Appendix D

Tables

Table D3.1 Results of the Baseline RRA obtained from Interviewing 17 Households (comprising 119 persons) from the Dinh Trang Thuong and Dak Plao Communes Living in the Planned Reservoir No.3 Impoundment Basin (1/3)

Parameter	Dinh Trang Thuong	Dak Plao
Demographic Characteristics:		
Commune Location	Hamlet 1, hamlet 4	Hamlet 3, hanlet 4, hamlet 5.
Main Tribe (as % of persons interviewed: note that a total of 17 families were interviewed)	Ma (100%) – 6 families interviewed	Ma (90%) – 9 families interviewed
Other Tribes (as % of persons interviewed))	Not Applicable	Kinh (10%) - 1 family interviewed
House Construction Material (e.g. wood, thatch)	All from bamboo and thatch. Minimum house area is 16 m^2. Maximum house area is 38 m^2.	44% are made from bamboo and thatch; and 56% are made from wood with metal roofs. Minimum house area is 24 m^2. Maximum house area is 70 m^2.
Total Persons in the Census Sample	51	68
Number Adult Males (18 years +) to 60	11	14
Number Adult Females (18 years +) to 55	12	15
Number Male Infants (< 5 years)	4	8
Number Female Infants (< 5 years)	5	10
Number Male Children (5 – 18 years)	4	8
Number Female Children (5 – 18 years)	5	11
Number Females over 55	6	5
Number males over 60	4	5
TOTAL PERSONS OF ALL-AGE GROUP IN SAMPLE	**51**	68
Smallest Family Size	4	2
Largest Family Size	12	10
Family Average Size	8.5	6.2
Number Children Not Attending School	2	0
Health Aspects:		
Mortality – Malaria	2 cases	-
Mortality – Diarrhea	-	-
Mortality – Parasites	-	-
Mortality – Lung Disease	-	-
Mortality – Other Cause	2	2
Causes of Death:		
Cause of Death in Children < 5 years age	Malaria	Malaria
Cause of Death in Children age 5 – 18 years	Malaria	Malaria
Principal Cause of Death in Adults	Malaria	Malaria
Principal cause of Death in Children	Malaria	Malaria
Other Diseases:		
Measles; Mumps, Diphtheria; Tetanus; Malaria; Whooping Cough etc)	All reported in the commune	All reported in the commune

(Continued.)

Table D3.1 Results of the Baseline RRA obtained from Interviewing 17 Households (comprising 119 persons) from the Dinh Trang Thuong and Dak Plao Communes Living in the Planned Reservoir No.3 Impoundment Basin (2/3)

Parameter	Dinh Trang Thuong	Dak Plao
Principal Means of Livelihood:		
Land Ownership (number of fields)	Each family has between 3 to 5 fields	Each family has between 2 to 6 fields
Size of fields:	0.5 ha to 2.5 ha	0.5 ha to 2.5 ha
Fields (Land) Owned within the Commune Location	All within commune boundary: about 0.3 to 2.5 km far from houses.	All within commune boundary: about 0.5 to 1.5 km from houses.
Fields (Land) Owned outside of Commune Location	none	none
Number of Fields outside of Commune Lost to Reservoir	none	none
Area of Fields (Land) Lost to Reservoir	17.6 ha	26.3 ha
Paddy (Number of harvests per year)	1 to 2 crops	1to 2 crops
Paddy Pests and Paddy Diseases	Insects, rodents and fungus	Insects, rodents and fungus
Livestock (cattle; goats; pigs; chicken; other)	Buffaloes, Cows, Goats, Pigs and Chickens	Buffaloes, Cows, Goats, Pigs, Chickens and Ducks
Home Garden Plots (for growing staple crops)	From 150 m^2 to 1500 m^2	From 200m^2 to 1850 m^2.
Fruit Produce	Bananas, jack fruit, papaw, mango, orange etc.	Bananas, jack fruit, papaw, mango, orange etc.
Area of Fruit Cultivation (ha)	From 150 m^2 to 1500 m^2.	From 200m^2 to 1850 m^2.
Number of Fruit Harvests per year	1 to 2 crops	1 to 2 crops
Principal Fruit Pests and Disease	insects and fungus	insects and fungus
Vegetable Produce	Pumpkin, maize and beans grown alongside coffee shrubs	Pumpkin, maize and beans grown alongside coffee shrubs
Area of Vegetable Cultivation (ha)	Not determined	Not determined
Number of Vegetable Harvests per year	2	2
Principal Vegetable Pest and Disease	Insects and fungus	Insects and fungus
Forestry	Ever-green forest, regenerated and recently replanted forest	Ever-green forest, regenerated and recently replanted forest
Fishing (see footnote below)	not common	not common
Handicraft Economy	not developed	not developed
Commune Economics:		
Household Annual Income (Vietnamese Dong)	From 5 to 22 million	From 3 to 30 million
Household Annual Expenditure (Vietnamese Dong)	From 5 to 20 million	From 3 to 16 million

(Continued.)

Table D3.1 Results of the Baseline RRA obtained from Interviewing 17 Households (comprising 119 persons) from the Dinh Trang Thuong and Dak Plao Communes Living in the Planned Reservoir No.3 Impoundment Basin (3/3)

Parameter	Dinh Trang Thuong	Dak Plao
Infrastructure:		
Health Services:		
Type of Health Service and Provisions	Basic health center in commune	Basic health center in commune
Location of Closest Medical Facility	Commune center	Commune center
Distance to Closest Medical Facility	From 1.2 to 12 km	From 0.2 to 0.6 km
Road Services:		
Major Road Facilities and Connections Close to the Commune	National Highway road no.28 and link roads	National Highway road no.28and link roads
Commune Road Construction Material	Compacted earth	Compacted earth
Existing Road Surface (Good; Fair; Poor; Bad)	Fair	Fair
Public Transport (Type of Public Transport)	Bus, truck.	Bus, truck.
Frequency of Public Transport Services	Bus 2 to 3 time a week in the dry season and no services in the rainy season	Bus 2 to 3 time a week in the dry season and no services in the rainy season
Education Facilities:		
Location of Primary Education Facilities	Commune center	Commune center
Distance from Home to Primary Education Facility	From 1.2 km to 12 km	From 0.2 to 0.6 km.
Secondary Education Facilities	None	None
Distance to Secondary Education Facility	More than 20 km	More than 20 km
Electricity Supplies:		
Number of houses connected to grid	none	none
Diesel or Other Electrical Generators	1	1
Water Supplies:		
Type of Water Supply (River; Standpipe; Well; etc)	Tube wells; dug wells and from streams / river	Tube wells; dug wells and from streams / river
Water Quality (Good; Poor; Polluted) for Drinking	Good	Good
Irrigation Supplies (for paddy etc)	Rain-fed and private pumps	
Reliability of Water Supply	No failures in supply	No failures in supply
Sanitation and Waste Disposal Facilities:		
Sanitation provisions (pits etc.)	None available	None available
Archaeological, Historic and Cultural Assets:		
Places of Religious Significance	None in Commune	None in Commuune
Temples	None in commune	None in commune
Archaeological Sites	None in commune	None in commune

Data Source : Resettlement surveys undertaken in the Field Investigation Stages June - September 1999

Table D4.1 Communes with Boundaries Occupying the Planned Dong Nai No.3 and No.4 Reservoir Areas

	Province	District	Commune Name
1	Lam Dong	Bao Lam	Loc Lam (penetrating into the reservoir 3 area)
2	Lam Dong	Bao Lam	Loc Phu (penetrating into the reservoir 3 area)
3	Lam Dong	Bao Lam	Loc Bao (penetrating into the reservoir 4 area)
4	Lam Dong	Lam Ha	Phuc Tho (penetrating into the reservoir 3 area)
5	Lam Dong	Di Ling	Dinh Trang Thuong (penetrating into the reservoir 3 area)
6	Dak Lak	Dak Nong	Dak Plao (penetrating into the reservoir 3 area)
7	Dak Lak	Dak Nong	Dak Som (penetrating into the reservoir 3 area)
8	Dak Lak	Dak Nong	Quang Khe (penetrating into the reservoir 3 and 4 area)

Source : Resettlement and environmental surveys undertaken in the Field Investigation Stages June – September 1999

