ANNEX-I

Facility Design and Cost Estimate

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I-1 Cost Estimation - Thongharb Nakhua

In Thongharb Nakhua area the major facilities planned for improvement are weir, road and culvert. The costs (I-1-1 to I-1-3) estimated for these facilities were based on the exchange rate as of January 2000 (7,500Kip=1USD). About 10-20 percent of the construction cost was added for study, survey and design. And about 5% was added as contingency.

I-1-1 Cost for Road Improvement and Construction - Thongharb Nakhua

Exchange rate = 7,500 Kip/USD (Jan 2000)

First group of villages

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nahin	Trunk	1,500	5.0	G	Grading	m2	344		7,500	2,581	344
					Fill and compaction	m3	20,072	3.3	4,950	99,355	13,247
					Gravel paving	m3	32,347	0.4	600	19,408	2,588
Total										121,345	16,179

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nakhua Nai	Trunk	400	5.0	G	Grading	m2	344		2,000	688	92
					Fill and compaction	m3	20,072	3.3	1,320	26,495	3,533
					Gravel paving	m3	32,347	0.4	160	5,175	690
Total										32,359	4,314

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nakhua Nok	Trunk	1,100	5.0	G	Grading	m2	344		5,500	1,893	252
					Fill and compaction	m3	20,072	3.3	3,630	72,861	9,715
					Gravel paving	m3	32,347	0.4	440	14,232	1,898
Total										88,986	11,865

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nahin	Lateral	400	4.0	New	Stripping	m2	1,216		1,600	1,946	259
					Fill and compaction	m3	20,072	2.7	1,080	21,678	2,890
					Laterite paving	m3	26,103	0.4	160	4,176	557
Total										27,800	3,707

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
NaKhua Nai	Lateral	1,700	4.0	A	Grading	m2	344		6,800	2,341	312
					Fill and compaction	m3	20,072	2.7	4,590	92,130	12,284
					Laterite paving	m3	26,103	0.4	680	17,750	2,367
Total										112,220	14,963

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
NaKhua Nok	Lateral	1,500	4.0	A	Grading	m2	344		6,000	2,065	275
					Fill and compaction	m3	20,072	2.7	4,050	81,291	10,839
					Laterite paving	m3	26,103	0.4	600	15,662	2,088
Total										99,017	13,202

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nakhua Nok	Lateral	200	4.0	New	Stripping	m2	1,216		800	973	130
					Fill and compaction	m3	20,072	2.7	540	10,839	1,445
					Laterite paving	m3	26,103	0.4	80	2,088	278
Total										13,900	1,853

Total for the first group of villages =		495,627 (x1,000Kip) or	66,084 USD
Survey & design =	10 % =	49,563 (x1,000Kip) or	6,608 USD
Contingency =	5 % =	24,781 (x1,000Kip) or	3,304 USD
Total for first group + contingency =		569,971 (x1,000Kip) or	75,996 USD

Second group of villages

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Thongharb	Lateral	1,200	4.0	New	Stripping	m2	1,216		4,800	5,838	778
					Fill and compaction	m3	20,072	2.7	3,240	65,033	8,671
					Laterite paving	m3	26,103	0.4	480	12,529	1,671
Total										83,400	11,120

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Thongharb	Lateral	1,500	4.0	A	Grading	m2	344		6,000	2,065	275
					Fill and compaction	m3	20,072	2.7	4,050	81,291	10,839
					Laterite paving	m3	26,103	0.4	600	15,662	2,088
Total										99,017	13,202

Total for the second group of villages = 182,417 (x1,000Kip) or 24,322 USD
Survey & design = 10 % = 18,242 (x1,000Kip) or 2,432 USD
Contingency = 5 % = 9,121 (x1,000Kip) or 1,216 USD

Total for second group + contingency = 209,780 (x1,000Kip) or 27,971 USD

Total for the model area = 779,750 (x1,000Kip) or 103,967 USD

Total length = 9,500 m 82,079 Kip/m or 10.94 USD/m

Note:
Souce: Unit Price for Irrigation Construction 1999-2000 Bolikhamxay, collected in Dec 1999
The unit price quoated above include administration and others
Materials and transportation for construction are included
In contracting the work to parastatal or private company, tax such as TCA is sometimes added.
Compaction allowance was made for the volume after compaction

I-1-2 Cost for Pipe and Box Culvert Construction - Thongharb

Exchange rate = 7,500 Kip/USD (Jan 2000)

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Nahin	P-1 600mmx1	Pipe + laying	m	1.00	7.0	m	489,444	3,426	457
	Length (m) = 7.0	Excavation	m2	1.79	12.53	m3	5,237	66	9
	Quantity = 1	Base gravel	m2	0.07	0.49	m3	26,103	13	2
		Refill with soil	m2	1.31	9.17	m3	16,551	152	20
	Total							3,656	488

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Nahin	P-2 600mmx2	Pipe + laying	m	1.00	48.0	m	489,444	23,493	3,132
	Length (m) = 8.0	Excavation	m2	2.30	55.2	m3	5,237	289	39
	Quantity = 3	Base gravel	m2	0.14	3.36	m3	26,103	88	12
		Refill with soil	m2	1.34	32.16	m3	16,551	532	71
	Total							24,402	3,254

