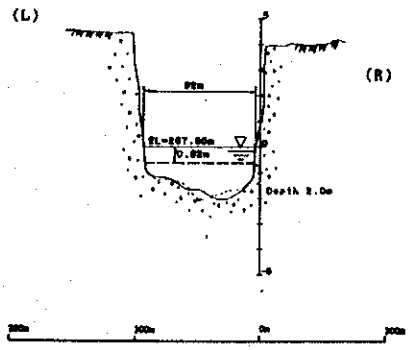
Legend : Survey Date
—— : Jan–Mar. 1994
- - - - - : Jun–Aug. 1993

CROSS SECTION

NO.1



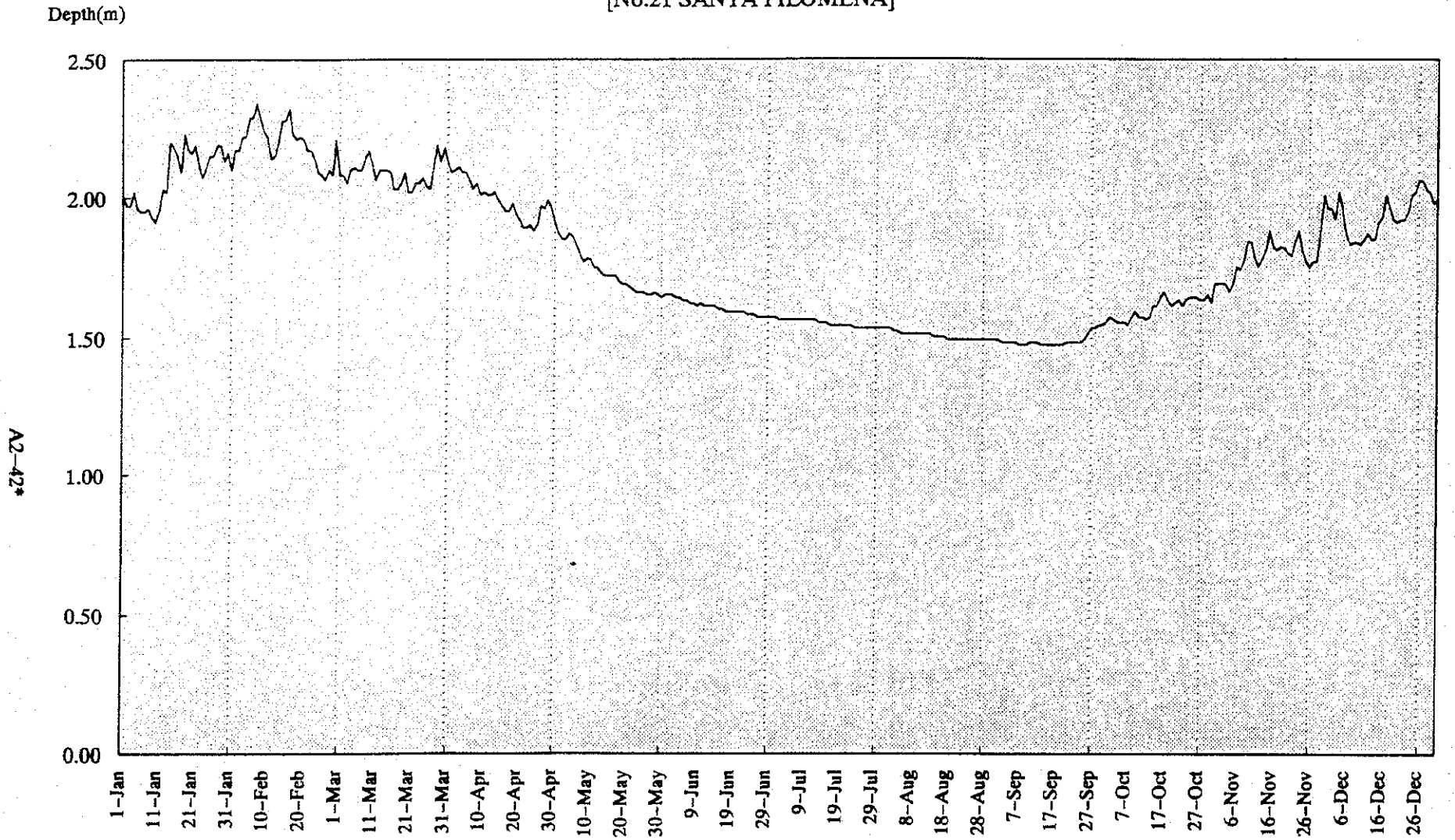
NO.2



: Water Level

Parnaiba River Depth Data

[No.21 SANTA FILOMENA]



A2-42*

Appendix 3 :
Cargo Volume in Scenarios

Table A3.1.1 Transport Cargo Volume in Scenario 1 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Rice		(55,700)	(239,000)	(20,000)	(5,950)	(-120,650)	(21,900)	(20,000)	(-241,900)		(10,900)	(18,000)	(60,400)	(-90,300)
	→	55,700	294,700	314,700	320,650	200,000	221,900	241,900			10,900	29,900	90,300	
	←													
Corn		(16,800)	(18,000)	(15,200)	(19,000)	(-69,000)					(14,000)	(5,500)	(48,000)	(-67,500)
	→	16,800	34,800	50,000	69,000						14,000	19,500	67,500	
	←		(-2,000)	(-8,000)		(-67,700)	(22,500)	(5,000)	(33,500)	(6,700)				
			2,000	10,000	10,000	(10,000)	67,700	45,200	40,200	6,700				
Fejon		(450)	(4,300)	(-4,750)							(2,000)	(1,300)	(5,900)	(-9,200)
	→	450	4,750								2,000	3,300	9,200	
	←													
Soy Been			(100,000)	(220,000)	(20,000)				(-340,000)					
	→		100,000	320,000	340,000	340,000	340,000	340,000						
	←													
Fruits			(700)	(1,600)	(1,150)	(-1,250)			(-2,200)					
	→		700	2,300	3,450	2,200	2,200	2,200						
	←													
Nuts			(1,000)	(2,500)	(900)	(1,600)			(-6,000)					
	→		1,000	3,500	4,400	6,000	6,000	6,000						
	←													
Babacu							(15,000)	(15,000)	(-30,000)					
	→						15,000	30,000						
	←								(-50,000)	(25,000)	(25,000)			
									50,000	25,000				
Sub-Total	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100	0	0	26,900	52,700	167,000	
	←	0	2,000	10,000	10,000	67,700	45,200	40,200	56,700	25,000	0	0	0	

Table A3.1.2 Transport Cargo Volume in Scenario 1 (in 2010)

Year : 2010
Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Salt	→													
		(-1,100)	(-2,000)	(-3,800)	(-1,200)	(-500)			(8,600)	(-1,500)	(-1,000)	(-500)		(3,000)
	←	1,100	3,100	6,900	8,100	8,600	8,600	8,600		1,500	2,500	3,000	3,000	
Fertilizer	→													
		(-6,000)	(-42,000)	(-72,000)	(-28,000)	(74,000)			(74,000)					
	←	6,000	48,000	120,000	148,000	74,000	74,000	74,000						
Sugar	→													
		(-1,100)	(-2,400)	(-3,300)	(-1,600)	(8,400)								
	←	1,100	3,500	6,800	8,400									
Wheat Flour	→													
		(-1,200)	(-2,500)	(-3,300)	(-1,800)	(8,800)								
	←	1,200	3,700	7,000	8,800									
Petroleum	→													
		(-2,700)	(-5,800)	(-7,800)	(-4,100)	(20,400)								
	←	2,700	8,500	16,300	20,400									
Cemente	→													
		(-600)	(-1,300)	(-1,700)	(-1,500)	(5,100)								
	←	600	1,900	3,600	5,100									
Limestone	→													
	←													
Sub-Total	→	0	0	0	0	0	0	0	0	0	0	0	0	0
	←	12,700	68,700	160,600	198,800	82,600	82,600	82,600	0	1,500	2,500	3,000	3,000	

Table A3.1.3 Transport Cargo Volume in Scenario 1 (in 2010)

~~Year : 2010~~
Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Agricultural Products	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100	0	0	26,900	52,700	167,000	
	←	0	2,000	10,000	10,000	67,700	45,200	40,200	56,700	25,000	0	0	0	
Commodities	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	82,600	82,600	82,600	0	1,500	2,500	3,000	3,000	
All total	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100	0	0	26,900	52,700	167,000	
	←	12,700	70,700	170,600	208,800	150,300	127,800	122,800	56,700	26,500	2,500	3,000	3,000	
Total		85,650	506,650	861,100	946,300	698,500	712,900	742,900	56,700	26,500	29,400	55,700	170,000	

Table A3.2.1 Transport Cargo Volume in Scenario 2 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Rice	→	(55,700)	(239,000)	(20,000)	(5,950)	(-120,650)	(21,900)	(20,000)	(-241,900)					
		55,700	294,700	314,700	320,650	200,000	221,900	241,900						
	←													
Corn	→	(16,800)	(18,000)	(15,200)	(19,000)	(-69,000)								
		16,800	34,800	50,000	69,000									
	←		(-2,000)	(-8,000)		(-61,000)	(22,500)	(5,000)	(33,500)					
			2,000	10,000	10,000	(10,000) 61,000	38,500	33,500						
Fejon	→	(450)	(4,300)	(-4,750)										
		450	4,750											
	←													
Soy Been	→		(100,000)	(220,000)	(20,000)				(-340,000)					
			100,000	320,000	340,000	340,000	340,000	340,000						
	←													
Fruits	→		(700)	(1,600)	(1,150)	(-1,250)			(-2,200)					
			700	2,300	3,450	2,200	2,200	2,200						
	←													
Nuts	→		(1,000)	(2,500)	(900)	(1,600)			(-6,000)					
			1,000	3,500	4,400	6,000	6,000	6,000						
	←													
Babacu	→						(15,000)	(15,000)	(-30,000)					
							15,000	30,000						
	←													
Sub-Total	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100		0	0	0	0	0
	←	0	2,000	10,000	10,000	61,000	38,500	33,500		0	0	0	0	0

Table A3.2.2 Transport Cargo Volume in Scenario 2 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Uruçui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	União	Miguel Alves	Porto	Luzilandia	Parnaiba
Salt	→													
		(1,100)	(2,000)	(3,800)	(1,200)	(500)			(8,600)					
	←	1,100	3,100	6,900	8,100	8,600	8,600	8,600						
Fertilizer	→													
		(6,000)	(42,000)	(72,000)	(28,000)	(74,000)			(74,000)					
	←	6,000	48,000	120,000	148,000	74,000	74,000	74,000						
Sugar	→													
		(1,100)	(2,400)	(3,300)	(1,600)	(8,400)								
	←	1,100	3,500	6,800	8,400									
Wheat Flour	→													
		(1,200)	(2,500)	(3,300)	(1,800)	(8,800)								
	←	1,200	3,700	7,000	8,800									
Petroleum	→													
		(2,700)	(5,800)	(7,800)	(4,100)	(20,400)								
	←	2,700	8,500	16,300	20,400									
Cemente	→													
		(600)	(1,300)	(1,700)	(1,500)	(5,100)								
	←	600	1,900	3,600	5,100									
Limestone	→													
	←													
Sub-Total	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	82,600	82,600	82,600	0	0	0	0	0	

Table A3.2.3 Transport Cargo Volume in Scenario 2 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Agricultural Products	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100	0	0	0	0	0	
	←	0	2,000	10,000	10,000	61,000	38,500	33,500	0	0	0	0	0	
Commodities	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	82,600	82,600	82,600	0	0	0	0	0	
All total	→	72,950	435,950	690,500	737,500	548,200	585,100	620,100	0	0	0	0	0	
	←	12,700	70,700	170,600	208,800	143,600	121,100	116,100	0	0	0	0	0	
Total		85,650	506,650	861,100	946,300	691,800	706,200	736,200	0	0	0	0	0	

Table A3.3.1 Transport Cargo Volume in Scenario 3 (in 2010)