Table D4.2 Demographic Characteristics of the Provinces and Communes

Parameter	Province		Distict		
	Dak Lak	Lam Dong	Dak Nong	Di Linh	Bao Lam
Area (km^2)	19535	9773.95	3131	1627.55	1457.15
Population	1515367	932473	29840	117,360	79,995
Pop. density	77.57	95	14	72	54.9
Pop. increase % pa	5.7	4.4	14.2	4	4.8

Data Source : 1998 District Statistical Year Books

Table D4.3 Communes' Population Numbers and Densities

Parameter	Commune						
	Quang Khe	Dak Som	Dak Plao	Din Trang Thuong	Loc Bao	Loc Phu	Loc Lam
Area (km^2)	226	75	220	89.9	245.8	123.8	134.4
Population	2450	1634	1004	1786	1119	1274	1335
Pop. density	10.82	21.79	4.56	19.87	4.55	10.29	9.93

Data Source : 1998 District Statistical Year Books

Table D4.4 Main Ethnic Groups within the Bao Lam, Di Ling and Dak Nong Districts

Ethnic Group	Dak Nong District		Di Ling District		Bao Lam District	
	Population	%	Population	%	Population	%
Kinh	13,582	49.0	73,605	64	54,512	69.84
Ma	4,071	14.7	1,850	1.6	11,682	14.94
K'ho	-	-	32,526	30.9	7,399	9.54
M'Hong	8,957	32.3	-	-	-	-
Hoa	-	-	1,100	1.0	882	1.12
Nung	-	-	1,483	1.3	1,488	1.9
Tay	-	-	61	0.05	1,547	1.97
Ra-Glay	-	-	964	0.80	-	-
Thai	160	0.6	69	0.05	43	0.05
Others	950	3.4	394	0.30	501	0.64
Total	27,720		115,052		78,054	

Data Source : the 1998 District Statistical Yearbooks

Table D4.5 Composition of Ethnic Groups within the 7 Communes Occupying Land within the Dong Nai No.3 and No.4 Planned Reservoir Areas

Ethnic Group	Commune							Total
	Quang Khe	Dak Som	Dak Plao	Loc Lam	Loc Phu	Loc Bao	Dinh Tr. Thuong	
Kinh	135	34	33	143	901	79	25	1350
Ma	2220	1600	930	1192	352	1040	1750	9084
M'Nong			14					14
Chiu								21
Others	56		27		21		11	94
Total No.	2411	1634	1004	1335	1274	1119	1786	10,563

Data Source : the 1998 District Statistical Yearbooks

Table D4.6 Agricultural Production from the 7 Commune Occupying Land within the Proposed Dong Nai No.3 and No.4 Planned Reservoirs

Population	Commune							
	Quang Khe	Dak Som	Dak Plao	Loc Lam	Loc Phu	Loc Bao	Dinh Tr. Thuong	Total
*Edible Crops**								
Area (ha)	154.4	32	72	96	96	102	51	603.4
Tonnes Harvested	229.7	50	112.7	189	190	202	150.1	
Pepper								
Area (ha)	3	-	-	-	-	-	-	3
Tonnes Harvested	5.1	-	-	-	-	-	-	
Coffee								
Area (ha)	821	115	59	282	739	277	913	3206
Tonnes Harvested	119.9	24.6	12.6	17	34	14	468.3	
Tea								
Area (ha)	-	-	-	228	255	122	19	624
Tonnes Harvested	-	-	-	671	424	221	57	
Fruit Trees								
Area Harvested (ha)	3	-	1	3.7	27	63.8	4	102.5
Total Area Harvested	981.4	147	132	609.7	1117	564.8	987	4538.9

Data Source : the 1998 District Statistical Yearbooks
Foot note : * ; Edible crops comprise staple foods such rice, potato, yams and maize

Table D4.7 Agricultural Production within the Districts encompassing the 7 Communes

Crop	Di Linh District		Bao Lam		Dak Nong	
	Area (ha)	Harvest (t)	Area (ha)	Harvest (t)	Area (ha)	Harvest (t)
Edible Crops						
Rice	2660	7613.5	463	896.5	808.9	980.35
Sweet potato	30	112.8	90	445	52.5	156.9
Yams	50	341.2	95	926.3	110	328.5
Maize	709	3835	70	122.5	308.5	684.4
Sub Total Area (ha)	3449		718		1279.9	
Cash Crops						
Mulberry	442	1768	776	4536	-	-
Tea	1548	4740	11037	39559	65	12
Coffee	26107.9	23665	9471	9517	5273	1505.96
Cashew nuts	10	-	60			
Black pepper	0.3	-	-		52.5	126.6
Fruit Trees	344.1		1683		81.8	
Sub Total Area (ha)	28452.3		23027		5472.3	
Total Area (ha)	31901.3		23745		6752.2	

Data Source : the 1998 District Statistical Yearbooks

Table D4.8 Areas of Forest in the 7 Communes Occupying Land within the Dong Nai No.3 and No.4 Planned Reservoir Areas

Parameter	Commune							
	Quang Khe (ha)	Dak Som (ha)	Dak Plao (ha)	Loc Lam (ha)	Loc Phu (ha)	Loc Bao (ha)	Dinh Tr. Thuong (ha)	Total (ha)
Forest area	18,708	5,964	21,423	10,218	9,633	21,345	5,690	92,981
Total area	22,600	7,500	22,000	13,440	12,380	24,580	8,990	111,490
% forest cover	82.8	79.5	97.3	76	77.8	86.8	63.2	

Data Source : the 1998 District Statistical Yearbooks and the Provincial Authority Land Department Surveys

Table D4.9 Socio-economical Data for the Dinh Trang Thuong and Dak Plao Communes

Parameter	Dinh Trang Thuong	Dak Plao and Dak Som
Demographic Characteristics:		
Commune Location	Di Linh- Lam Dong	Dak Nong-Daklak
Main Tribe (%)	Ma (97%)	Ma (93%)
Other Tribes (%)	Kinh, Other (3%)	Kinh, other (7%)
Commune Area (ha)	8,990 ha	29,514 ha
Number of Houses	280 (2/5 hamlets, or small villages, in the reservoir area)	324 (4/5 hamlets or, small villages, in the reservoir area)
House Construction (e.g. wood, thatch)	Made from wood and thatch	Made from wood and thatch
Commune Population	1786	2173
Number Adult Males (18 years +) to 60	323	413
Number Adult Females (18 years +) to 55	333	422
Number Male Infants (< 5 years)	Not Available	Not Available
Number Female Infants (< 5 years)	Not Available	Not Available
Number Male Children (5 – 18 years)	Not Available	Not Available
Number Female Children (5 – 18 years)	Not Available	Not Available
Health Aspects:		
Mortality – Malaria	350 cases	280 cases
Mortality – Diarrhoea	120 cases	52
Mortality – Parasites	no	no
Mortality – Lung Disease	no	6
Mortality – Other Cause	90	102
Cause of Death in Children < 5 years age	Not Available	Not Available
Cause of Death in Children age 5 – 18 years	Not Available	10
Principal Cause of Death in Adults	Malaria, bronchial disease and diarrhea	Malaria, bronchial disease and diarrhea
Principal Cause of Death in Children	Malaria and diarrhea	Malaria and diarrhea
Measles; Mumps, Diphtheria; Tetanus; Malaria; Whooping Cough etc	Reported in the communes	Reported in the communes

Data Source : the 1998 District Statistical Yearbooks

Table D4.10 Socio-Economic Census Survey Data (20% Sample) Collected during February to August 1999 from the Dinh Trang Thuong and Dak Plao Households living within the Proposed Dong Nai No.3 Reservoir Area (1/3)