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Nakhua-Nai	P-1 600mmx1	Pipe + laying	m	1.00	35.0	m	489,444	17,131	2,284
	Length (m) = 7.0	Excavation	m2	1.79	62.65	m3	5,237	328	44
	Quantity = 5	Base gravel	m2	0.07	2.45	m3	26,103	64	9
		Refill with soil	m2	1.31	45.85	m3	16,551	759	101
	Total							18,281	2,438

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Nakhua-Nok	P-1 600mmx1	Pipe + laying	m	1.00	42.0	m	489,444	20,557	2,741
	Length (m) = 7.0	Excavation	m2	1.79	75.18	m3	5,237	394	52
	Quantity = 6	Base gravel	m2	0.07	2.94	m3	26,103	77	10
		Refill with soil	m2	1.31	55.02	m3	16,551	911	121
	Total							21,938	2,925

Village	Type		Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Thongharb	P-1	600mmx1	Pipe + laying	m	1.00	56.0	m	489,444	27,409	3,655
	Length (m) =	7.0	Excavation	m2	1.79	100.24	m3	5,237	525	70
	Quantity =	8	Base gravel	m2	0.07	3.92	m3	26,103	102	14
			Refill with soil	m2	1.31	73.36	m3	16,551	1,214	162
	Total								29,250	3,900

Total for culvert =		97,528 (x1,000Kip) or	13,004 USD
Survey & design =	10 % =	9,753 (x1,000Kip) or	1,300 USD
Contingency =	5 % =	4,876 (x1,000Kip) or	650 USD
Total + survey & design + contingency =		112,157 (x1,000Kip) or	14,954 USD

Note:
Souce: Unit Price for Irrigation Construction 1999-2000 Bolikhamxay, collected in Dec 1999
The unit price quoated above include administration and others
Materials and transportation for construction are included
In contracting the work to parastatal or private company, tax such as TCA is sometimes added.

I-1-3 Cost of Weir Bridge - Thongharb

Exchange rate = 7,500 Kip/USD (Jan 2000)

(1) Weir bridge construction

Item	Unit	Unit cost	Quantity (m2, m3)	Cost (x1,000Kip)	Cost USD	Local contricution (%)	Local contricution USD	
Cut/Stripping and earth removal	m3	5,237	1,800	9,427	1,257	30	377	
Lean concrete M150	m3	527,726	3,060	1,614,843	215,312	5	10,766	
Fill with compaction (transport 0.5km)	m3	38,258	600	22,955	3,061	10	306	
Concrete pipe 1000mmx5 L=14m	m	804,534	70	56,317	7,509	15	1,126	
Gabion (3+5)x14x0.5 Up and downstream	m3	80,417	56	4,503	600	30	180	
GAbion 5x25x0.5x2 (pump site)	m3	80,417	175	14,073	1,876	30	563	
Total				1,722,118	229,616		13,318	216,298

(2) Cost for survey and detail design. 20 % = 344,424 x1,000kip or 45,923 USD

(3) Contingency = 5 % = 86,106 x1,000kip or 11,481 USD

Total cost (1) to (3) = 2,152,648 x1,000kip or 287,020 USD

Source: Savannakhet 1999-2000 collected in December 1999
The unit price quoated above include administration and others
In contracting the work to parastatal or private company, tax such as TCA is sometimes added.
Inclusive of cost of materials

I-2 Cost Estimation - Vangkhong

In Vangkhong area the major facilities planned for improvement are irrigation canal construction, land reclamation and preparation, road and culvert. The costs (I-2-1 to I-2-4) estimated for these facilities were based on the exchange rate as of January 2000 (7,500Kip=1USD). About 10-20 percent of the construction cost was added for study, survey and design. And about 5% was added as contingency.

I-2-1 Cost for Land Clearing – Vangkhong

Target area =	60 ha	
Thick forest =	5 %	3 ha
Thick bush =	30 %	18 ha
Medium bush =	45 %	27 ha
Normal bush =	20 %	12 ha
Total =	100 %	60 ha

Exchange rate = 7,500 Kip/USD (Jan 2000)

(1) Land clearing

Item	Unit	Unit cost per m2	Quantity (m2)	Cost (x1,000Kip)	Cost USD
Thick forest	m2	496	30,000	14,873	1,983
Thick bush	m2	389	180,000	69,930	9,324
Medium bush	m2	289	270,000	77,963	10,395
Normal bush	m2	188	120,000	22,500	3,000
Total				185,265	24,702

(2) Administration & etc :	16.5	% =	30,569	4,076
(3) Contingency =	5.0	% =	9,263	1,235

Total (1)+(2)+(3) = 225,097 x1,000Kip or 30,013

Cost of land clearing = 3,752 x1,000Kip/ha or 500

Source: Unit Price for Irrigation Construction 1999-2000 Khammouane, collected in Jan

Note:

All unit prices adjusted to exchange rate 7500kip/USD

Thick forest unit price is the sum of slashing thick forest and clearing medium bush

The unit prices quoted above do not include administration and others

In contracting the work to parastatal or private company, TCA is sometimes added.