Year : 2010
Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Rice	→	(55,700)	(239,000)	(140,800)	(71,200)	(-506,700)								
		55,700	294,700	435,500	506,700									
	←													
Corn	→	(16,800)	(18,000)	(24,200)	(29,200)	(-88,200)								
		16,800	34,800	59,000	88,200									
	←		(-2,000)	(-8,000)										
			2,000	10,000	10,000	(10,000)								
Fejon	→	(450)	(4,300)	(1,600)	(8,700)	(-15,050)								
		450	4,750	6,350	15,050									
	←													
Soy Been	→		(100,000)	(240,000)	(21,500)	(-361,500)								
			100,000	340,000	361,500									
	←													
Fruits	→		(700)	(1,600)	(1,150)	(-3,450)								
			700	2,300	3,450									
	←													
Nuts	→		(1,000)	(2,500)	(900)	(-4,400)								
			1,000	3,500	4,400									
	←													
Babacu	→													
	←													
Sub-Total	→	72,950	435,950	846,650	979,300	0	0	0	0	0	0	0	0	0
	←	0	2,000	10,000	10,000	0	0	0	0	0	0	0	0	0

Table A3.3.2 Transport Cargo Volume in Scenario 3 (in 2010)

Year : 2010
Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Salt	→													
		(-1,100)	(-2,000)	(-3,800)	(-1,200)	(8,100)								
	←	1,100	3,100	6,900	8,100									
Fertilizer	→													
		(-6,000)	(-42,000)	(-72,000)	(-28,000)	(148,000)								
	←	6,000	48,000	120,000	148,000									
Sugar	→													
		(-1,100)	(-2,400)	(-3,300)	(-1,600)	(8,400)								
	←	1,100	3,500	6,800	8,400									
Wheat Flour	→													
		(-1,200)	(-2,500)	(-3,300)	(-1,800)	(8,800)								
	←	1,200	3,700	7,000	8,800									
Petroleum	→													
		(-2,700)	(-5,800)	(-7,800)	(-4,100)	(20,400)								
	←	2,700	8,500	16,300	20,400									
Cemente	→													
		(-600)	(-1,300)	(-1,700)	(-1,500)	(5,100)								
	←	600	1,900	3,600	5,100									
Limestone	→													
	←													
Sub-Total	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	0	0	0	0	0	0	0	0	

Table A3.3.3 Transport Cargo Volume in Scenario 3 (in 2010)

Year : 2010
Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniso	Miguel Alves	Porto	Luzilandia	Parnaiba
Agricultural Products	→	72,950	435,950	846,650	979,300	0	0	0	0	0	0	0	0	
	←	0	2,000	10,000	10,000	0	0	0	0	0	0	0	0	
Commodities	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	0	0	0	0	0	0	0	0	
All total	→	72,950	435,950	846,650	979,300	0	0	0	0	0	0	0	0	
	←	12,700	70,700	170,600	208,800	0	0	0	0	0	0	0	0	
Total		85,650	506,650	1,017,250	1,188,100	0	0	0	0	0	0	0	0	

Table A3.4.1 Transport Cargo Volume in Scenario 4 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniso	Miguel Alves	Porto	Luzilandia	Parnaiba
Rice	→	(55,700)	(239,000)	(20,000)	(5,950)	(-320,650)								
		55,700	294,700	314,700	320,650									
	←													
Corn	→	(16,800)	(18,000)	(15,200)	(19,000)	(-69,000)								
		16,800	34,800	50,000	69,000									
	←		(-2,000)	(-8,000)		(-61,000)	(22,500)	(5,000)	(33,500)					
			2,000	10,000	10,000	(10,000)	61,000	38,500	33,500					
Fejon	→	(450)	(4,300)	(-4,750)										
		450	4,750											
	←													
Soy Been	→		(100,000)	(220,000)	(20,000)				(-340,000)					
			100,000	320,000	340,000	340,000	340,000	340,000						
	←													
Fruits	→		(700)	(1,600)	(1,150)	(-1,250)			(-2,200)					
			700	2,300	3,450	2,200	2,200	2,200						
	←													
Nuts	→		(1,000)	(2,500)	(900)	(1,600)			(-6,000)					
			1,000	3,500	4,400	6,000	6,000	6,000						
	←													
Babacu	→						(15,000)	(15,000)	(-30,000)					
							15,000	30,000						
	←													
Sub-Total	→	72,950	435,950	690,500	737,500	348,200	363,200	378,200	0	0	0	0	0	0
	←	0	2,000	10,000	10,000	61,000	38,500	33,500	0	0	0	0	0	0

Table A3.4.2 Transport Cargo Volume in Scenario 4 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Salt	→													
		(-1,100)	(-2,000)	(-3,800)	(-1,200)	(-500)			(8,600)					
	←	1,100	3,100	6,900	8,100	8,600	8,600	8,600						
Fertilizer	→													
		(-6,000)	(-42,000)	(-72,000)	(-28,000)	(74,000)			(74,000)					
	←	6,000	48,000	120,000	148,000	74,000	74,000	74,000						
Sugar	→													
		(-1,100)	(-2,400)	(-3,300)	(-1,600)	(8,400)								
	←	1,100	3,500	6,800	8,400									
Wheat Flour	→													
		(-1,200)	(-2,500)	(-3,300)	(-1,800)	(8,800)								
	←	1,200	3,700	7,000	8,800									
Petroleum	→													
		(-2,700)	(-5,800)	(-7,800)	(-4,100)				(20,400)					
	←	2,700	8,500	16,300	20,400	20,400	20,400	20,400						
Cemente	→													
		(-600)	(-1,300)	(-1,700)	(-1,500)	(5,100)								
	←	600	1,900	3,600	5,100									
Limestone	→													
	←													
Sub-Total	→	0	0	0	0	0	0	0	0	0	0	0	0	
	←	12,700	68,700	160,600	198,800	103,000	103,000	103,000	0	0	0	0	0	

Table A3.4.3 Transport Cargo Volume in Scenario 4 (in 2010)

Unit : t/year

		St. Filomena	Ribeiro Goncalves	Urucui	Guadalupe	Floriano	Amarante	Palmeiras	Teresina	Uniao	Miguel Alves	Porto	Luzilandia	Parnaiba
Agricultural Products	→	72,950	435,950	690,500	737,500	348,200	363,200	378,200						
	←		2,000	10,000	10,000	61,000	38,500	33,500						
Commodities	→													
	←	12,700	68,700	160,600	198,800	103,000	103,000	103,000						
All total	→	72,950	435,950	690,500	737,500	348,200	363,200	378,200	0	0	0	0	0	
	←	12,700	70,700	170,600	208,800	164,000	141,500	136,500	0	0	0	0	0	
Total		85,650	506,650	861,100	946,300	512,200	504,700	514,700	0	0	0	0	0	

Appendix 4 :
Cargo Handling Volume in the River Ports

Table A4.1.1 Cargo Handling Volume in Scenario 1 in 2010 (Necessary Goods)

Location	Salt		Fertilizer		Sugar		Wheat Flour		Petro		Cement		Limestone		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba	3,000														3,000	0	3,000
2. Luzilandia															0	0	0
3. Porto		500													0	500	500
4. Miguel Alves		1,000													0	1,000	1,000
5. Uniao		1,500													0	1,500	1,500
6. Teresina	8,600		74,000												82,600	0	82,600
7. Palmeiras															0	0	0
8. Amarante															0	0	0
9. Floriano		500	74,000		8,400		8,800		20,400		5,100				116,700	500	117,200
10. Guadalupe		1,200		28,000		1,600		1,800		4,100		1,500			0	38,200	38,200
11. Urucui		3,800		72,000		3,300		3,300		7,800		1,700			0	91,900	91,900
12. Riberio Goncalves		2,000		42,000		2,400		2,500		5,800		1,300			0	56,000	56,000
13. Santa Filomena		1,100		6,000		1,100		1,200		2,700		600			0	12,700	12,700
Total	11,600	11,600	148,000	148,000	8,400	8,400	8,800	8,800	20,400	20,400	5,100	5,100	0	0	202,300	202,300	404,600

Table A4.1.2 Cargo Handling Volume in Scenario 1 in 2010 (Agricultural Products)

Unit : ton/year

Location	Rice		Corn		Fejorn		Soy Been		Fruits		Nuts		Babacu		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba		90,300		67,500		9,200									0	167,000	167,000
2. Luzilandia	60,400		48,000		5,900										114,300	0	114,300
3. Porto	19,000		5,500		1,300										25,800	0	25,800
4. Miguel Alves	10,900		14,000		2,000								25,000		51,900	0	51,900
5. Uniao			6,700										25,000		31,700	0	31,700
6. Teresina		241,900	33,500					340,000		2,200		6,000		80,000	33,500	670,100	703,600
7. Palmeiras	20,000		5,000										15,000		40,000	0	40,000
8. Amarante	21,900		22,500										15,000		59,400	0	59,400
9. Floriano		120,650	10,000	136,700						1,250	1,600				11,600	258,600	270,200
10. Guadalupe	5,950		19,000				20,000		1,150		900				47,000	0	47,000
11. Urucui	20,000		15,200	8,000		4,750	220,000		1,600		2,500				259,300	12,750	272,050
12. Riberio Goncalves	239,000		18,000	2,000	4,300		100,000		700		1,000				363,000	2,000	365,000
13. Santa Filomena	55,700		16,800		450										72,950	0	72,950
Total	452,850	452,850	214,200	214,200	13,950	13,950	340,000	340,000	3,450	3,450	6,000	6,000	80,000	80,000	1,110,450	1,110,450	2,220,900

Table A4.1.3 Cargo Handling Volume in Scenario 2 in 2010 (Necessary Goods)

Location	Salt		Fertilizer		Sugar		Wheat Flour		Petro		Cement		Limestone		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina	8,600		74,000												82,600	0	82,600
7. Palmeiras															0	0	0
8. Amarante															0	0	0
9. Floriano		500	74,000		8,400		8,800		20,400		5,100				116,700	500	117,200
10. Guadalupe		1,200		28,000		1,600		1,800		4,100		1,500			0	38,200	38,200
11. Urucui		3,800		72,000		3,300		3,300		7,800		1,700			0	91,900	91,900
12. Ribeiro Goncalves		2,000		42,000		2,400		2,500		5,800		1,300			0	56,000	56,000
13. Santa Filomena		1,100		6,000		1,100		1,200		2,700		600			0	12,700	12,700
Total	8,600	8,600	148,000	148,000	8,400	8,400	8,800	8,800	20,400	20,400	5,100	5,100	0	0	199,300	199,300	398,600

Table A4.1.4 Cargo Handling Volume in Scenario 2 in 2010 (Agricultural Products)

Unit : ton/year

Location	Rice		Corn		Fejorn		Soy Been		Fruits		Nuts		Babacu		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina		241,900	33,500					340,000		2,200		6,000		30,000	33,500	620,100	653,600
7. Palmeiras	20,000		5,000										15,000		40,000	0	40,000
8. Amarante	21,900		22,500										15,000		59,400	0	59,400
9. Floriano		120,650	10,000	130,000						1,250	1,600				11,600	251,900	263,500
10. Guadalupe	5,950		19,000				20,000		1,150		900				47,000	0	47,000
11. Urucui	20,000		15,200	8,000		4,750	220,000		1,600		2,500				259,300	12,750	272,050
12. Ribeiro Goncalves	239,000		18,000	2,000	4,300		100,000		700		1,000				363,000	2,000	365,000
13. Santa Filomena	55,700		16,800		450										72,950	0	72,950
Total	362,550	362,550	140,000	140,000	4,750	4,750	340,000	340,000	3,450	3,450	6,000	6,000	30,000	30,000	886,750	886,750	1,773,500

Table A4.1.5 Cargo Handling Volume in Scenario 3 in 2010 (Agricultural Products)