Commune Name	Dinh Trang Thuong	Dak Plao
Demographic Characteristics:		
• Main Tribe (as % of persons interviewed)	Ma (100%)	Ma (90%)
• Other Tribes (as % of persons interviewed))	Not Applicable	Kinh (10%)
• House Construction Material (e.g. wood, thatch)	All the houses made of thatch and leaves. Minimum house area is16 m^2. Maximum house area is 38 m^2.	40% made by thatch and leaves, 60 % made by wood and metal roof. Minimum house area is 24 m^2. Maximum house area is 70 m^2.
Health Aspects:		
• Mortality – Malaria	2 cases	none
• Mortality – Diarrhea	none	none
• Mortality – Parasites	none	none
• Mortality – Lung Disease	none	none
• Mortality – Other Cause	2	2
• Cause of Death in Children < 5 years of age	Malaria	Malaria
• Cause of Death in Children aged 5 – 18 years	Malaria	Malaria
• Principal Cause of Death in Adults	Malaria	Malaria
• Principal cause of Death in Children	Malaria	Malaria
• Other Causes of Illness : Measles; Mumps, Diphtheria; Tetanus; Malaria; Whooping Cough etc	All reported in the commune	All reported in the commune
Principal Means of Livelihood:		
• Land Ownership (number of fields)	Each family has 3 to 5 fields	Each family has 2 to 6 fields
• Size of fields	0.5 ha to 2.5 ha	0.5 ha to 2.5 ha
• Fields (Land) Owned within the Commune Location	All within commune boundary: about 0.3 to 2.5 km far from houses.	All within commune boundary: about 0.5 to 1.5 km from houses.
• Fields (Land) Owned outside of Commune Location	none	none
• Number of Fields outside of Commune that will be Impounded by the Reservoir No.3	none	none
• Area of Fields (Land) Impounded by Reservoir No.3	25 ha	59 ha
• Paddy (Number of harvests per year)	1 to 2 crops	1to 2 crops
• Paddy Pests and Diseases	Insects; rodents and fungus	Insects; rodents and fungus
• Livestock (cattle; goats; pigs; chicken; other)	Buffaloes, Cows Goats, Pigs, and Chickens	Buffaloes, Cows, Goats Pigs, Chicken, and Ducks
• Home Garden	From 150 m^2 to 1500 m^2	From 200m^2 to 1850 m^2.

(Continued.)

Table D4.10 Socio-Economic Census Survey Data (20% Sample) Collected during February to August 1999 from the Dinh Trang Thuong and Dak Plao Households living within the Proposed Dong Nai No.3 Reservoir Area (2/3)

Commune Name	Dinh Trang Thuong	Dak Plao
• Fruit (and Fruit type)	Bananas, jack fruit, papaya, mango, orange etc.	Bananas, jack fruit, papaya, mango, orange etc.
• Fruit – Area of Cultivation (ha)	From 150 m^2 to 1500 m^2.	From 200m^2 to 1850 m^2.
• Fruit – Number of Harvests per year	1 to 2 crops	1 to 2 crops
• Principal Fruit Pests and Diseases	Insects	Insects
• Common Types of Vegetables (grown between coffee bushes)	Gourd, Pumpkin and Green Vegetables	Gourd, Pumpkin and Green Vegetables
• Vegetable – Area of Cultivation (ha)	Mixed in the Coffee Fields	Mixed in the Coffee Fields
• Vegetable – Number of harvests per year	1	1
• Principal Vegetable Pest and Disease	Insects and rodents	Insects and rodents
• Forestry	Ever-green forest, regenerated and replanted forest	Ever-green forest, regenerated and replanted forest
• Fishing (see footnote below)	none	none
• Handicrafts	none	none
Commune Economics:		
• Household Annual Income (VND)	From 5 to 22 million	From 3 to 30 million
• Household Annual Expenditure (VND)	From 5 to 20 million	From 3 to 16 million
Infrastructure:		
Health Services:		
• Type of Health Service and Provisions	Basic Health Center	Basic Health Center
• Location of Closest Medical Facility	Commune Basic Health Center	Commune Basic Health Center
• Distance to Closest Basic Medical Facility	From 1.2 to 12 km	From 0.2 to 0.6 km
Road Services:		
• Major Road Facilities and Connections Close to the Commune	National Highway road no.28 and link roads	National Highway road no.28and link roads
• Commune Road Construction Material	Compacted earth	Compacted earth
• Existing Road Surface (Good; Fair; Poor; Bad)	Fair in the dry season; often impassable in wet season	Fair in the dry season; often impassable in wet season
• Roads without a surface; e.g. mud compacted	Without surface finish	Without surface finish
• Public Transport (Type of Public Transport)	Bus, truck.	Bus, truck.
• Frequency of Public Transport Services	Bus 2 to 3 times a week in the dry season and severely erratic service in wet season	Bus 2 to 3 time a week in the dry season and severely erratic service in the wet season
Education Facilities:		
• Primary Education Facility	One in Commune	One in Commune
• Distance to Primary Education Facility	From 1.2 km to 12 km	From 0.2 to 0.6 km.
• Secondary Education Facilities	None	None
• Distance to Secondary Education Facility	More than 20 km	More than 20 km

(Continued.)

Table D4.10 Socio-Economic Census Survey Data (20% Sample) Collected during February to August 1999 from the Dinh Trang Thoung and Dak Plao Households living within the Proposed Dong Nai No.3 Reservoir Area (3/3)

Commune Name	Dinh Trang Thuong	Dak Plao
Electricity Supplies:		
· Number of houses connected to grid	none	none
· Diesel or Other Electrical Generator	1	1
Water Supplies:		
Type of Water Supply (River; Standpipe; Well; etc)	Tube and dug wells and from streams / river	Tube and dug wells and from streams / river
· Water Quality (Good; Poor; Polluted) for Drinking	Good	Good
· Irrigation Supplies (for paddy etc)	Rain-fed and private pumps	Rain-fed and private pumps
· Reliability of Water Supply (note any failures)	No Failures	No Failures
Sanitation and Waste Disposal Facilities:		
· Note any sanitation provisions (pits etc.)	None	None
Archaeological, Historic and Cultural Assets:		
· Places of Religious Significance	None in commune	None in commune
· Temples	None in commune	None in commune
· Archaeological and Historical Sites of Importance	None in commune	None in commune

Data Source : Rapid Rural Appraisal undertaken in the Field Investigation Stages June - September 1999

Table D4.11 Summary of the Number of Households and Other Assets Impacted by Impounding the Dong Nai No. 3 Reservoir Area with a FSL of 590 m

Parameter	Unit	Commune					Total
		Quang Khe	Dak Plao Dak Som	Phuc Tho	Dinh Tr Thuong	Loc Phu Loc Lam	
Households Loosing Homes and Fields							
· Relocated Households	No.	0	168	0	89	0	257
· Relocated Persons	No.	0	1065	0	318	0	1383
· Kinh Ethnic Group Households	No.	0	12	0	5	0	17
· Kinh Ethnic Group Persons	No.	0	46	0	12	0	58
· Ma Ethnic Group Households	No.	0	124	0	84	0	208
· Ma Ethnic Group Persons	No.	0	853	0	306	0	1159
· Tay Ethnic Group Households	No.	0	15	0	0	0	15
· Tay Ethnic Group Persons	No.	0	72	0	0	0	72
· H'Mong Ethnic Group Households	No.	0	13	0	0	0	13
· H'Mong Ethnic Group Persons	No.	0	73	0	0	0	73
· Other Recorded Households	No.	0	4	0	0	0	4
· Other Recorded Persons	No.	0	21	0	0	0	21
Households Loosing Fields Only							
· Total Households			98		29		127
· Total Persons			651		112		763
Affected Totals							
· Total of all Households Affected							384
· Total of all Persons Affected							2146
Impacted Homes (Dwellings)							
· Type 4 Homes (Areas)	ha	0	0.2284	0	0.0148	0	0.2432
· Thatched Homes / Shelters	ha	0	0.2580	0	0	0	0.2580
· Bamboo Homes / Shelters	ha	0	0.3675	0	0.2106	0	0.5781
Major Infrastructure							
· School / health center / public hall	ha	0	0.1490				0.1490
· National Road 28	km	0	5	0	7	0	12
· Unmade Road	km	0	4	0	0	0	4
· Culvert (drainage)	No.	0	2	0	2	0	4
Minor Infrastructure							
· Water Wells	No.	0	11		4	0	15
· Cemeteries	No.	0	633	0	446	0	1079
Private Land Use Area							
· Paddy	ha	0	81.27	0	37.45	0	118.71
· Shifting Cropped Land	ha		25.35	0	10.20	0	35.54
· Perennial Cropped Land	ha	0	231.55	0	67.553	0	299.10
· Residential Land	ha	0	9.50	0	4.20	0	13.70
Total Private Land Use Area	ha		347.67	0	119.43	0	467.06
*Government Land							
Special Purpose Land	ha	0	4.0	0	0	0	4.00
· Owned Forestry Land	ha	14.16	1867.24	117.8	777.2	1116.3	3892.70
· Other Land	ha	3.54	465	29.5	210.1	279.1	987.24
Total Government Land Area	ha	17.7	2336.24	147.3	987.3	1395.4	4883.94
Total Land Area	ha	17.70	2683.91	147.3	1106.7	1395.4	5351