I-2-2 Canal Construction Cost – Vangkhong

Canal density = 40 m/ha
Target area = 60 ha
Total length of earth canal = 2,400 m

Type II (B0.7mxH0.5m)= 50 % 1,200 m
Type III (B1.0mxH0.7m)= 50 % 1,200 m

Exchange rate = 7,500 Kip/USD (Jan 2000)

(1) Canal construction

Item	Unit	Unit cost	Quantity			Cost	
			X-section	Length	Volume	(x1,000Kip)	USD
Type II	m3	13,523	1.52	1,200	1,824	24,665	3,289
Type III	m3	13,523	2.50	1,200	3,000	40,568	5,409
Total						65,233	8,698

(2) Survey & design =	10	% =	6,523	870
(3) Cost for constructing appurtenant structur	10	% =	6,523	870
Total cost (1) to (3) =			78,279	10,437
(4) Administration & etc =	16.5	% =	12,916	1,722
(5) Contingency =	5.0	% =	3,914	522

Total cost (1) to (5) = 95,109 x1,000Kip or 12,681 USD

Cost of canal per ha of irrigated land = 1,585 x1,000Kip/ha or 211 USD/ha

Source: Unit Price for Irrigation Construction 1999-2000 Khammouane, collected in Jan 2000
Note:
All unit prices adjusted to exchange rate 7500kip/USD
Thick forest unit price is the sum of slashing thick forest and clearing medium bush
The unit prices quoted above do not include administration and others
In contracting the work to parastatal or private company, TCA is sometimes added.
Land clearing for canal construction is included in Cost for Land Clearing

I-2-3 Cost for Road Improvement and Construction - Vangkhong

Exchange rate = 7,500 Kip/USD (Jan 2000)

Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Trunk	150	5.0	G	Grading	m2	330		750	248	33
				Fill and compaction	m3	29,700	3.3	495	14,702	1,960
				Gravel paving	m3	32,347	0.4	60	1,941	259
Total									16,890	2,252

Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Lateral	400	4.0	New	Stripping	m2	885		1,600	1,416	189
				Fill and compaction	m3	29,700	2.7	1,080	32,076	4,277
				Laterite paving	m3	19,808	0.4	160	3,169	423
Total									36,661	4,888

Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Lateral	350	4.0	New	Stripping	m2	885		1,400	1,239	165
				Fill and compaction	m3	29,700	2.7	945	28,067	3,742
				Laterite paving	m3	19,808	0.4	140	2,773	370
Total									32,079	4,277

Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Lateral	800	4.0	New	Stripping	m2	885		3,200	2,832	378
				Fill and compaction	m3	29,700	2.7	2,160	64,152	8,554
				Laterite paving	m3	19,808	0.4	320	6,338	845
Total									73,322	9,776

Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Lateral	700	4.0	New	Stripping	m2	885		2,800	2,478	330
				Fill and compaction	m3	29,700	2.7	1,890	56,133	7,484
				Laterite paving	m3	19,808	0.4	280	5,546	739
Total									64,157	8,554

(1) Total for road improvment =			223,109	x1,000Kip or	29,748 USD
(2) Survey & design =	10	% =	22,311	x1,000Kip or	2,975 USD
Sub-total (1)+(2)=			245,420	x1,000Kip or	32,723 USD
(3) Administration & etc =	16.5	% =	40,494	x1,000Kip or	5,399 USD
(4) Contingency =	5	% =	12,271	x1,000Kip or	1,636 USD
Total (1)+(2)+(3)+(4) =			298,185	x1,000Kip or	39,758 USD
Total length of road =	2,400 m		124,244	Kip/m or	16.57 USD/m

Source: Unit Price for Irrigation Construction 1999-2000 Khammouane, collected in Jan 2000

Note:

Thick forest unit price is the sum of slashing thick forest and clearing medium bush

The unit prices quoted above do not include administration and others

In contracting the work to parastatal or private company, TCA is sometimes added.

Compaction allowance was made for the volume after compaction

I-2-4 Cost for Pipe and Box Culvert Construction - Vangkhong

Exchange rate = 7,500 Kip/USD (Jan 2000)

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Vangkhong	P-1 600mmx1	Pipe + laying	m	1.00	35.0	m	472,639	16,542	2,206
	Length = 7.0	Excavation	m2	1.79	62.65	m3	13,494	845	113
	Quantity = 5	Base gravel	m2	0.07	2.45	m3	25,206	62	8
		Refill with soil	m2	1.31	45.85	m3	8,794	403	54
	Total							17,853	2,380

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Vangkhong	B-13 1.5x1.5x3	Concrete M200	m3	7.11	99.5	m3	769,001	76,546	10,206
	Length = 7.0	Excavation	m2	18.84	263.76	m3	13,494	3,559	475
	Quantity = 2	Base gravel	m2	0.63	8.82	m3	25,206	222	30
		Refill with soil	m2	4.35	60.9	m3	8,794	536	71
	Total							80,863	10,782