Unit : ton/year

Location	Rice		Corn		Fejorn		Soy Been		Fruits		Nuts		Babacu		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina															0	0	0
7. Palmeiras															0	0	0
8. Amarante															0	0	0
9. Floriano		506,700	10,000	88,200		15,050		361,500		3,450		4,400			10,000	979,300	989,300
10. Guadalupe	71,200		29,200		8,700		21,500		1,150		900				132,650	0	132,650
11. Urucui	140,800		24,200	8,000	1,600		240,000		1,600		2,500				410,700	8,000	418,700
12. Ribeiro Goncalves	239,000		18,000	2,000	4,300		100,000		700		1,000				363,000	2,000	365,000
13. Santa Filomena	55,700		16,800		450										72,950	0	72,950
Total	506,700	506,700	98,200	98,200	15,050	15,050	361,500	361,500	3,450	3,450	4,400	4,400	0	0	989,300	989,300	1,978,600

Table A4.1.6 Cargo Handling Volume in Scenario 3 in 2010 (Necessary Goods)

Location	Salt		Fertilizer		Sugar		Wheat Flour		Petro		Cement		Limestone		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina															0	0	0
7. Palmeiras															0	0	0
8. Amarante															0	0	0
9. Floriano	8,100		148,000		8,400		8,800		20,400		5,100				198,800	0	198,800
10. Guadalupe		1,200		28,000		1,600		1,800		4,100		1,500			0	38,200	38,200
11. Urucui		3,800		72,000		3,300		3,300		7,800		1,700			0	91,900	91,900
12. Ribeiro Goncalves		2,000		42,000		2,400		2,500		5,800		1,300			0	56,000	56,000
13. Santa Filomena		1,100		6,000		1,100		1,200		2,700		600			0	12,700	12,700
Total	8,100	8,100	148,000	148,000	8,400	8,400	8,800	8,800	20,400	20,400	5,100	5,100	0	0	198,800	198,800	397,600

Table A4.1.7 Cargo Handling Volume in Scenario 4 in 2010 (Agricultural Products)

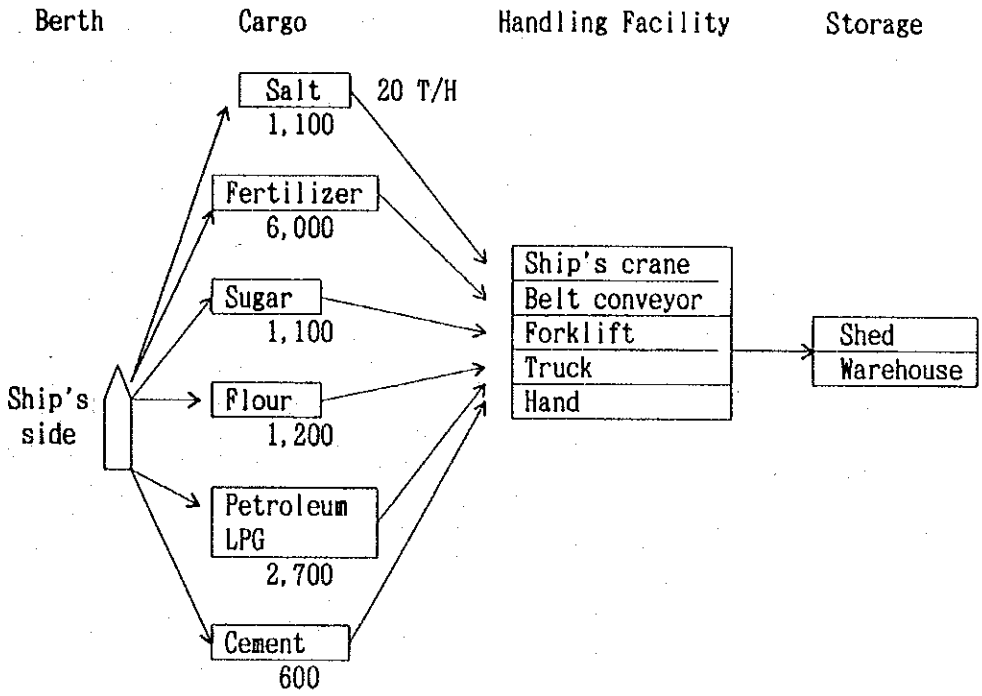
Unit : ton/year

Location	Rice		Corn		Fejorn		Soy Been		Fruits		Nuts		Babacu		Total		
	Loading	Unloading	Loading	Unloading	Losding	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina			33,500					340,000		2,200		6,000		30,000	33,500	378,200	411,700
7. Palmeiras			5,000										15,000		20,000	0	20,000
8. Amarante			22,500										15,000		37,500	0	37,500
9. Floriano		320,650	10,000	130,000						1,250	1,600				11,600	451,900	463,500
10. Guadalupe	5,950		19,000				20,000		1,150		900				47,000	0	47,000
11. Urucui	20,000		15,200	8,000		4,750	220,000		1,600		2,500				259,300	12,750	272,050
12. Ribeiro Goncalves	239,000		18,000	2,000	4,300		100,000		700		1,000				363,000	2,000	365,000
13. Santa Filomena	55,700		16,800		450										72,950	0	72,950
Total	320,650	320,650	140,000	140,000	4,750	4,750	340,000	340,000	3,450	3,450	6,000	6,000	30,000	30,000	844,850	844,850	1,689,700

Table A4.1.8 Cargo Handling Volume in Scenario 4 in 2010 (Necessary Goods)

Location	Salt		Fertilizer		Suger		Wheat Flour		Petro		Cement		Limestone		Total		
	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Loading	Unloading	Total
1. Parnaiba															0	0	0
2. Luzilandia															0	0	0
3. Porto															0	0	0
4. Miguel Alves															0	0	0
5. Uniao															0	0	0
6. Teresina	8,600		74,000						20,400						103,000	0	103,000
7. Palmeiras															0	0	0
8. Amarante															0	0	0
9. Floriano		500	74,000		8,400		8,800				5,100				96,300	500	96,800
10. Guadalupe		1,200		28,000		1,600		1,800		4,100		1,500			0	38,200	38,200
11. Urucui		3,800		72,000		3,300		3,300		7,800		1,700			0	91,900	91,900
12. Ribeiro Goncalves		2,000		42,000		2,400		2,500		5,800		1,300			0	56,000	56,000
13. Santa Filomena		1,100		6,000		1,100		1,200		2,700		600			0	12,700	12,700
Total	8,600	8,600	148,000	148,000	8,400	8,400	8,800	8,800	20,400	20,400	5,100	5,100	0	0	199,300	199,300	398,600

(Unloading)



(Loading)

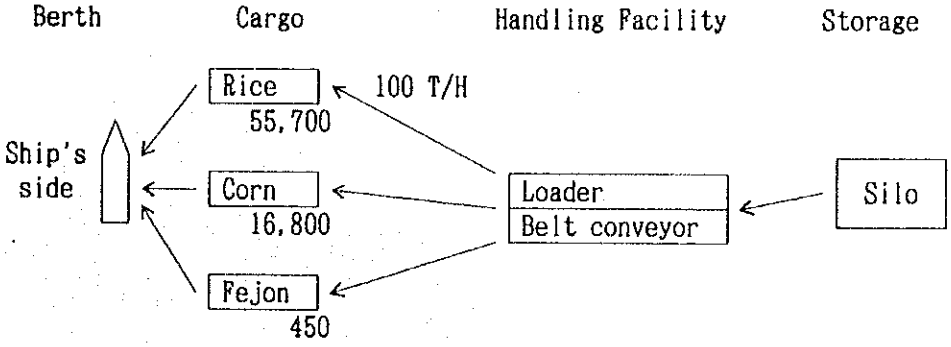
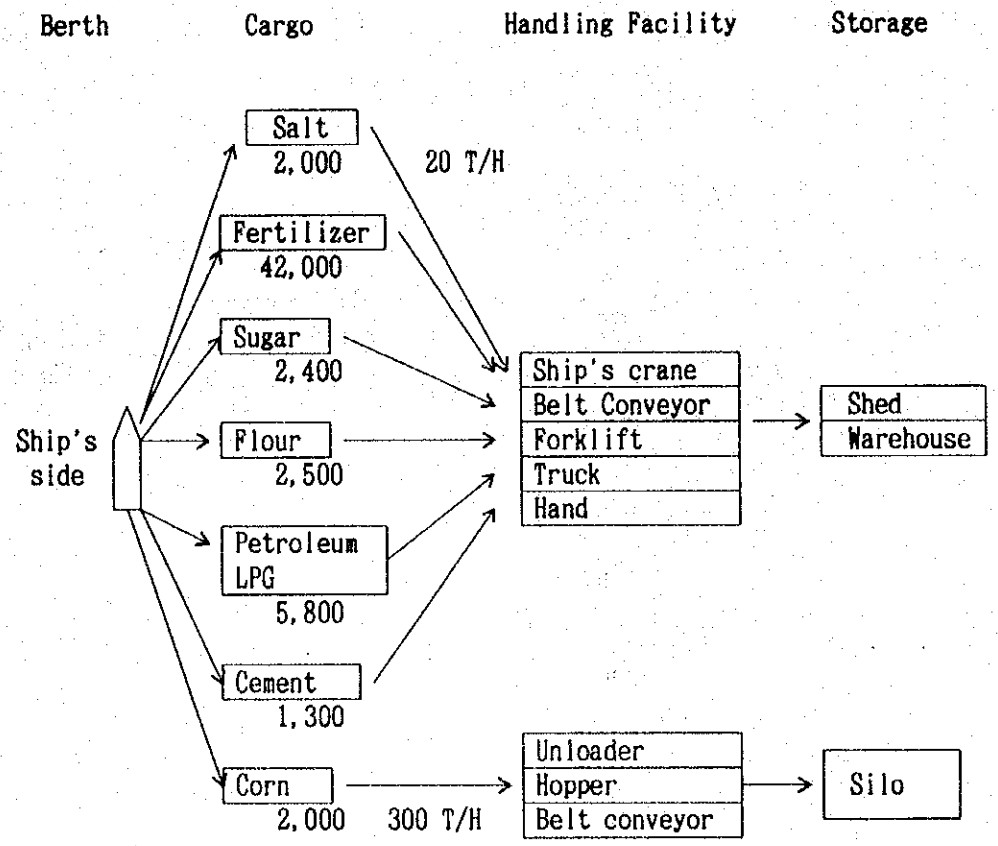


Fig. A4.1.1 Cargo flow and Facility Planning at Santa Filomena

(Unloading)



(Loading)