Footnote : * ; Government owned land is not subject to monetary or any other means of compensation

Data Source : Resettlement surveys undertaken in the Field Investigation Stages June - September 1999

Table D4.12 Summary of the Number of Households Impacted by Impounding the Dong Nai No.3 Reservoir Area with a FSL of 590 m

Parameter	Dong Nai 3 Reservoir and Dam Construction (at FSL of 590 m)
Flooded Area (ha)	5,351
• Flooded Households (number to be relocated)	257
• Non flooded households loosing land (number)	127
(Total Number of Impacted Households)	(384)
• Head count (numbers to be relocated)	1,383
• Head count non-flooded households loosing land	763
(Total Impacted Head Count)	(2,146)
Composition of Flooded Ethnic Households	
i) Ma Minority Ethnic Group	
• Ma (number flooded households)	208
• Ma (head count in flooded households)	1,159
ii) Kinh Majority Ethnic Group	
• Kinh (number flooded households)	17
• Kinh (head count in flooded households)	58
iii) Miscellaneous Ethnic Groups	
• Other (number flooded households)	32
• Other (head count in flooded households)	166

Data Source : Resettlement Surveys undertaken in the Field Investigation Stages June - September 1999

Table D4.13 Area of Land Flooded by Impounding Dong Nai No.3 Reservoir with a FSL of 590 m

Type of Land Impounded	Unit	Commune					Total
		Quang Khe	Dak Plao and Dak Som	Phuc Tho	Dinh Trang Thuong	Loc Phu and Loc Lam	
Household Land							
• Paddy Fields	ha	-	81.27		37.45		118.71
• Fruit and vegetable crops	ha	-	25.35		10.2		35.55
• Rice – perennial crops	ha	-	231.55		76.553		299.1
• Residential land	ha	-	9.5		4.2		13.7
Total Household Land	ha		347.67		119.43		467.06
*Government Owned Land							
• Special purpose land	ha	-	4.0		-		4.0
• Forestry land	ha	14.16	1867.24	117.8	777.2	1116.3	3892.7
• Other land	ha	3.54	465	29.5	210.1	279.1	987.24
Total Government Land	ha	17.70	2336.24	147.3	987.3		4883.94
Total Land Area	ha	17.7	2683.9	147.3	1106.7	1395.4	5351

Footnote : * ; Government owned land is not subject to monetary or any other means of compensation

Data Source : Resettlement surveys undertaken the Field Investigation Stages June - September 1999

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (1/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
LAND REGISTRATION						642,500	642,500
Dong Nai No.3 Reservoir Area	ha	5,351		100,000		535,10015	535,100
Dong Nai No.4 Reservoir Area	ha	490		100,000		49,000	49,000
Other Areas (provisionally 10%)	ha	584		100,000		58,400	58,400
COMPENSATION					35,233,506	79,313,198	114,546,704
CROPS, TREES AND SHRUBS						22,579,626	22,579,626
Annuals Crops (Total):						1,507,361	1,507,361
Rice	ha						
Dinh Trang Thuong Commune – Lam Dong Province		37,450		10,200,00		381,990	381,990
Dak Plao / Dak Som Commune – Dak Lak Province		81,265		10,000,000		812,650	812,650
Total		118,715					
Cassava and Corn	ha						
Dinh Trang Thuong Commune – Lam Dong Province		10,200		10,200,000		104,040	104,040
Dak Plao / Dak Som Commune – Dak Lak Province		25,347		8,000,000		202,776	202,776
Total		35,547					
Sugar Cane	ha						
Dak Plao / Dak Som Commune – Dak Lak Province		0.1181		50,000,000		5,905	5,905
Total		0.1181					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (2/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
Perennial Trees (Total):						21,072,625	21,072,265
Avocado	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		5		127,500			
Dak Plao / Dak Som Commune – Dak Lak Province		78		200,000		638	638
Total		83				15,600	15,600
Pomelo	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		11		80,000		880	880
Total		11					
Rambutan	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		8		100,000		800	800
Total		8					
Orange	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		49		100,000		4,900	4,900
Total		49					
Coffee shrubs under 4 years age	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		17,115		21,250		363,694	363,694
Dak Plao / Dak Som Commune – Dak Lak Province		56,827		46,000		2,614,042	2,614,042
Total		73,942					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (3/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
Coffee shrubs from 4 to 8 years age	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		51,343		42,500		2,182,078	2,182,078
Dak Plao / Dak Som Commune – Dak Lak Province		170,480		89,500		15,257,960	15,257,960
Total		221,823					
Lemon	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		15		100,000		1,500	1,500
Total							
Banana	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		366		21,250		7,778	7,778
Dak Plao / Dak Som Commune – Dak Lak Province		7,476		15,000		112,140	112,140
Total							
Coconut palm	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		22		200,000		4,400	4,400
Total		22					
Carambola	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		2		80,000		160	160
Total		2					
Apple	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		8		68,000		544	544
Dak Plao / Dak Som Commune – Dak Lak Province		56		89,000		4,480	4,480
Total		64					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (4/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
Plum	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		4		102,000		408	408
Dak Plao / Dak Som Commune – Dak Lak Province		14		80,000		1,120	1,120
Total		18					
Tamarind	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		9		100,000		900	900
Total		9					
Jack Fruit	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		38		255,000		9,690	9,690
Dak Plao / Dak Som Commune – Dak Lak Province		467		50,000		3,400	93,400
Total		505					
Cashew	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		68		50,000		3,400	3,400
Total		68					
Papaya	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		44		120,000		5,280	5,280
Total		44					
Guava	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		310		100,000		31,000	31,000
Total		310					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (5/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
Mandarin	Trees						
Dak Plao / Dak Som Commune – Dak Lak Province		21		100,000		2,100	2,100
Total		21					
Durian	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		55		510,000		28,050	28,050
Dak Plao / Dak Som Commune – Dak Lak Province		50		600,000		30,000	30,000
Total		105					
Pineapple	Shrubs						
Dinh Trang Thuong Commune – Lam Dong Province		30		4,250		128	128
Dak Plao / Dak Som Commune – Dak Lak Province		5,637		5,000		28,185	28,185
Total		5,667					
Pepper	Shrubs						
Dak Plao / Dak Som Commune – Dak Lak Province		1,227		200,000		245,000	245,000
Total		1,227					
Star-apple							
Dak Plao / Dak Som Commune – Dak Lak Province	Trees	12		200,000		2,400	2,400
Total		12					
Mango	Trees						
Dinh Trang Thuong Commune – Lam Dong Province		13		170,000		2,210	2,210
Dak Plao / Dak Som Commune – Dak Lak Province		85		200,000		17,000	17,000
Total		98					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (6/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
LAND						6,157,791	6,157,791
Residential Land:							
Dinh Trang Thuong Commune – Lam Dong Province	ha	4.2		98,000,000		411,600	411,600
Dak Plao / Dak Som Commune – Dak Lak Province	ha	9.5		20,000,000		190,000	190,000
Total		13.7				601,600	601,000
Crop Land (50% type 2; 25% each type 3and type 4:)							
Dinh Trang Thuong Commune – Lam Dong Province	ha	47,650		4,425,000		210,851	210,851
Dak Plao / Dak Som Commune – Dak Lak Province	ha	106,612		6,900,000		4,609,717	735,623
Total		154,262				946,474	946,474
Perennial Tree Land (50% type 2; 25% each types 3 and 4)							
Dinh Trang Thuong Commune – Lam Dong Province	ha	67,553		26,250,000		1,773,266	1,773,266
Dak Plao / Dak Som Commune – Dak Lak Province	ha	231,547		12,250,000		2,836,451	2,836,451
Total		299,100					
BUILDINGS					32,030,460	43,365,490	75,395,950
Houses (Total):						3,663,650	3,663,650
House Type 4B							
Dinh Trang Thuong Commune – Lam Dong Province	m^2	148		500,000		74,000	74,000
Dak Plao / Dak Som Commune – Dak Lak Province	m^2	2,284		600,000		1,370,400	1,370,400
Total		2,284					