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Vangkhong	B-23 2mx2mx3	Concrete M200	m3	12.36	173.0	m3	769,001	133,068	17,742
	Length = 7.0	Excavation	m2	31.50	441	m3	13,494	5,951	793
	Quantity = 2	Base gravel	m2	0.84	11.76	m3	25,206	296	40
		Refill with soil	m2	6.30	88.2	m3	8,794	776	103
	Total							140,091	18,679

(1) Total for culvert =		238,807 x1,000Kip or	31,841 USD
(2) Survey & design =	10 % =	23,881 x1,000Kip or	3,184 USD
Sub-total (1)+(2)=		262,687 x1,000Kip or	35,025 USD
(3) Administration & etc =	16.5 % =	43,343 x1,000Kip or	5,779 USD
(4) Contingency =	5 % =	13,134 x1,000Kip or	1,751 USD
Total (1)+(2)+(3)+(4) =		319,165 x1,000Kip or	42,555 USD

I-2-5 Hydraulic Properties of Trapezoidal Irrigation Canal - Vangkhong

Freeboard Fr =	0.3
Side slope 1:n, n=	1.5
Invert gradient 1/ I , I =	2,000
Coefficient of roughness n =	0.035

1/I= 2,000

Type	B (m)	H (m)	H' (m)	L (m)	L' (m)	A (m2)	A' (m2)	P	R=A/P	V(m/s)	Q(m3/s)
I	0.5	0.3	0.6	1.4	2.3	0.285	0.84	1.582	0.180	0.204	0.058
II	0.7	0.5	0.8	2.2	3.1	0.725	1.52	2.503	0.290	0.280	0.203
III	1.0	0.7	1.0	3.1	4.0	1.435	2.50	3.524	0.407	0.351	0.504
IV	1.5	1.2	1.5	5.1	6.0	3.960	5.63	5.827	0.680	0.494	1.956

Bottom width of canal	B
Depth of water	H
Depth of canal	H'=H+Fr
Width of water surface	L=B+n*H
Width of canal	L'=B+n*H'
Flow area	A=H(B+nH)
Area of canal section (cut area)	A'=H'(B+nH')
Wetted perimeter	P=b+2*H*(1+n^2)^0.5
Hydraulic radius	R=A/P
Velocity Manning's equation	V=(1/n)*R^(2/3)*(1/I)^0.5
Discharge	Q=V*A

1/I= 500

Type	B (m)	H (m)	H' (m)	L (m)	L' (m)	A (m2)	A' (m2)	P	R=A/P	V(m/s)	Q(m3/s)
I	0.5	0.3	0.6	1.4	2.3	0.285	0.840	1.582	0.180	0.41	0.12
II	0.7	0.5	0.8	2.2	3.1	0.725	1.520	2.503	0.290	0.56	0.41
III	1.0	0.7	1.0	3.1	4.0	1.435	2.500	3.524	0.407	0.70	1.01
IV	1.5	1.2	1.5	5.1	6.0	3.960	5.625	5.827	0.680	0.99	3.91

1/I= 1,000

Type	B (m)	H (m)	H' (m)	L (m)	L' (m)	A (m2)	A' (m2)	P	R=A/P	V(m/s)	Q(m3/s)
I	0.5	0.3	0.6	1.4	2.3	0.285	0.840	1.582	0.180	0.29	0.08
II	0.7	0.5	0.8	2.2	3.1	0.725	1.520	2.503	0.290	0.40	0.29
III	1.0	0.7	1.0	3.1	4.0	1.435	2.500	3.524	0.407	0.50	0.71
IV	1.5	1.2	1.5	5.1	6.0	3.960	5.625	5.827	0.680	0.70	2.77

1/I= 1,500

Type	B (m)	H (m)	H' (m)	L (m)	L' (m)	A (m2)	A' (m2)	P	R=A/P	V(m/s)	Q(m3/s)
I	0.5	0.3	0.6	1.4	2.3	0.285	0.840	1.582	0.180	0.24	0.07
II	0.7	0.5	0.8	2.2	3.1	0.725	1.520	2.503	0.290	0.32	0.23
III	1.0	0.7	1.0	3.1	4.0	1.435	2.500	3.524	0.407	0.41	0.58
IV	1.5	1.2	1.5	5.1	6.0	3.960	5.625	5.827	0.680	0.57	2.26

1/I= 2,000

Type	B (m)	H (m)	H' (m)	L (m)	L' (m)	A (m2)	A' (m2)	P	R=A/P	V(m/s)	Q(m3/s)
I	0.5	0.3	0.6	1.4	2.3	0.285	0.840	1.582	0.180	0.20	0.06
II	0.7	0.5	0.8	2.2	3.1	0.725	1.520	2.503	0.290	0.28	0.20
III	1.0	0.7	1.0	3.1	4.0	1.435	2.500	3.524	0.407	0.35	0.50
IV	1.5	1.2	1.5	5.1	6.0	3.960	5.625	5.827	0.680	0.49	1.96

I-3 Cost Estimation - Phonthan

In Phonthan area the major facilities planned for improvement are dyke and spillway improvement, road and culvert. The costs (I-3-1 to I-3-4) estimated for these facilities were based on the exchange rate as of January 2000 (7,500Kip=1USD). About 10-20 percent of the construction cost was added for study, survey and design. And about 5% was added as contingency.