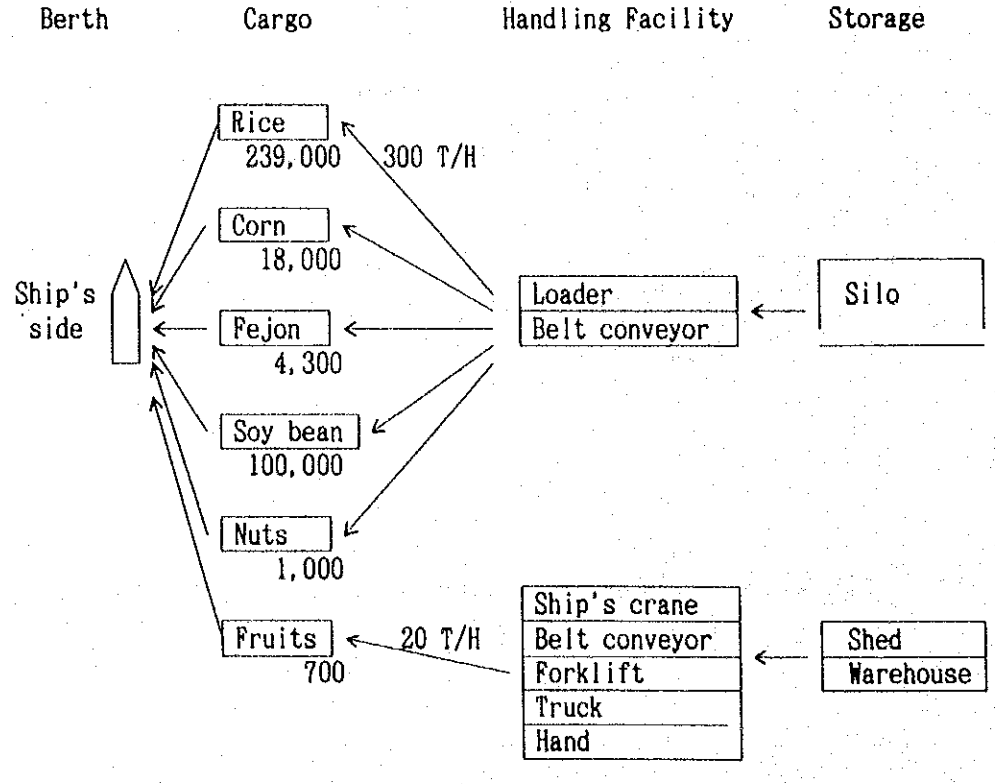
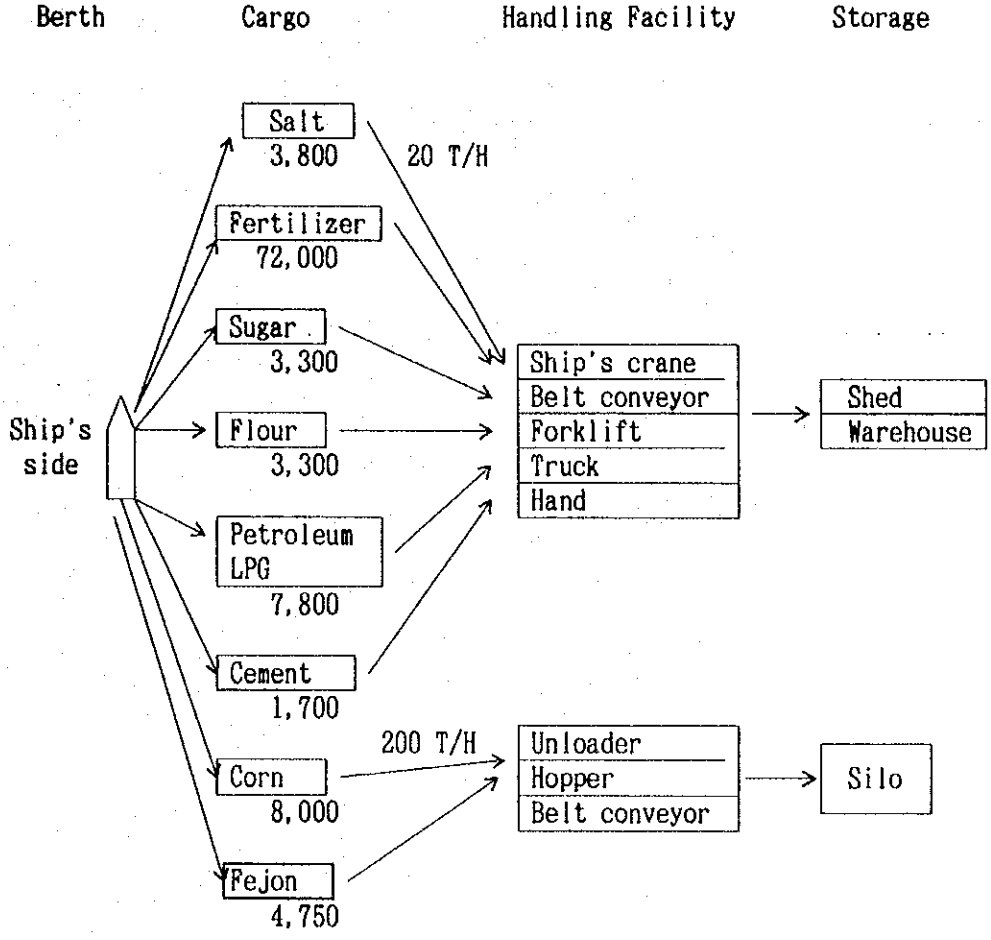


Fig. A4.1.2 Cargo flow and Facility Planning at Ribeiro Goncalves

(Unloading)



(Loading)

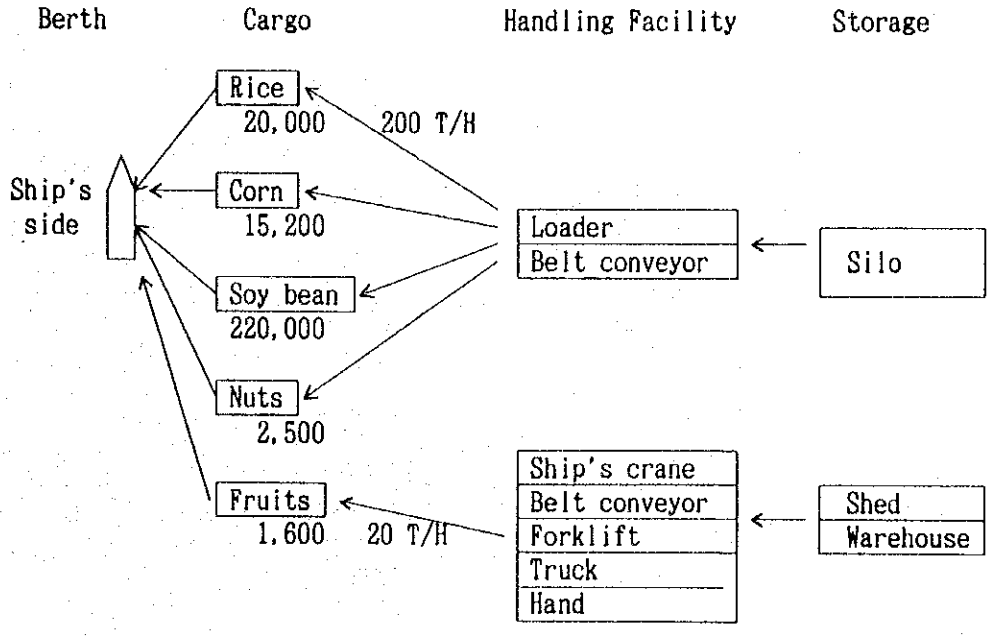
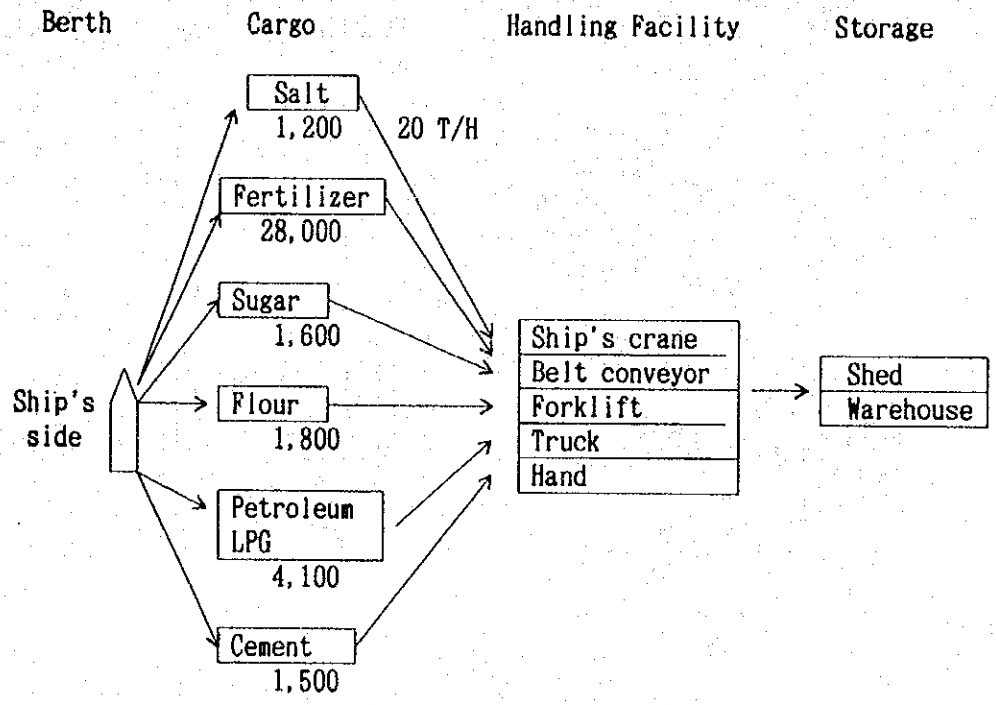


Fig. A4.1.3 Cargo flow and Facility Planning at Urucui

(Unloading)



(Loading)

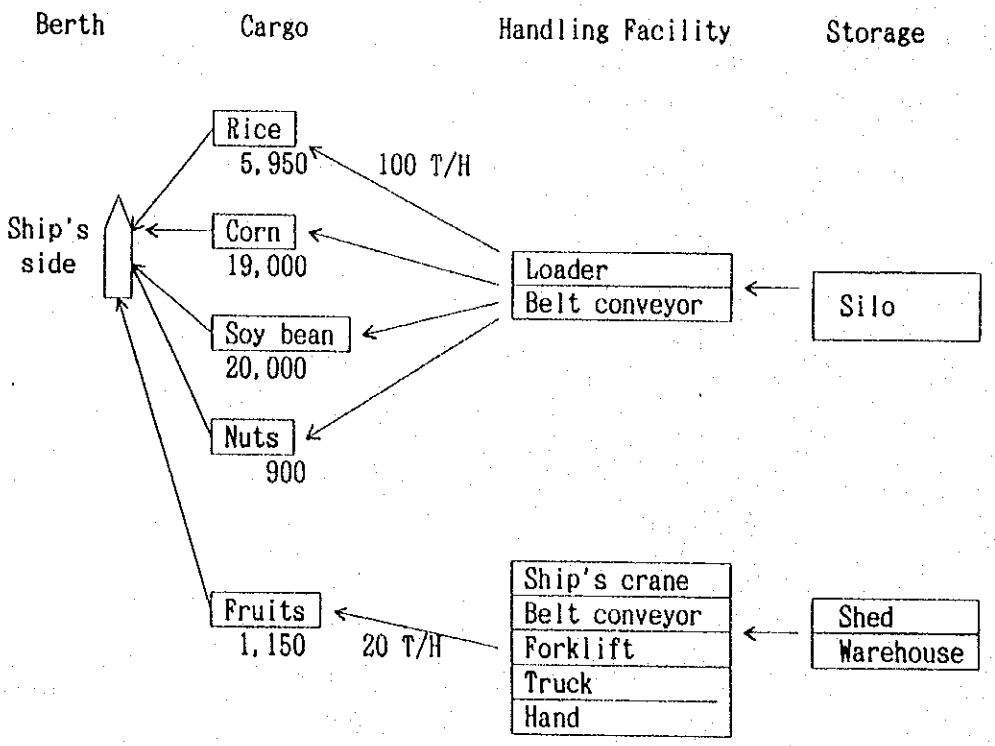
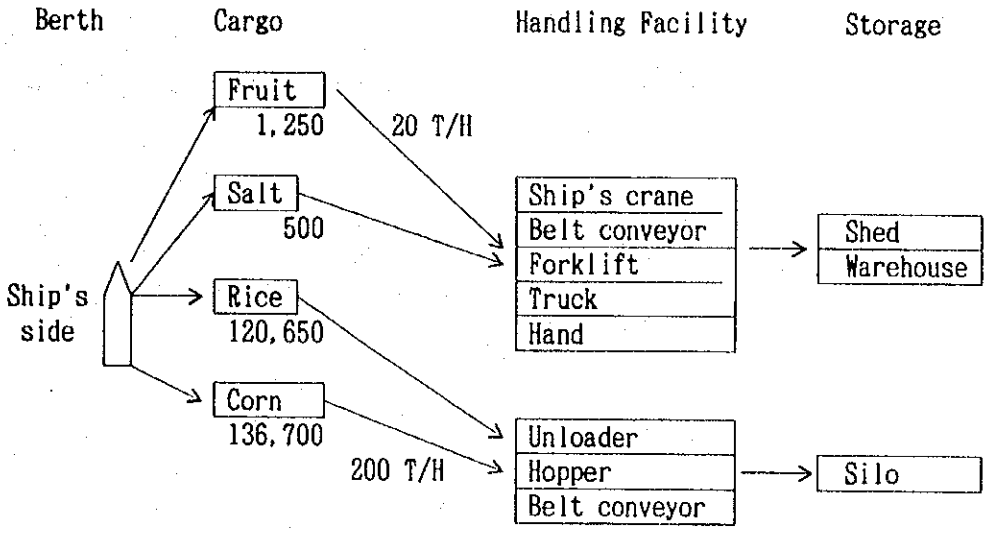