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (7/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
Wooden Houses with Thatched Roofs							
Dak Plao / Dak Som Commune – Dak Lak Province	m^2	2,580		300,000		774,000	774,000
Total		2,580					
Bamboo Houses	m^2						
Dinh Trang Thuong Commune – Lam Dong Province		2,106		250,000		526,500	526,500
Dak Plao / Dak Som Commune – Dak Lak Province		3,675		250,000		918,750	918,750
Total		5,781				553,500	553,500
Tombs:	Nos.						
Earthen Tombs							
Dinh Trang Thuong Commune – Lam Dong Province		446		500,000		223,000	223,000
Dak Plao / Dak Som Commune – Dak Lak Province		605		500,000		302,500	302,500
Total		1,051					
Cemented Tombs:							
Dak Plao / Dak Som Commmune – Dak Lak Province		28		1,000,000		28,000	28,000
Total		28					
Road Works (Total)					32,030,460	39,148,340	71,178,800
National Highway Road No.28 Re-alignment	km	50	638,010,000	779,790,000	31,900,500	38,989,500	70,890,000
Culvert 4m each	Nos.	2	34,380,000	42,020,000	68,760	84,040	152,800
Culvert Pipes (diam. 1m)	Nos.	8	7,650,000	9,350,000	61,200	74,800	136,000
Contingency Applied at 10%					3,203,046	7,210,291	10,413,337

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (8/9)

Item	Unit	Quantity	Unit Price (Dongs per Unit)		Amount (10^3 of Dongs)		
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Total
PREPARTATION OF RESETTLEMENT AREAS					10,858,891	17,548.328	28,407,319
Clearing Land for Habitation and Crops	ha	521	1,715,000	4,175,000	893,515	2,175,175	3,068,690
Leveling Land for Homes and Utilities (18 ha)	$100m^3$	900	725,000	125,000	652,500	112,500	765,000
Local Government Offices	m^2	300	300,000	1,000,000	889,050	300,000	1,189,050
Medical Center	m^2	240	350,000	1,250,000	84,000	300,000	384,000
Educational Facilities	m^2	950	250,000	950,000	237,500	902,500	1,140,000
Marketplace	m^2	700	250,000	950,000	165,000	665,000	840,000
Water wells	Nos.	257		2,000,000		514,000	514,000
Access Roads to Resettlement Centers	km	9.5	424,530,000	518,870,000	4,033,035	4,929,265	8,962,300
Roads in Resettlement Areas	km	7	324,630,000	396,770,000	2,272,410	2,777,390	5,049,800
15 kV line	km	9.5	60,000,000	70,000,000	570,000	665,000	1,235,000
Substation (15/0.4kV 150kVA)	Nos.	2	32,400,000	48,600,000	64,800	97,200	162,000
Household Removal Allowances	Nos.	257		1,000,000		257,000	257,000
Resettlement Allowances	Nos.	1,383		900,000		1,244,700	1,244,700
Allowance for Very Poor Households	Nos.	157		2,000,000		314,000	314,000
Planning Resettlement Area Layout (3% Contingency)						699,295	699,295
Other Contingency Factors (10%)					987,181	1,595,303	2,582,484
OTHER COSTS						3,459,080	3,459,080
Resettlement Committee Costs (2%)						2,859,080	2,859,080
Monitoring the RAP (3%)						600,000	600,000
GRAND TOTAL					54,662,201	92,393,399	147,055,600

Data Source : Resettlement surveys and the RAP prepared during Field Investigation Stages January - September 1999

(Continued.)

Table D4.14 Compensation and Resettlement Costs (in Vietnamese Dong) Evaluated in the RAP (9/9)

Notes:
Compensation measure unit costs are prescribed through Government Decree No.22/1998-ND-CP of 22 April 1998. These are refined and incorporated into Provincial Authority Regulations as noted below.

Dinh Trang Thuong Commune (Lam Dong Province)
Compensation for trees and crops are based on Lam Dong Provincial Authority Compensation Decision No. 2034/QD-UB dated September 1998 (and its Guideline No.627 dated 8 October 1998).
Compensation for houses and other buildings are based on Lam Dong Provincial Authority Decision No. 2237/QD-UB dated 31 August 1998.
Compensation for land is based on the Lam Dong Province Instruction Letter 627/LTdated 8 October 1998 (issued by Lam Dong Joint Services of Finance and Prices, Land, Construction, Agriculture and Rural Development and Tax Agency).

Dak Plao / Dak Som Commune (Dak Lak Province)
Compensation for trees and crops and buildings are based on the Dak Lak Provincial Authority Decision No. 3079/1998/QD-UB dated 23 December 1998.
Compensation for land is based on the Dak Lak Provincial Authority Decision No. 2383/1998/QD-UB.

Other Compensation and Resettlement Measures
Unit costs for roads are provisionally estimated from the Ministry of Construction publication "Standard Construction Unit Prices".
Other construction costs are based on current pricing levels.
Costs for planning the resettlement area layout and its design, and preparing the site for human occupancy, including relocating graves, are provisional sums.

House Types
House types are classified according to definitions prescribed by the Ministry of Construction. Type 4 houses are made from brick, cement or wood and have tiled floors and metal or tiled roofs. Type 5 is made from bamboo, and the walls and roofs are made from bamboo leaves (thatch).

Table D4.15 Main Compensation Measures and Schedules for Implementation (1/2)

Lost Asset	Location of Lost Asset	Person or Authority Affected	Compensation Measures	Implementation of Compensation Measure
Residential homes, other fixed assets and land	Reservoir area	The owner or temporary (shifting cultivator) land occupier.	Providing new homes, or the cash equivalent to purchase materials and the labor for rebuilding homes in the resettlement areas. Providing land-owners with replacement land of equable area at the resettlement location. Providing non-owners of land (shifting cultivators) with land or cash subsidy to purchase land.	Provided no less than 4 months before commencing resettlement.
Residential homes, other fixed assets and land	In the safety (security) margin (strip of land) surrounding the reservoir above the FSL, and surrounding the power house, switch yards etc.	The owner or temporary (shifting cultivator) occupier.	Providing new homes, or the cash equivalent to purchase materials and the labor for rebuilding homes in the resettlement areas. Providing land-owners with replacement land of equable area at the resettlement location. Providing non-owners of land (shifting cultivators) with land or cash subsidy to purchase land.	Provided no less than 4 months before commencing resettlement.

(Continued.)

Table D4.15 Main Compensation Measures and Schedules for Implementation (2/2)

Lost Asset	Location of Lost Asset	Person or Authority Affected	Compensation Measures	Implementation of Compensation Measure
Cemeteries and graves.	Within and outside of the reservoir area, the powerhouse, switch yards etc.	The owner or temporary (shifting cultivator) land occupier.	Cash allowances and all expenditure for exhuming the grave, transporting corpses, and rebuilding the grave sites in the resettlement areas. Reasonable cash compensation for erecting fencing or walls around the cemetery perimeter.	The Project Management Board (PMB) and the Local Provincial Authority will consult with and advise the affected households of the arrangements, one to two years before commencement of construction works. From that date burial in existing cemeteries would be prohibited. Preparation and provision of construction materials for the new cemeteries will begin at the same time.
Animal pastures and cropped land	Reservoir area, and any exclusion limits above the FSL	The owner or temporary (shifting cultivator) land occupier.	Full market value cash compensation for the land and the crop, or provision of new fields of equable area in the resettlement locations.	Provided at least one to two years before compulsory land acquisition to allow preparation and sowing of the fields for the new harvests.
Public amenities and utilities owned by the Provincial and Local Authorities.	All amenities and utilities impacted by constructing and operating the Project.	Provincial and Local (District) Authorities.	Full costs for rebuilding and replacing the amenities and utilities.	Provided before land acquisition for developing the project.