I-3-1 Cost of Embankment Improvement – Phonthan

Exchange rate = 7,500 Kip/USD (Jan 2000)

(1) Embankment Improvement

Item	Unit	Unit cost	Quantity (m2, m3)	Cost (x1,000Kip)	Cost USD
Clearing medium bush (front slope)	m2	327	6,414	2,097	280
Cut/Stripping and earth removal	m3	8,654	1,802	15,596	2,079
Fill with compaction (transport 5-10km)	m3	29,327	12,836	376,432	50,191
Slope finishing (front slope + weir top)	m2	673	9,268	6,238	832
Sodding (front slope)	m3	2,885	6,414	18,500	2,467
Rip-rap (back slope)	m3	91,923	1,346	123,750	16,500
Total				542,612	72,348

(2) Cost for survey and detail design. 10 % = 54,261 7,235

(3) Contingency = 5 % = 27,131 3,617

Total cost (1) to (3) = **624,004** x1,000kip **83,201** USD

Source: Savannakhet 1999-2000 collected in December 1999
The unit price quoated above include administration and others
In contracting the work to parastatal or private company, tax such as TCA is sometimes added.
Inclusive of cost of materials

I-3-2 Cost for Spillway Improvement - Phonthan

Exchange rate = 7,500 Kip/ (Jan 2000)

Village	Item	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	Service spillway	Medium concrete	m3	85.00	85.0	m	1,394,231	118,510	15,801
		Excavation	m3	45.00	45.0	m3	8,654	389	52
		Refill with soil	m3	30.00	30.0	m3	16,827	505	67
		Gabion 10x7x0.5	m3	35.00	35.0	m3	91,923	3,217	429
	Total							122,621	16,349

Village	Item	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	Emergency spillway	Ordinary concrete	m3	47.70	47.7	m	956,250	45,613	6,082
		Excavation	m3	35.00	35.0	m3	8,654	303	40
		Refill with soil	m3	15.00	15.0	m3	16,827	252	34
		Gabion 7x0.5x35	m3	131.50	131.5	m3	91,923	12,088	1,612
	Total							58,256	7,768

Total for spillway =		180,877 (x1,000Kip)	24,117 USD
Survey & design =	10 % =	18,088 (x1,000Kip)	2,412 USD
Contingency =	5 % =	9,044 (x1,000Kip)	1,206 USD
Total + survey & design + contingency =		208,009 (x1,000Kip)	27,735 USD

I-3-3 Cost for Road Improvement and Construction - Phonthan (1/2)

Exchange rate = 7,500 Kip/USD (Jan 2000)

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Nakham	Trunk	1,200	5.0	G	Grading	m2	2,498		6,000	14,985	1,998
					Fill and compaction	m3	29,325	3.3	3,960	116,127	15,484
					Gravel paving	m3	32,347	0.4	480	15,526	2,070
	Total									146,638	19,552

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Trunk	200	5.0	G	Grading	m2	2,498		1,000	2,498	333
					Fill and compaction	m3	29,325	3.3	660	19,355	2,581
					Gravel paving	m3	32,347	0.4	80	2,588	345
	Total									24,440	3,259

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Trunk	300	5.0	A	Grading	m2	2,498		1,500	3,746	500
					Fill and compaction	m3	29,325	3.3	990	29,032	3,871
					Gravel paving	m3	32,347	0.4	120	3,882	518
	Total									36,660	4,888

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Lateral	500	4.0	A	Grading	m2	2,498		2,000	4,995	666
					Fill and compaction	m3	29,325	2.7	1,350	39,589	5,279
					Laterite paving	m3	26,103	0.4	200	5,221	696
	Total									49,804	6,641

Cost for Road Improvement and Construction – Phonthan (2/2)

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Lateral	700	4.0	A	Grading	m2	2,498		2,800	6,993	932
					Fill and compaction	m3	29,325	2.7	1,890	55,424	7,390
					Laterite paving	m3	26,103	0.4	280	7,309	974
	Total									69,726	9,297

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Lateral	300	4.0	G	Grading	m2	2,498		1,200	2,997	400
					Fill and compaction	m3	29,325	2.7	810	23,753	3,167
					Laterite paving	m3	26,103	0.4	120	3,132	418
	Total									29,883	3,984

Village	Road Type	Length(m) (m)	Road width (m)	Improvement Grade	Item	Unit	Unit cost	X-section (m2)	Quantity	Cost (x1,000Kip)	Cost USD
Phonthan	Lateral	1,000	4.0	A	Grading	m2	2,498		4,000	9,990	1,332
					Fill and compaction	m3	29,325	2.7	2,700	79,178	10,557
					Laterite paving	m3	26,103	0.4	400	10,441	1,392
	Total									99,609	13,281

Total for road improvment =		456,759 (x1,000Kip)	60,901 USD
Survey & design =	10 % =	45,676 (x1,000Kip)	6,090 USD
Contingency =	5 % =	22,838 (x1,000Kip)	3,045 USD
Total + survey & design + contingency =		525,273 (x1,000Kip)	70,036 USD
Total length of road =	4,200 m	125,065 Kip/m	16.68 USD/m