Fig. A4.1.4 Cargo flow and Facility Planning at Guadalupe

(Unloading)



(Loading)

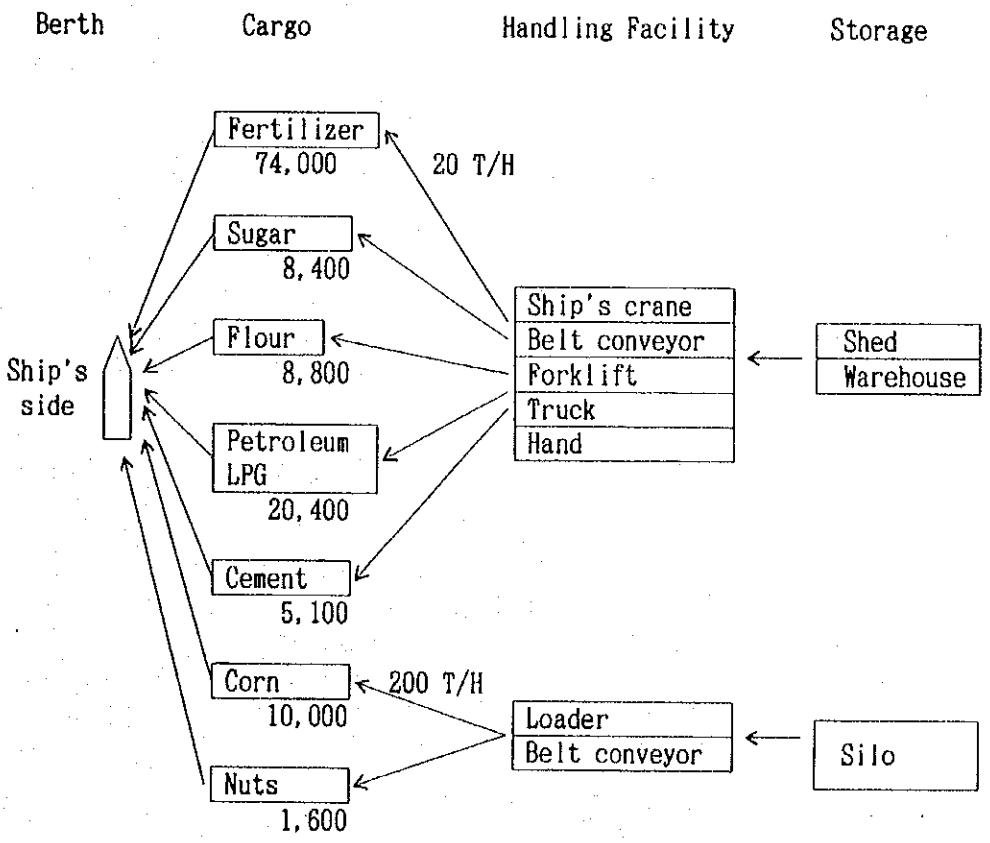


Fig. A4.1.5 Cargo flow and Facility Planning at Floriano

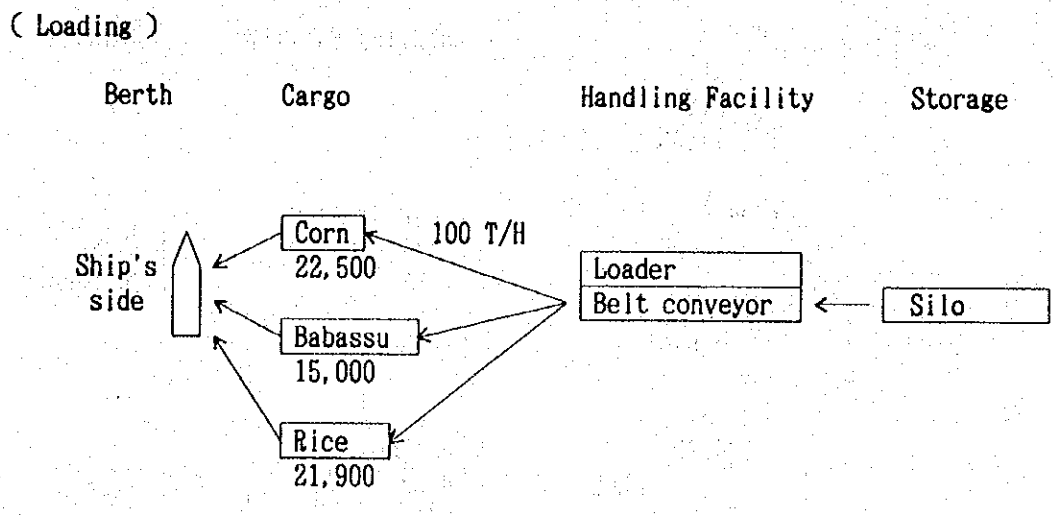


Fig. A4.1.6 Cargo flow and Facility Planning at Amarante

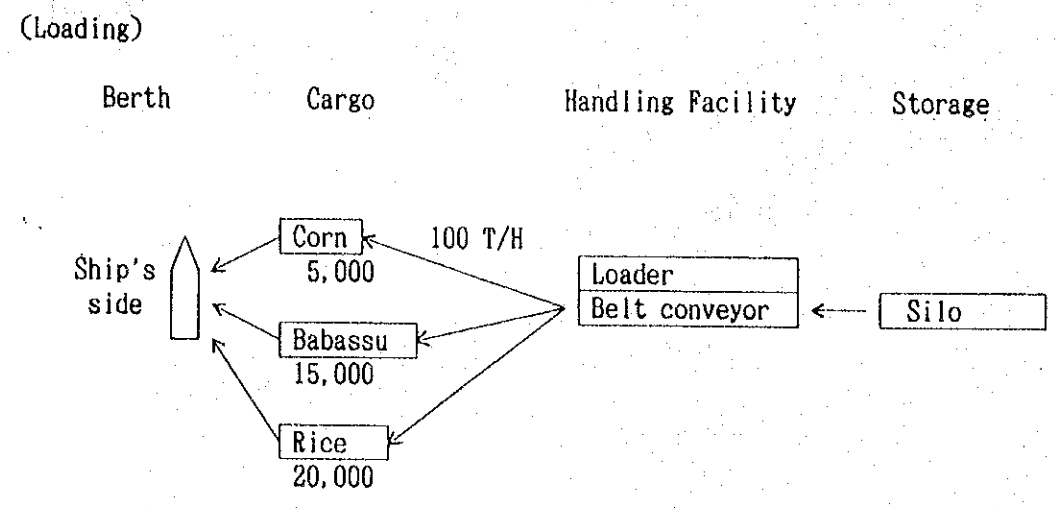


Fig. A4.1.7 Cargo flow and Facility Planning at Palmeiras

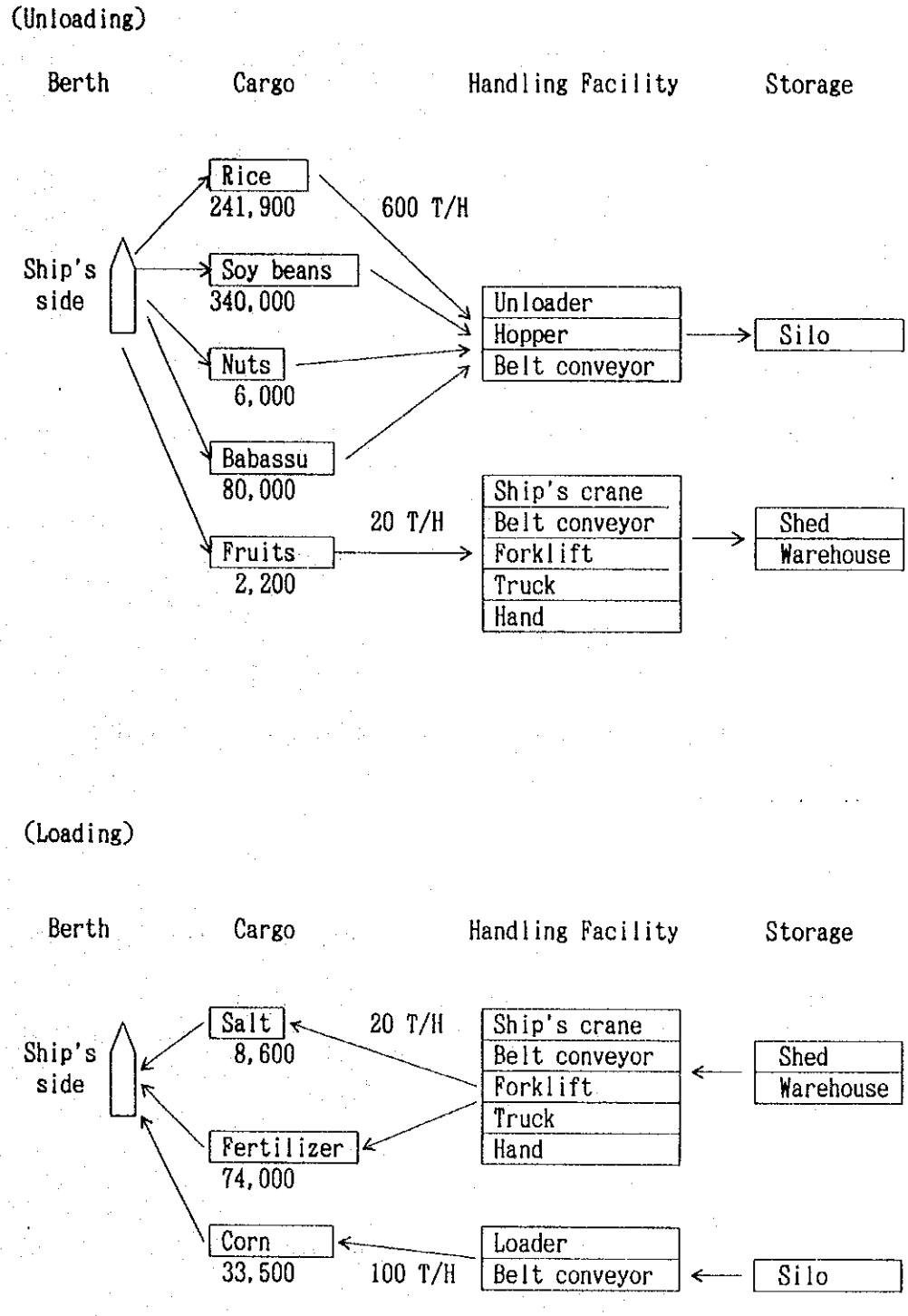


Fig. A4.1.8 Cargo flow and Facility Planning at Teresina

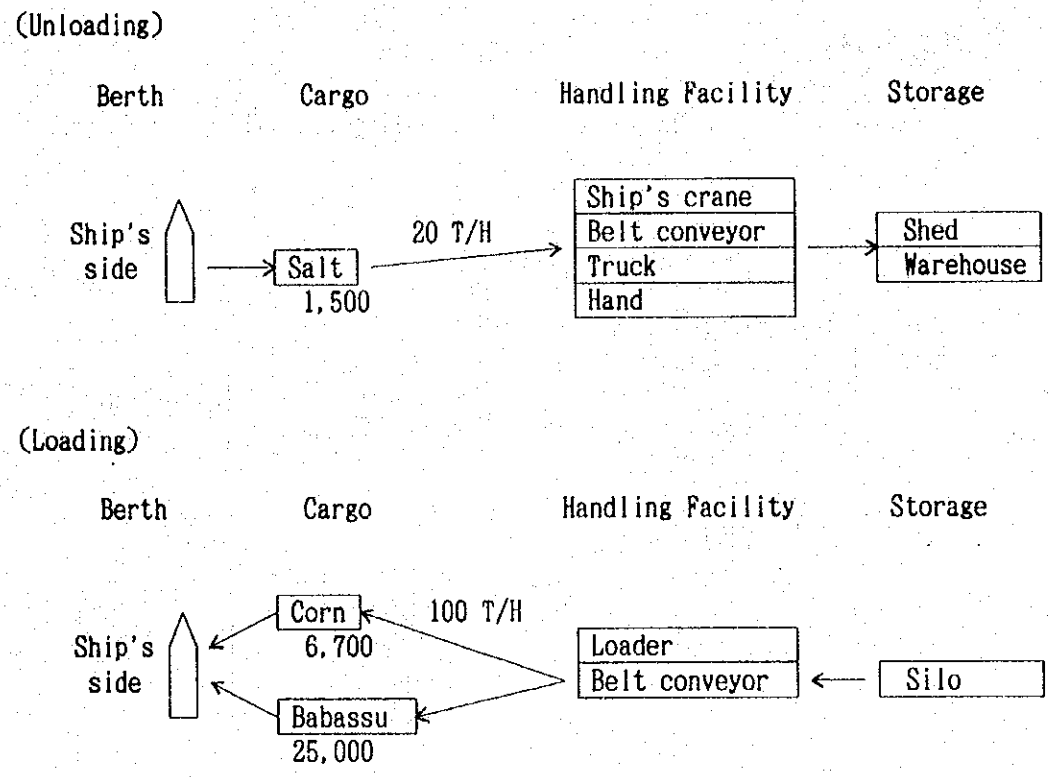


Fig. A4.1.9 Cargo flow and Facility Planning at Uniao

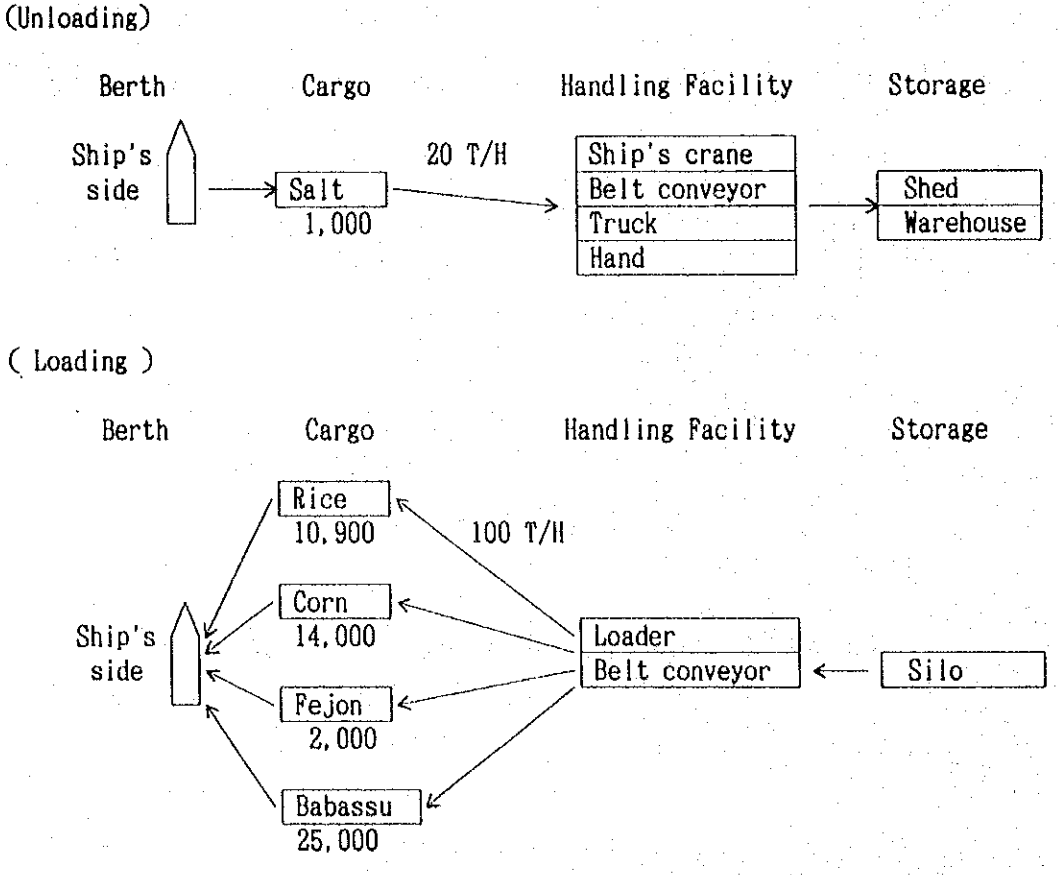
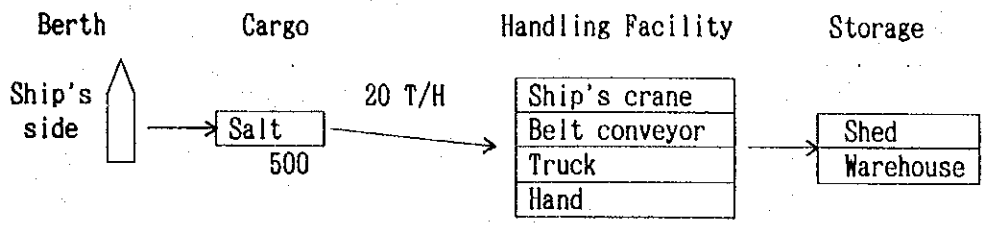


Fig. A4.1.10 Cargo flow and Facility Planning at Miguel Alves

(Unloading)



(Loading)

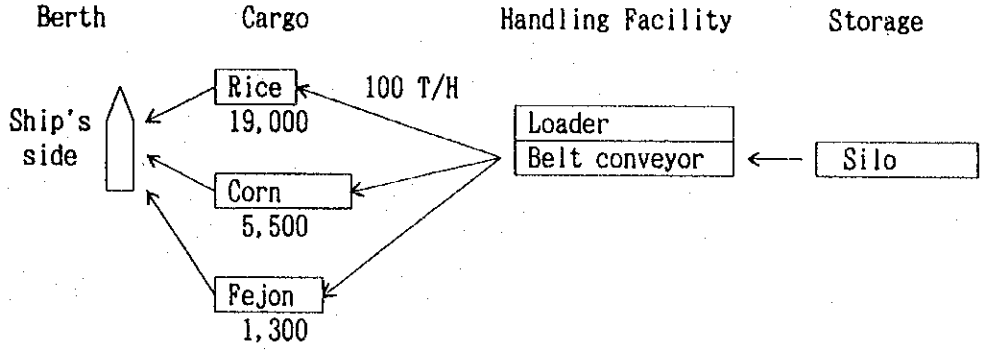


Fig. A4.1.11 Cargo flow and Facility Planning at Porto

(Loading)

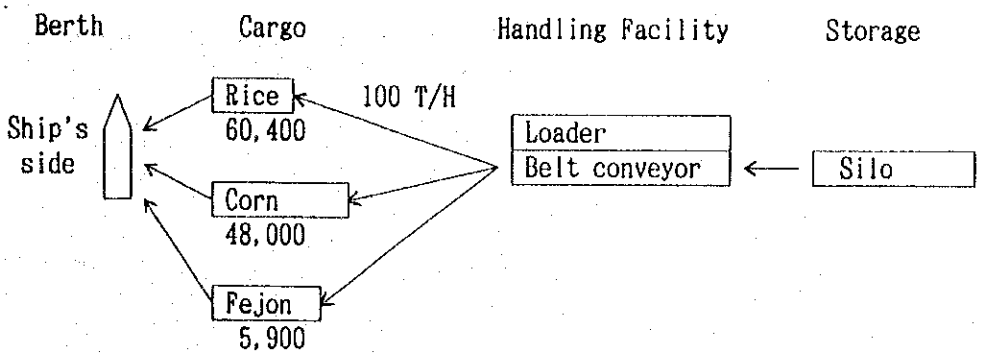
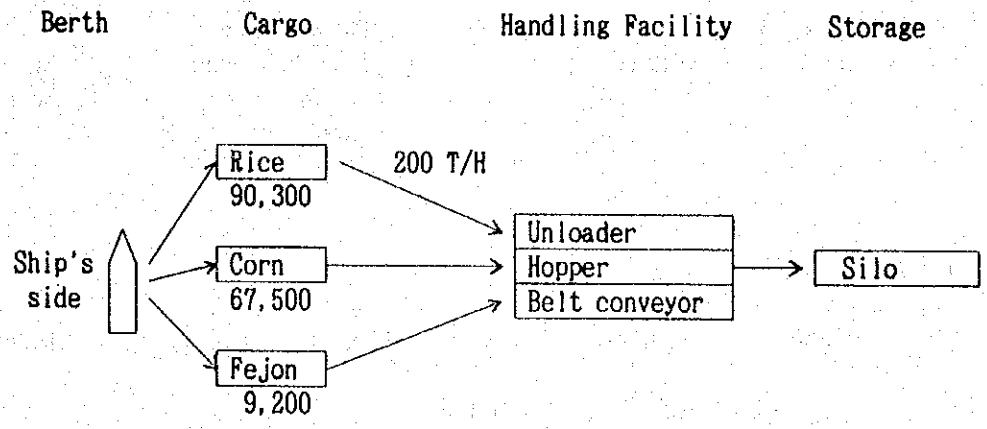


Fig. A4.1.12 Cargo flow and Facility Planning at Porto

(Unloading)



(Loading)

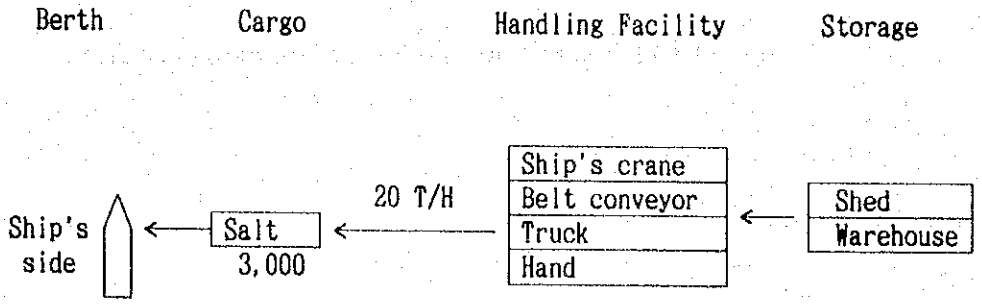