Data Source : Baseline RAP finalized during the Field Investigation Stages June - September 1999

Table D5.1 Dong Nai River Water Quality : Upstream, Downstream and in the Mid Region of the Planned Dong Nai No.3 and No.4 Reservoirs

Parameter	Unit	Upstream DN3	Mid Point DN3	Upstream DN4	Planned Tailrace DN4
Temperature	°C	23.6	24.2	22.2	28.3
pH		7.1	7.0	7.0	7.0
SS	mg/l	17	20	17	19
DO	mg/l	6.4	6.9	6.6	5.8
Total P	mg/l	0.03	0.03	0.09	0.03
N-NO2	mg/l	0	0	0	0
N-NO3	mg/l	0.19	0.19	0.28	0.17
BOD5	mg/l	8	4	9	2
COD	mg/l	15	5	14	5
Dioxin	mg/l	0	0	0	0
Total Coliform bacteria	mnp per 100 ml	110,000	400	240,000	240,000

Data Source : Water quality survey and analyses undertaken in the Field Investigation Stages June – September 1999

Table D5.2 Types of Vegetation and their Areas covering the Planned Dong Nai No. 3 and No.4 Reservoir Areas (all units are in hectares)

(Unit :ha)

Vegetation Type	Dong Nai 3	Dong Nai 3 (Percentage)	Dong Nai 4	Dong Nai 4 (Percentage)
Broad-leafed forest	3.07	0.1	11.07	3.50
Mixed broad-leafed / bamboo forest	0	0	111.32	35.22
Bamboo forest	4722.06	90.6	193.61	61.28
Shrub-grassland	31.90	0.6	0	0
Agricultural fields (fruit, rice, coffee, etc)	453.3	8.7	0	0
Total area by vegetation cover	5213.33	100	316	100

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June - September 1999

Table D5.3 Comparison between the Floral Diversity within the Dong Nai No.3 and No.4 Regional Areas and the Cat Tien National Park

Area	No. Plant Families	No. Plant Genera	No. Plant Species
Cat Tien National Park	149	602	772
Dong Nai 3 and 4 Regional Areas	139	462	722

Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June - September 1999

Table D5.4 Comparative Numbers of Recorded Animal Species in the Whole of Viet Nam, the Cat Tien National Park (CTNP) and the Dong Nai No.3 and No.4 Regional Areas

Named Habitat Area	Mammal Species	Bird Species	Reptile Species	Amphibian Species
DN3 and DN4 Regional Areas	35	157	22	8
CTN Park	70	260	47	20
Whole of Viet Nam	276	828	180	82

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June - September 1999

Table D5.5 Endangered (Red Book) Bird Species Recorded in the Planned Dong Nai No. 3 and No. 4 Areas

Family and Species	Vietnamese Name	English Name	Status
Pheasants			
· Lophura nycthemera	Ga Loi van	silver pheasant	threatened
· L. diardi	Ga Loi hong tia	siamese fireback	threatened
· Polyplectron germaini	Ga tien mat do	germain peacock pheasant	threatened
· Pavo munctius	Cong	green Peafowl	rare
Hornbil			
· Buceros bicornis	Hong hoang	great hornbill	threatened
Tits			
· Sitta solangiae	Treo cay tran den	velvet fronted Nuthatch	threatened
Babblers			
· Garrulax milleti	Khuou dau den	black hooded laughing thrush	rare
· G. vassali	Khuou dau xam	white cheeked laughing thrush	threatened

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June - September 1999

Table D5.6 Endangered (Red Book) Animal Species Historically Recorded in the Planned Dong Nai No.3 and No.4 Regional Areas

Family and Species	Vietnamese Name	English Name	Status
Primates			
• Nycticebus pygmaeus	Cu li nho	loris	vulnerable
• Macaca arctoides	Khimat do	stump-tailed macaque	vulnerable
• Hylobates gabriella	Vuon den	gibbon	endangered
Wild dogs			
• Cuon alpinus	Soi do	dhole	endangered
Bear			
• Helarctos malayanus		sun bear	protected
Otters			
• Lutra perspicillata	Rai ca long muot	smooth otter	vulnerable
Wild cats			
• Panthera tigris	Ho	tiger	endangered
• Neofelis nebulosa	Bao gam	clouded leopard	vulnerable
• Felis bengalensis		leopard cat	protected
Deer			
• Tragulus javanicus	Cheo cheo Nam Duong	mouse deer	vulnerable
• Cervus unicolor		sambar deer	protected
• Muntiacus muntjac		barking deer	protected
Wild Oxen			
• Bos gaurus	Bo tot	gaur	endangered
Goat-Antelope			
• Capricornis	Son duong	serow (goat-antelope)	vulnerable
Elephant			
• Elephas maximus	Voi an do	asian elephant	vulnerable

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June - September 1999

Table D5.7 Fish Species Recorded in the Dong Nai River at the Planed Dong Nai No.3 and No.4 Reservoir Locations

Family	Species	Vietnamese name	English name
Mastacembelidae	Mastacembelus armatus	ca chach bong	spiny eel
	Mastacemebelus circumcinctus	ca chach khoang	
(Carps) Cyprinidae	Mystacoleulus greennaiyi	ca lai xuoc	
	Mystacoleulus magrinatus	ca vay xuocx	
	Cosmochilus harmandi	ca duong bay	
	Hampala macrolepidota	ca ngua nam	Barb
	Tor duronensis	ca me	
	Tor stracheyi	ca ngua gai	
	Tor tambroides	ca ngua xam	
	Cyclocheilichthys apogon	ca coc dam	
	Cyclocheilichthys tapiensis	ca cay	
	Probarbus jullieni	ca trac soc	Barb
	Puntius vernayi	calai	
	Puntius foxi	ca hong nhan	
	Puntius huguenini	ca diec coc	
	Osteochilus prosemion	ca lui	Barb
	Osteochilus hisschtii	ca lui (me)	
	Osteochilus vittatus	ca lui soc	
	Labeo dyocheilus		
Channidae	Channa striatus	ho ca loc	also carp
	Channa lucius	ca trau day	
Siluridae (catfish)	Ompak bimaculatus Kryptopterus cryptopterus	ca tren bau ca tren da	
Sisoidae	Bagarius suchus	ca chien	
	Bagarius yarelli	ca chien	

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June – September 1999

Table D5.8 National Parks and Nature Reserves within 100 km of the Proposed Dong Nai No.3 and No.4 Projects

Park or Nature Reserve	Distance From and Location Relative to DN3 and DN4
Thuong Da Nhim Nature Reserve	Upland to DN3/4. 70 km east of DN3, and about 10 km north of Da Nhim.
Cat Tien National Park	Downstream of DN3/4. 50 km south west of DN4
Bien Lac Nuoiong Nature Reserve	Downland of DN3/4. 90 km south of DN3/DN4
Ka Lon Song Mar Nature Reserve	Downland of DN3/4. 90 km south east from DN3

Data Source : EIA study and surveys prepared and conducted under contract in the Field Investigation Stages June – September 1999