Source: Savannakhet 1999-2000 collected in December 1999
The unit price quoated above include administration and others
In contracting the work to parastatal or private company, tax such as TCA is sometimes added.
Inclusive of cost of materials
Compaction allowance was made for the volume after compaction

I-3-4 Cost for Pipe and Box Culvert Construction – Phonthan

Exchange rate = 7,500 Kip/ (Jan 2000)

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	P-1 600mmx1	Pipe + laying	m	1.00	42.0	m	239,387	10,054	1,341
	Length = 7.0	Excavation	m2	1.79	75.18	m3	8,654	651	87
	Quantity = 6	Base gravel	m2	0.07	2.94	m3	30,118	89	12
		Refill with soil	m2	1.31	55.02	m3	16,827	926	123
	Total							11,719	1,563

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	P-1 600mmx1	Pipe + laying	m	1.00	16.0	m	239,387	3,830	511
	Length = 8.0	Excavation	m2	1.79	28.64	m3	8,654	248	33
	Quantity = 2	Base gravel	m2	0.07	1.12	m3	30,118	34	4
		Refill with soil	m2	1.31	20.96	m3	16,827	353	47
	Total							4,464	595

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	P-23 1,000mmx4	Pipe + laying	m	1.00	32.0	m	437,781	14,009	1,868
	Length = 8.0	Excavation	m2	5.13	41.04	m3	8,654	355	47
	Quantity = 1	Base gravel	m2	0.36	2.88	m3	30,118	87	12
		Refill with soil	m2	1.38	11.04	m3	16,827	186	25
	Total							14,637	1,952

Village	Type	Item	Unit		Quantity		Unit Cost Kip	Cost x1,000Kip	Cost USD
Phonthan	B-4 1mx1mx4	Medium Concrete	m3	4.40	70.4	m	1,394,231	98,154	13,087
	Length = 8.0	Excavation	m2	11.65	186.4	m3	8,654	1,613	215
	Quantity = 2	Base gravel	m2	0.56	8.96	m3	30,118	270	36
		Refill with soil	m2	2.69	43.04	m3	16,827	724	97
	Total							100,761	13,435

Total for culvert =		131,581 (x1,000Kip)	17,544 USD
Survey & design =	10 % =	13,158 (x1,000Kip)	1,754 USD
Contingency =	5 % =	6,579 (x1,000Kip)	877 USD
Total + survey & design + contingency =		151,319 (x1,000Kip)	20,176 USD

I-3-5 Quantity of fill, Cut, Sodding and Rip-rap - Phonthan

Survey point	Dist from Left bank (m)	Interval (m)	Fill		Cut		Sodding		Rip-rap	
			(m2)	(m3)	(m2)	(m3)	(m)	(m2)	(m)	(m2)
	0		0.0		0.0		0.0		0.0	
0	60	60	18.7	561.0	2.8	84.0	5.9	177.0	5.9	177.0
5	65	5	12.4	77.8	2.8	14.0	6.4	30.8	5.5	28.5
55	115	50	12.1	612.5	2.2	125.0	7.1	337.5	2.8	207.5
105	165	50	6.6	467.5	1.6	95.0	10.7	445.0	9.2	300.0
155	215	50	1.5	202.5	0.6	55.0	9.8	512.5	9.6	470.0
205	265	50	32.6	852.5	3.8	110.0	13.0	570.0	12.5	552.5
225	285	20	18.8	514.0	3.5	73.0	12.5	255.0	20.6	331.0
305	365	80	35.0	2,152.0	4.3	312.0	14.0	1,060.0	14.7	1,412.0
355	415	50	44.1	1,977.5	4.9	230.0	18.4	810.0	14.2	722.5
405	465	50	27.3	1,785.0	3.6	212.5	14.0	810.0	12.5	667.5
455	515	50	33.8	1,527.5	3.8	185.0	13.0	675.0	22.6	877.5
508	568	53	23.5	1,518.5	4.0	206.7	7.5	543.3	7.5	797.7
	618	50	0.0	587.5	0.0	100.0	0.0	187.5	0.0	187.5
Total				12,836		1,802		6,414		6,731

Rip-rap thickness = 0.2 m
Rip-rap thickness = 1,346 m3

Note: Fill includes 0.2m of surface cut (treatment) before filling
Cut is the volume for 0.2m cut treatment before filling
Sodding to cover the whole of front slope (dry side) of weir
Rip-rap to cover the whole of back slope (wet side) of weir

I-4 Unit Cost Quoted for Cost Estimation

The unit cost quoted for cost estimation is summarized in I-4-1. I-4-2 shows the relation between pipe radius and cost. The relation between box culvert size and cost can also be found in the same table. I-4-3 and I-4-4 are graphical presentation of the data shown in I-4-2.