Fig. A4.1.13 Cargo flow and Facility Planning at Parnaiba

Table A4.2.1 Required Port Facilities at Each River Port in Scenarios 2 and 4

	Mooring Basin	Berthing Facilities	Loading Equipment	Unloading Equipment	Silo	Shed or Warehouse
1. Parnaíba	-	-	-	-	-	-
2. Luzilandia	-	-	-	-	-	-
3. Porto	-	-	-	-	-	-
4. Miguel Alves	-	-	-	-	-	-
5. Uniao	-	-	-	-	-	-
6. Teresina	x	x	x	x	x	x
7. Palmeiras	-	x	x	-	x	-
8. Amarante	-	x	x	-	x	-
9. Floriano	x	x	x	x	x	x
10. Guadalupe	x	x	x	x	x	x
11. Urucui	x	x	x	x	x	x
12. Riberio Goncalves	x	x	x	x	x	x
13. Santa Filomena	-	x	x	x	x	x

Source : JICA Study Team
Note : x : Required
- : Not required

Table A4.2.2 Required Port Facilities at Each River Port in Scenario 3

	Mooring Basin	Berthing Facilities	Loading Equipment	Unloading Equipment	Silo	Shed or Warehouse
1. Parnaíba	-	-	-	-	-	-
2. Luzilandia	-	-	-	-	-	-
3. Porto	-	-	-	-	-	
4. Miguel Alves	-	-	-	-	-	-
5. Uniao	-	-	-	-	-	-
6. Teresina	-	-	-	-	-	-
7. Palmeiras	-	-	-	-	-	-
8. Amarante	-	-	-	-	-	-
9. Floriano	x	x	x	x	x	x
10. Guadalupe	x	x	x	x	x	x
11. Urucui	x	x	x	x	x	x
12. Riberio Goncalves	x	x	x	x	x	x
13. Santa Filomena	-	x	x	x	x	x