Appendix D

Figures

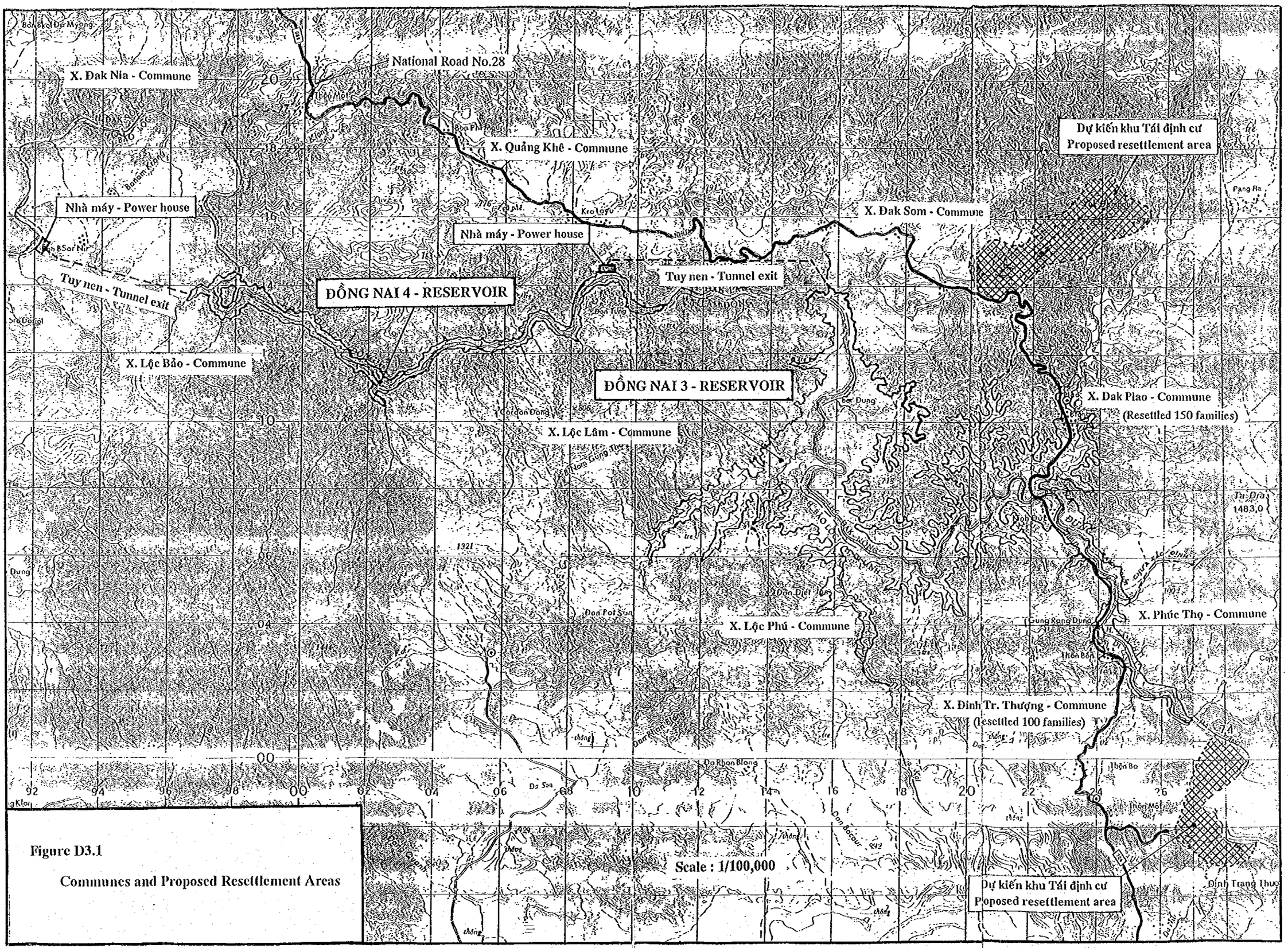

Figure D3.1

Communes and Proposed Resettlement Areas

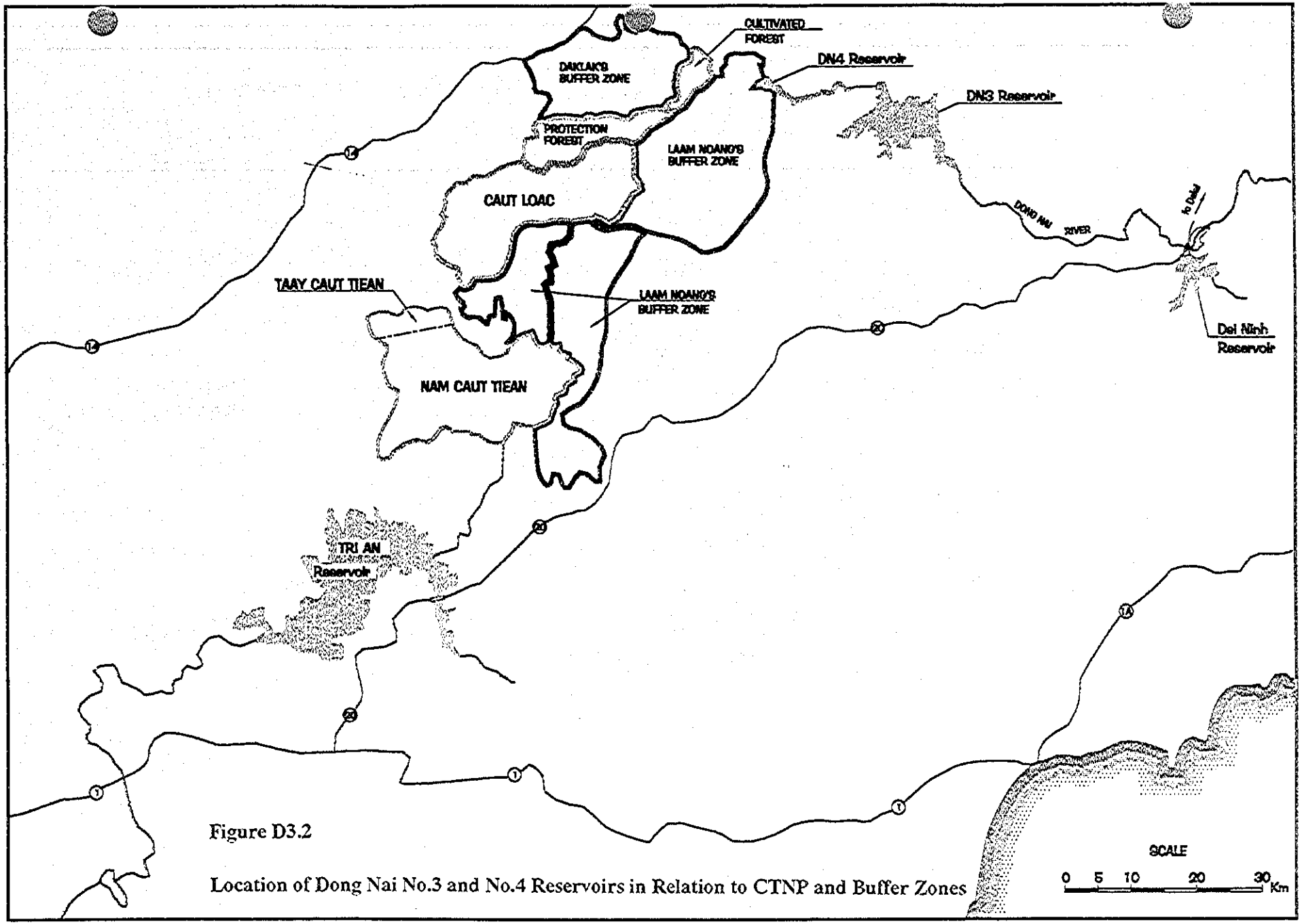

Figure D3.2

Location of Dong Nai No.3 and No.4 Reservoirs in Relation to CTNP and Buffer Zones