I-4-1 Unit Cost Quoted for Cost Estimation

Exchange rate 7500Kip/1USD (Jan 2000)

Road Improvement work

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Grading	m2	344	330	2,498
Fill and compaction	m3	20,072	29,700	29,325
Gravel paving	m3	32,347	32,347	32,347
Stripping	m2	1,216	885	
Laterite paving	m3	26,103	19,808	26,103

Pie and Box Culvert

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Pipe + laying	m			
600		489,444	472,639	239,387
1000				437,781
Concrete M200			769,001	
Medium Concrete				1,394,231
Excavation	m2	5,237	13,494	8,654
Base gravel	m2	26,103	25,206	30,118
Refill with soil	m2	16,551	8,794	16,827

Weir Construction

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Pipe + laying	m			
Cut/Stripping and earth removal	m3	5,237		
Lean concrete M150	m3	527,726		
Fill with compaction (transport 0.5km)	m3	38,258		
Concrete pipe 1000m	m	804,534		
Gabion	m3	80,417		

Canal Construction

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Type II	m3		13,523	
Type III	m3		13,523	

Dike Improvement

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Clearing medium bush (front slope)	m2			327
Cut/Stripping and earth removal	m3			8,654
Fill with compaction (transport 5-10km	m3			29,327
Slope finishing (front slope + weir top)	m2			673
Sodding (front slope)	m3			2,885
Rip-rap (back slope)	m3			91,923

Land Clearing

Item	Unit	Unit cost (Kip)		
		Thongharb	Vangkhong	Phonthan
Thick forest	m2		496	
Thick bush	m2		389	
Medium bush	m2		289	
Normal bush	m2		188	

I-4-2 Cost for Pipe and Box Culvert Installation

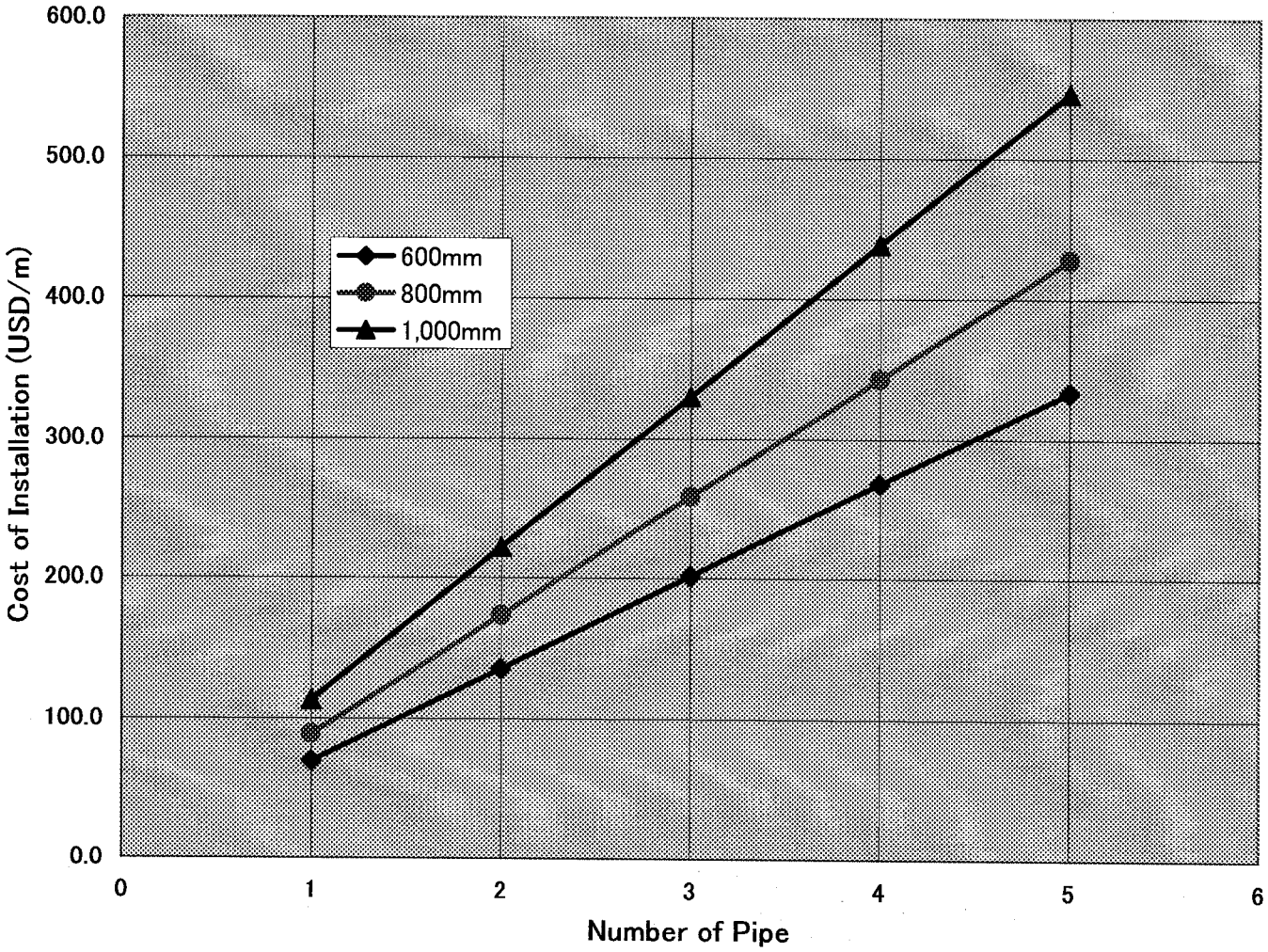
Cost for Pipe Culvert Installation

	Pipe Radius (mm)		
No. of Pipe	600	800	1000
1	69.7	89.0	113.2
2	135.6	173.6	221.5
3	201.6	258.3	329.7
4	267.4	342.9	437.9
5	333.4	427.5	546.2