Source : JICA Study Team
Note : x : Required
- : Not required

Table A4.3 Required Shed Capacity for General Cargo Berth

Location	Cargo Volume (ton)	Rotation Rate	No. of Shed	Required Capacity (ton)	Coefficient	Required Shed Area (m2)
1. Parnaiba	3,000	20	1	150	0.5	300
2. Luzilandia	-	-	-	-	-	-
3. Porto	500	20	1	25	0.5	50
4. Miguel Alves	1,000	20	1	50	0.5	100
5. Uniao	1,500	20	1	75	0.5	150
6. Teresina	82,600	20	2	2,065	1.0	2,065
7. Palmeiras	-	-	-	-	-	-
8. Amarante	-	-	-	-	-	-
9. Floriano	117,200	20	2	2,930	1.2	2,442
10. Guadalupe	38,200	20	1	1,910	1.5	1,273
11. Urucui	91,900	20	2	2,298	1.0	2,298
12. Riberio Goncalves	56,000	20	1	2,800	2.0	1,400
13. Santa Filomena	12,700	20	1	635	0.5	1,270

Appendix 5 :
Staff Allocation in Scenarios

Table A5.1.1 Staff Allocation of Each Vessel Office in Scenarios 2 and 4

Liaison Offices	Staff Members			
	Manager	Office Supporting Staffs	Technician	Total
1 Parnaiba	-	-	-	-
2 Luzilandia	-	-	-	-
3 Porto	-	-	-	-
4 Miguel Albes	-	-	-	-
5 Uniao	-	-	-	-
6 Teresina	1	6	2	9
7 Palmeiras	1	-	-	1
8 Amarante	1	-	-	1
9 Floriano	1	4	2	7
10 Guadalupe	1	2	-	3
11 Urucui	1	3	2	6
12 Libeiro Goncalves	1	3	-	4
13 Santa Filomena	1	-	-	1
Total	8	18	6	32

Table A5.1.2 Staff Allocation of Each Vessel Office in Scenario 3

Liaison Offices	Staff Members			
	Manager	Office Supporting Staffs	Technician	Total
1 Parnaiba	-	-	-	-
2 Luzilandia	-	-	-	-
3 Porto	-	-	-	-
4 Miguel Alves	-	-	-	-
5 Uniao	-	-	-	-
6 Teresina	-	-	-	-
7 Palmeiras	-	-	-	-
8 Amarante	-	-	-	-
9 Floriano	1	4	2	7
10 Guadalupe	1	2	-	3
11 Urucui	1	3	2	6
12 Libeiro Goncalves	1	3	-	4
13 Santa Filomena	1	-	-	1
Total	5	12	4	21

Table A5.2.1 Staff Allocation of Each Port Office in Scenarios 2 and 4

Liaison Offices	Staff members			
	Manager	Office Supporting Staffs	Technician	Labour
1 Parnaiba	-	-	-	-
2 Ruzilandia	-	-	-	-
3 Porto	-	-	-	-
4 Miguel Alves	-	-	-	-
5 Uniao	-	-	-	-
6 Teresina	1	5	5	20
7 Palmeiras	1	2	3	5
8 Amarante	1	2	3	5
9 Floriano	1	5	5	15
10 Guadalupe	1	2	3	10
11 Ulucui	1	5	5	15
12 Libeiro Goncalves	1	5	5	15
13 Santa Filomena	1	2	3	10
Total	8	28	32	95

Table A5.2.2 Staff Allocation of Each Port Office in Scenarios 3

Liaison Offices	Staff members			
	Manager	Office Supporting Staffs	Technician	Labour
1 Parnaiba	-	-	-	-
2 Ruzilandia	-	-	-	-
3 Porto	-	-	-	-
4 Miguel Alves	-	-	-	-
5 Uniao	-	-	-	-
6 Teresina	-	-	-	-
7 Palmeiras	-	-	-	-
8 Amarante	-	-	-	-
9 Floriano	1	5	5	15
10 Guadalupe	1	2	3	10
11 Ulucui	1	5	5	15
12 Libeiro Goncalves	1	5	5	15
13 Santa Filomena	1	2	3	10
Total	5	19	21	65

Appendix 6 :
Related Tables for Locks & Cost Estimations

Table A6.1.1 Specification of the Gate Equipments

	Upstream Lock		Downstream Lock		Filling and Emptying Gate
	Upstream Gate	Downstream Gate	Upstream Gate	Downstream Gate	
Type	Vertical Lift Gate	Vertical Lift Gate	Vertical Lift Gate	Vertical Lift Gate	Reversal Tainter Gate
Quantity	1 set	1 set	1 set	1 set	8 sets
Clear Width	12.00m	12.00m	12.00m	12.00m	2.00m
Clear Height	14.00m	8.00m	3.40m	19.60m	1.20m
Design Head	14.15m	26.25m	3.10m	26.25m	29.45m
Operating Head	Balanced Water Level				29.45m
Operating System	Chain Hoist Combined with Counterweight				Hydraulic Cylinder
Operating Speed	2.0m/min	2.0m/min	2.0m/min	2.0m/min	1.2m/min
Lifting Height	14.10m	8.10m	3.50m	19.70m	1.25m
	Stoplog for Lock Chamber	Stoplog for Filling and Emptying Gate			
Type	Multiple Slide Gate	Fixed Weel Gate			
Quantity	2 sets	4 sets			
Clear Width	12.00m	2.00m			
Height	15.00m (1 black : 1.50m)	1.20m (Clear Height)			
Design Head	15.00m	29.45m			
Operating System	Monorail Hoist	Monorail Hoist			

Table A6.1.2 Weight of Steel Structures for the Upstream Lock

(Unit : ton)

Item		Q'ty	Material	Parts	Total
Upstream Gate	Gate Leaf	1	110.0	1.5	111.5
	Gate Guide	1	17.0	0.5	17.5
	Hoist	1	20.0	20.0	40.0
	Counter Weight	2	8.0	—	8.0
	Sub Total		155.0	22.0	177.0
Downstream Gate	Gate Leaf	1	90.0	1.0	91.0
	Gate Guide	1	9.0	—	9.0
	Hoist	1	15.0	13.0	28.0
	Counter Weight	2	7.0	—	7.0
	Sub Total		121.0	14.0	135.0
Filling and Emptying Gate	Gate Leaf	4	6.0	0.2	6.2
	Trunnion	4	6.0	0.2	6.2
	Gate Guide	4	2.0	—	2.0
	Hoist	4	18.0	3.6	21.6
	Sub Total		32.0	4.0	36.0
Stoplog for Lock Chamber	Gate Leaf	1	100.0	1.0	101.0
	Gate Guide	1	10.0	—	10.0
	Lifting Beam	1	2.5	—	2.5
	Monorail Hoist	1	3.0	2.5	5.5
	Sub Total		115.5	3.5	119.0
Stoplog for Filling and Emptying Gate	Gate Leaf	2	2.5	0.1	2.6
	Bulkhead	2	1.0	—	1.0
	Lifting Beam	1	0.4	—	0.4
	Monorail Hoist	4	2.6	1.4	4.0
	Sub Total		6.5	1.5	8.0
Trashrack for Filling Culvert		2	18.0	—	18.0
Ancillary Facilities	Floating Bollard	6	21.0	—	21.0
	Monorail Hoist in the Hoisting Room	2	3.0	0.9	3.9
	Handrail and Ladder		11.0	0.1	11.1
	Pit Cover		6.0	—	6.0
	Sub Total		41.0	1.0	42.0
Mooring Wharf in the Reservoir		1	110.0	—	110.0
Total			599.0	46.0	645.0

Table A6.1.3 Weight of Steel Structures for the Downstream Lock

(Umit : ton)

Item		Q'ty	Material	Parts	Total
Upstream Gate	Gate Leaf	1	17.0	0.5	17.5
	Gate Guide	1	3.0	—	3.0
	Hoist	1	5.0	3.5	8.5
	Counter Weight	2	3.0	—	3.0
	Sub Total		28.0	4.0	32.0
Downstream Gate	Gate Leaf	1	190.0	2.0	192.0
	Gate Guide	1	18.0	—	18.0
	Hoist	1	35.0	45.0	80.0
	Counter Weight	2	14.0	—	14.0
	Sub Total		257.0	47.0	304.0
Filling and Emptying Gate	Gate Leaf	4	6.0	0.2	6.2
	Trunnion	4	6.0	0.2	6.2
	Gate Guide	4	2.0	—	2.0
	Hoist	4	18.0	3.6	21.6
	Sub Total		32.0	4.0	36.0
Stoplog for Lock Chamber	Gate Leaf	1	100.0	1.0	101.0
	Gate Guide	1	11.0	—	11.0
	Lifting Beam	1	2.5	—	2.5
	Monorail Hoist	1	3.0	2.5	5.5
	Sub Total		116.5	3.5	120.0
Stoplog for Filling and Emptying Gate	Gate Leaf	2	2.5	0.1	2.6
	Bulkhead	2	1.0	—	1.0
	Lifting Beam	1	0.4	—	0.4
	Monorail Hoist	4	2.6	1.4	4.0
	Sub Total		6.5	1.5	8.0
Trashrack for Filling Culvert		2	12.0	—	12.0
Ancillary Facilities	Floating Bollard	6	21.0	—	21.0
	Monorail Hoist in the Hoisting Room	2	3.5	0.9	4.4
	Handrail and Ladder		11.0	0.1	11.1
	Pit Cover		6.5	—	6.5
	Sub Total		42.0	1.0	43.0
Total			494.0	61.0	555.0

Table A6.1.4 Construction Cost of Steel Structures for the Upstream Lock

Item		Weight (ton)	Unit Cost (US$/ton)	Cost (US$)
Upstream Gate	Gate Leaf	111.5	7600	847400
	Gate Guide	17.5	9000	157500
	Hoist	40.0	11100	444000
	Counter Weight	8.0	5500	44000
	Sub Total	177.0	—	1492900
Downstream Gate	Gate Leaf	91.0	7600	691600
	Gate Guide	9.0	9000	81000
	Hoist	28.0	11100	310800
	Counter Weight	7.0	5500	38500
	Sub Total	135.0	—	1121900
Filling and Emptying Gate	Gate Leaf	6.2	9000	55800
	Trunnion	6.2	7600	47120
	Gate Guide	2.0	10400	20800
	Hoist	21.6	11100	239760
	Sub Total	36.0	—	363480
Stoplog for Lock Chamber	Gate Leaf	101.0	6900	696900
	Gate Guide	10.0	7600	76000
	Lifting Beam	2.5	9000	22500
	Monorail Hoist	5.5	11100	61050
	Sub Total	119.0	—	856450
Stoplog for Filling and Emptying Gate	Gate Leaf	2.6	9000	23400
	Bulkhead	1.0	9000	9000
	Lifting Beam	0.4	9000	3600
	Monorail Hoist	4.0	11100	44400
	Sub Total	8.0	—	80400
Trashrack for Filling Culvert		18.0	7600	136800
Ancillary Facilities	Floating Bollard	21.0	7600	159600
	Monorail Hoist in the Hoisting Room	3.9	11100	43290
	Handrail and Ladder	11.1	6200	68820
	Pit Cover	6.0	6200	37200
	Sub Total	42.0	—	308910
Mooring Wharf in the Reservoir		110.0	7600	836000
Total		645.0	—	5196840