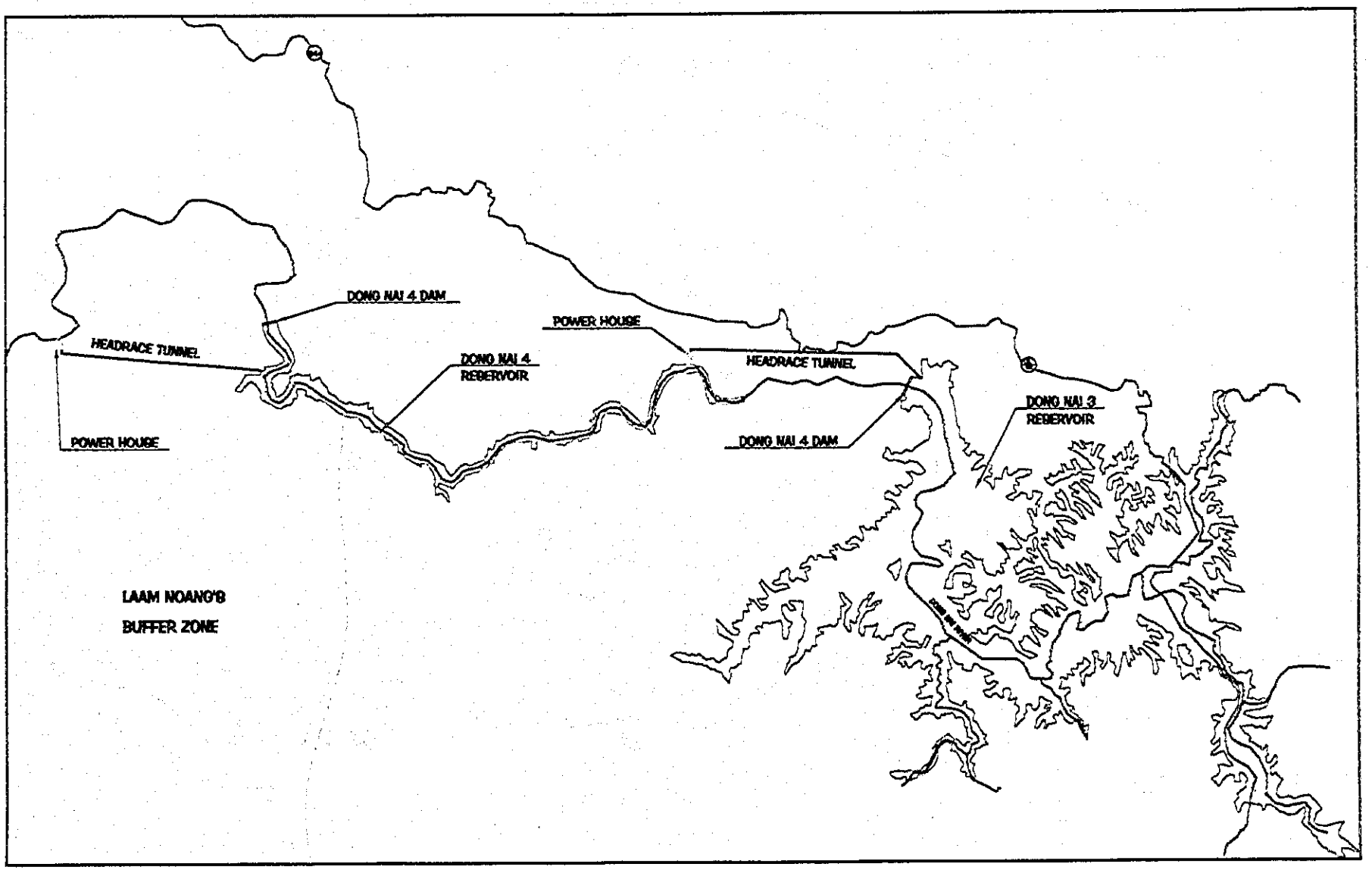

Figure D6.1 Dong Nai No.4 Reservoir with the Lam Dong Buffer Zone

Appendix E :

Examination of Optimum Project Layout Plan

(Carried out in the First Field Investigation Stage between January and March 1999)

Appendix E : Examination of Optimum Project Layout Plan

(Carried out in the First Field Investigation between January and March 1999)

Table of Contents

List of Tables

List of Figures

Appendix E : Examination of Optimum Project Layout Plan

(Carried out in the First Field Investigation Stage between January and March 1999)

E1 INTRODUCTION

E1.1 Background

In the Scope of the Study for Feasibility Study on the Dong Nai No.3 and No.4 Combined Hydropower Project in the Middle Reaches of the Dong Nai River in the Socialist of Vietnam (hereinafter referred as "the Project") which was agreed between the Government of Vietnam and the Government of Japan on 26th August 1998, it is stipulated that the preliminary optimization of the Dong Nai No.3 and No.4 Combined Hydropower Project is to be carried out in the Preliminary Investigation Stage after the necessary data collection, consisting of the following two study subjects:

a. Review of the existing proposals of the development scheme, and

b. Formulation of alternative schemes and their comparative studies to select the optimum development plan of the dam and powerhouse sites including waterway system

The Scope of the Study further specifies that the subsequent detailed field investigations and their analyses will be carried out for the optimum Project layout plan composed of the dam sites, powerhouse sites and waterway routes of the Dong Nai No.3 and No.4 schemes that are to be selected through the preliminary optimization in the Preliminary Investigation Stage.

In accordance with the Scope of the Study mentioned above, the JICA Study Team proposed to perform the preliminary optimization study in the First Field Investigation in the Inception Report submitted to EVN in early January 1999. The First Field Investigation was started with arrival of the JICA Study Team members at Hanoi on 17 January 1999. After the Minutes of Meeting on the Inception Report was signed between the both sides on 20th January 1999, the JICA Study Team proceeded to Ho Chi Minh City to commence the data collection and field reconnaissance required for the preliminary optimization study. The First Field Investigation was conducted for 60 days from 17 January 1999 and 17 March 1999, during which the existing proposals on the Project including those in the JICA's master plan study (1996) and EVN's pre-feasibility study (1998) were fully reviewed based on the data and information collected from the concerned governmental organizations and field reconnaissance to work out the optimum project layout plan. The results of the project layout plan study carried out in the First Field Investigation are described in detail in the Progress Report No.1 submitted to EVN in March 1999. In the subsequent detailed field investigations including preparation of 1 to 1,000 scaled topographic maps and geological investigation have been performed for the optimum project layout plan selected through the examination of the alternative project layout plans.

This Appendix E : Examination of Optimum Project Layout Plan discusses the results of

the examination of the project layout plans carried out in the First Field Investigation, which lasted about two months between the middle of January and middle of March 1999.

The selected project layout plan has been further studied by incorporating various investigation results obtained from the Detailed Field Investigation to arrive at the final optimum development plan as discussed in the corresponding Chapters of Main Report.

E1.2 Basic Data Utilized

During the First Field Investigation, the JICA Study Team collected the data and information related to the Project from the concerned governmental organizations as much as possible. Besides, the JICA Study Team performed field reconnaissance in order to confirm the Project site conditions stated in such previous reports as the JICA mater plan Study Report and EVN's pre-feasibility study report.

The preliminary optimization study to select the optimum project layout plan was carried out with the data and information made available through the above field investigations, that include hydrological data, 1 to 10,000 scaled topographic maps and site conditions clarified through the field reconnaissance. Especially, the 1 to 10,000 scaled topographic maps for the Dong Nai No.3 and No.4 scheme sites that were produced in the previous pre-feasibility study by PECC2 and the feasibility study on the Dong Nai No.4 scheme by PECC1, respectively, were effectively utilized in examining the alignments of those major structures for the alternative project layout plans.

E2 METHODOLOGIES AND PROCEDURES ADOPTED

In principle, the preliminary optimization study carried out in this study stage did not aim at determining the optimum development scale of the Dong Nai No.3 and No.4 Combined Hydropower Project, but at selecting the optimum layout plan thereof for which the detailed field investigation works were to be performed in the subsequent Second Feld Investigation. The optimum development scale for the layout plan of the Project that was tentatively selected through the preliminary optimization study was going to be scrutinized in more elaborated manner in the latter study stages applying the results of the detailed field investigations and their analyses.

As proposed in the Inception Report on this Study, the economic viability of five (5) alternative layout plans were compared in terms of the annual economic net benefit (B-C) derived based on their benefits accrued by hydropower generation as well as their preliminary costs. These five alternative layout plans worked out in the preliminary optimization study are explained in detail in the succeeding Chapter E3. For each of alternative layout plans and development cases set up for Alternatives 1 and 2, the reservoir operation study was carried out to estimate the outputs of each alternative which consist of dependable peak power and firm/secondary energy outputs. Based on the results of the reservoir operation study, the annual economic benefit for the project outputs were preliminarily measured by capital and operation costs of the most competitive thermal power plant thereto, which was adopted in the Preliminary Investigation Stage. On the other hand, the project costs estimated preliminarily for the respective alternatives were converted into the economic values to estimate the annual economic costs.

In making the comparison of the alternative layout plans, as the first step, the Alternative 1 and Alternative 2 proposed in the previous JICA master plan and pre-feasibility study, respectively, were examined to determine the favorable dam site of Dong Nai No.3 out of the two alternative dam sites identified in the said master plan study and pre-feasibility study, namely upstream and downstream dam sites, as well as the optimum development scale of the Dong Nai No.3 at a preliminary study level. In total, eight cases of the development scales were set up by varying a full supply water level (FSL) of the upstream and downstream alternative dam sites of the Dong Nai No. 3.

In succession, a layout plan for each of the other three (3) alternatives, Alternative 3 to Alternative 5, was worked out based on available data and information on topography, hydrology, geology, etc. Concerning the Dong Nai No.3 scheme, they were planned to have the same features as those of the development case, that was selected among from the eight development cases of the Alternative 1 and 2 through the above comparison study made as the first step. These four alternatives were compared applying the same procedures as those mentioned above, in order to select the optimum layout plan of the Project.