Table A6.1.5 Construction Cost of Steel Structures for the Downstream Lock

Item		Weight (ton)	Unit Cost (US$/ton)	Cost (US$)
Upstream Gate	Gate Leaf	17.5	7600	133000
	Gate Guide	3.0	9000	27000
	Hoist	8.5	11100	94350
	Counter Weight	3.0	5500	16500
	Sub Total	32.0	—	270850
Downstream Gate	Gate Leaf	192.0	7600	1459200
	Gate Guide	18.0	9000	162000
	Hoist	80.0	11100	888000
	Counter Weight	14.0	5500	77000
	Sub Total	304.0	—	2586200
Filling and Emptying Gate	Gate Leaf	6.2	9000	55800
	Trunnion	6.2	7600	47120
	Gate Guide	2.0	10400	20800
	Hoist	21.6	11100	239760
	Sub Total	36.0	—	363480
Stoplog for Lock Chamber	Gate Leaf	101.0	6900	696900
	Gate Guide	11.0	7600	83600
	Lifting Beam	2.5	9000	22500
	Monorail Hoist	5.5	11100	61050
	Sub Total	120.0	—	864050
Stoplog for Filling and Emptying Gate	Gate Leaf	2.6	9000	23400
	Bulkhead	1.0	9000	9000
	Lifting Beam	0.4	9000	3600
	Monorail Hoist	4.0	11100	44400
	Sub Total	8.0	—	80400
Trashrack for Filling Culvert		12.0	7600	91200
Ancillary Facilities	Floating Bollard	21.0	7600	159600
	Monorail Hoist in the Hoisting Room	4.4	11100	48840
	Handrail and Ladder	11.1	6200	68820
	Pit Cover	6.5	6200	40300
	Sub Total	43.0	—	317560
Total		555.0	—	4573740

Table A6.1.6 Cost of the Control Equipment

Item	Specification	Quantity	Cost(US $)
Local Control Panel for Lock Gate	Type : Outdoor Type Size : $800^{W} \times 600^{D} \times 2000^{H}$	4	160000
Local Control Panel for Filling and Emptying Gate	Type : Outdoor Type Size : $800^{W} \times 600^{D} \times 2000^{H}$	8	320000
Remote Control Panel	Type : Indoor Desk Type Size : $3000^{W} \times 1000^{D} \times 1500^{H}$	3	270000
ITV Monitoring Equipment	Type : Outdoor Type Camera and Controller	6	120000
Traffic Signal	Type : Outdoor Type	8	50000
Water Level Indicator	Pressure Detective Type	5	200000
Announcement Equipment	Microphone : 2 Speaker : 4 Amplifier : 2	1set	10000
Lighting Equipment	Mercury Vapor Lamp	16	64000
Elevator for Upstream Lock	Lifting Load : 200kg Lifting Height : 21m	1	100000
Elevator for Downstream Lock	Lifting Load : 200kg Lifting Height : 15m	1	90000
Cable	Power Cable : 18000m Control Cable : 150000m	1set	260000
Conduit Pipe	Conduit Pipe 2000 Coupling,Connector : 2000	1set	50000
Installation	———	—	1000000
T o t a l	———	—	2694000

Table A6.1.7 Cost of the Relevant Civil Works

Item	Description	Quantity	Unit Cost (US$)	Cost (US$)
Second Stage Concrete for Lock Chamber	Structual Concrete	700 m^3	180	126000
Counter Weight for Gate Hoist	Structual Concrete	130 m^3	180	23400
Wall for Hoisting Room and Operating Room	Reinforced Concrete	350 m^3	320	112000
Storage Facility for Stoplog	Reinforced Concrete	220 m^3	320	70400
Removing of gravel and Soil in the Downstream Channel		1000 m^3	10	10000
Others	—	—	—	100000
Total	—	—	—	441800

Table A6.2.1 Construction Cost for Type 1 River Port

Unit : US$

Item	Secifications	Unit	Qty	Unit Cost	Cost
1. Loading Platform	Concrete deck with pile foundation (15mLx10mWx3.5mD)	m	15	35,000	525,000
2. Bresting Dolphin	Concrete deck with pile foundation	pcs	2	30,000	60,000
3. Mooring Dolphin	Concrete base with pile	pcs	2	15,000	30,000
4. Revetment	Stone with concrete	m	80	2,000	160,000
5. Port Office	10 m x 20 m	m2	200	2,000	400,000
6. Pavement	Asphalt	m2	1500	80	120,000
7. Utilities		LS	1		155,000
8. Others		LS	1		200,000
Total					1,650,000

Table A6.2.2 Construction Cost for Type 2 River Port

Unit : US$

Item	Secifications	Unit	Qty	Unit Cost	Cost
1. Platform	Concrete deck with pile foundation (25mLx10mWx3.5mD)	m	25	35,000	875,000
2. Bresting Dolphin	Concrete deck with pile foundation	pcs	1	30,000	30,000
3. Mooring Dolphin	Concrete base with pile	pcs	2	15,000	30,000
4. Revetment	Stone with concrete	m	80	2,000	160,000
5. Port Office	10 m x 20 m	m2	200	2,000	400,000
6. Pavement	Asphalt	m2	1500	80	120,000
7. Shed	20 m x 15 m	m2	300	1,000	300,000
8. Utilities		LS	1		205,000
9. Others		LS	1		200,000
Total					2,320,000

Table A6.2.3 Construction Cost for Type 3 River Port

Unit : US$

Item	Secifications	Unit	Qty	Unit Cost	Cost
1. Platform	Concrete deck with pile foundation (15mLx10mWx3.5mD and 50mLx10mWx3.5D)	m	65	35,000	2,275,000
2. Bresting Dolphin	Concrete deck with pile foundation	pcs	2	30,000	60,000
3. Mooring Dolphin	Concrete base with pile	pcs	3	15,000	45,000
4. Revetment	Stone with concrete	m	150	2,000	300,000
5. Port Office	10 m x 20 m	m2	200	2,000	400,000
6. Pavement	Asphalt	m2	2000	80	160,000
7. Shed	40 m x 30 m	m2	1200	1,000	1,200,000
8. Utilities		LS	1		480,000
9. Others		LS	1		400,000
Total					5,320,000

Table A6.2.4 Construction Cost for Type 4 River Port

Unit : US$

Item	Secifications	Unit	Qty	Unit Cost	Cost
1. Platform	Concrete deck with pile foundation (15mLx10mWx3.5mD and 50mLx10mWx3.5Dx2 deck)	m	115	35,000	4,025,000
2. Bresting Dolphin	Concrete deck with pile foundation	pcs	2	30,000	60,000
3. Mooring Dolphin	Concrete base with pile	pcs	3	15,000	45,000
4. Revetment	Stone with concrete	m	200	2,000	400,000
5. Port Office	15 m x 20 m	m2	300	2,000	600,000
6. Pavement	Asphalt	m2	3000	80	240,000
7. Shed	40 m x 30 m x 2	m2	2400	1,000	2,400,000
8. Utilities		LS	1		810,000
9. Others		LS	1		400,000
Total					8,980,000

Table A6.3.1 Office Administration Cost in Scenario 1

Vessel Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	13	3,500	45,500	546,000
b. Office staff	person	23	1,400	32,200	386,400
c. Office engineer	person	8	1,600	12,800	153,600
sub-total				90,500	1,086,000
2 Travel expenses	office	13	3,000	39,000	468,000
3 Utilities cost	office	13	2,000	26,000	312,000
4 Office supply	office	13	1,000	13,000	156,000
5 Material cost for maintenance	office	13	3,000	39,000	468,000
6 Other cost	office	13	2,000	26,000	312,000
Total				233,500	2,802,000

Port Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	13	3,500	45,500	546,000
b. Office staff	person	39	1,400	54,600	655,200
c. Office engineer	person	47	1,600	75,200	902,400
d. Workers	person	130	600	78,000	936,000
sub-total				253,300	3,039,600
2 Travel expenses	office	13	2,000	26,000	312,000
3 Utilities cost	office	13	1,000	13,000	156,000
4 Office supply	office	13	1,000	13,000	156,000
5 Material cost for maintenance	office	13	1,000	13,000	156,000
6 Other cost	office	13	2,000	26,000	312,000
Total				344,300	4,131,600

River management

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	8	3,500	28,000	336,000
b. Office staff	person	26	1,400	36,400	436,800
c. Office engineer	person	64	1,600	102,400	1,228,800
sub-total				166,800	2,001,600
2 Travel expenses	office	8	5,000	40,000	480,000
3 Utilities cost	office	8	1,000	8,000	96,000
4 Office supply	office	8	1,000	8,000	96,000
5 Material cost for maintenance	office	8	1,000	8,000	96,000
6 Other cost	office	8	2,000	16,000	192,000
Total				246,800	2,961,600

Table A6.3.2 Office Administration Cost in Scenario 2

Vessel Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	8	3,500	28,000	336,000
b. Office staff	person	18	1,400	25,200	302,400
c. Office engineer	person	6	1,600	9,600	115,200
sub-total				62,800	753,600
2 Travel expenses	office	8	3,000	24,000	288,000
3 Utilities cost	office	8	2,000	16,000	192,000
4 Office supply	office	8	1,000	8,000	96,000
5 Material cost for maintenance	office	8	3,000	24,000	288,000
6 Other cost	office	8	2,000	16,000	192,000
Total				150,800	1,809,600

Port Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	8	3,500	28,000	336,000
b. Office staff	person	28	1,400	39,200	470,400
c. Office engineer	person	32	1,600	51,200	614,400
d. Workers	person	95	600	57,000	684,000
sub-total				175,400	2,104,800
2 Travel expenses	office	8	2,000	16,000	192,000
3 Utilities cost	office	8	1,000	8,000	96,000
4 Office supply	office	8	1,000	8,000	96,000
5 Material cost for maintenance	office	8	1,000	8,000	96,000
6 Other cost	office	8	2,000	16,000	192,000
Total				231,400	2,776,800

River management

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	5	3,500	17,500	210,000
b. Office staff	person	14	1,400	19,600	235,200
c. Office engineer	person	36	1,600	57,600	691,200
sub-total				94,700	1,136,400
2 Travel expenses	office	5	5,000	25,000	300,000
3 Utilities cost	office	5	1,000	5,000	60,000
4 Office supply	office	5	1,000	5,000	60,000
5 Material cost for maintenance	office	5	1,000	5,000	60,000
6 Other cost	office	5	2,000	10,000	120,000
Total				144,700	1,736,400

Table A6.3.3 Office Administration Cost in Scenario 3

Vessel Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	5	3,500	17,500	210,000
b. Office staff	person	12	1,400	16,800	201,600
c. Office engineer	person	4	1,600	6,400	76,800
sub-total				40,700	488,400
2 Travel expenses	office	5	3,000	15,000	180,000
3 Utilities cost	office	5	2,000	10,000	120,000
4 Office supply	office	5	1,000	5,000	60,000
5 Material cost for maintenance	office	5	3,000	15,000	180,000
6 Other cost	office	5	2,000	10,000	120,000
Total				95,700	1,148,400

Port Operation

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	5	3,500	17,500	210,000
b. Office staff	person	19	1,400	26,600	319,200
c. Office engineer	person	21	1,600	33,600	403,200
d. Workers	person	65	600	39,000	468,000
sub-total				116,700	1,400,400
2 Travel expenses	office	5	2,000	10,000	120,000
3 Utilities cost	office	5	1,000	5,000	60,000
4 Office supply	office	5	1,000	5,000	60,000
5 Material cost for maintenance	office	5	1,000	5,000	60,000
6 Other cost	office	5	2,000	10,000	120,000
Total				151,700	1,820,400

River management

Unit : US$

	Unit	Qty	Unit Cost	Cost per month	Cost per year
1 Personnel cost					
a. Office manager	person	4	3,500	14,000	168,000
b. Office staff	person	14	1,400	19,600	235,200
c. Office engineer	person	36	1,600	57,600	691,200
sub-total				91,200	1,094,400
2 Travel expenses	office	4	5,000	20,000	240,000
3 Utilities cost	office	4	1,000	4,000	48,000
4 Office supply	office	4	1,000	4,000	48,000
5 Material cost for maintenance	office	4	1,000	4,000	48,000
6 Other cost	office	4	2,000	8,000	96,000
Total				131,200	1,574,400