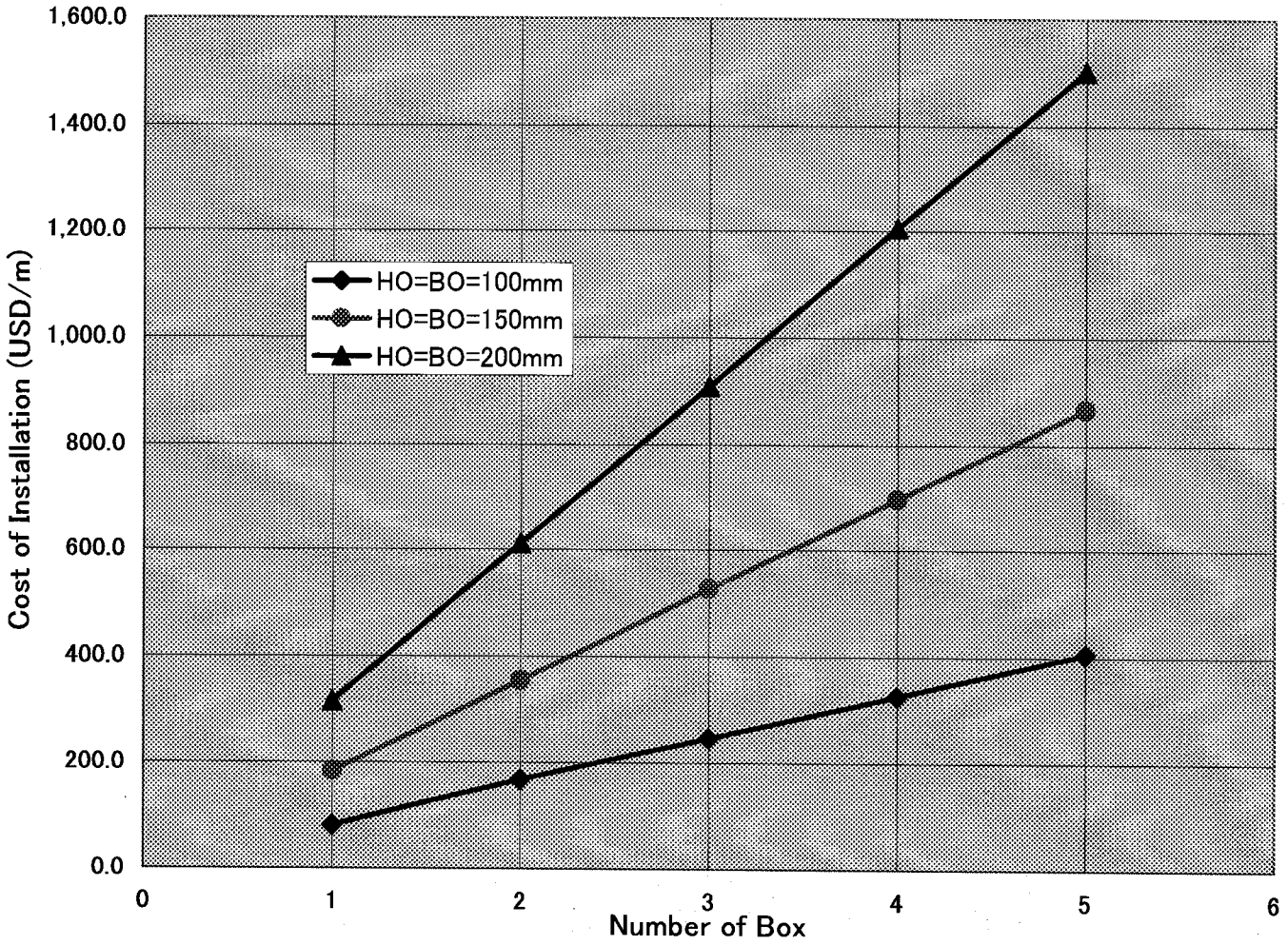
Cost for Box Culvert Installation

	Box HO=BO (mm)		
No. of box	100	150	200
1	81.3	183.5	315.0
2	166.7	354.4	611.8
3	246.2	525.2	908.5
4	325.6	696.1	1,205.3
5	405.1	867.0	1,502.0

I-4-3 Cost for Pipe Culvert Installation – Thongharb



I-4-4 Cost for Box Culvert Installation – Thongharb



I-5 Unit Costs for Study, Survey and Design

The unit costs for study, survey and design were collected from PAFSO and the SSDC of DOI (I-5-1 to I-5-3). These unit costs, constantly subject to review, are normally adopted as the reference by government agencies in quoting and contracting projects to local consultant/contractor. For overseas aided project, a different unit costs list must be prepared separately.

I-5-1 Unit Price for Study, Survey and Design (1/2)

Unit Price for Study, Survey and Design - Dam and Diversion Weir

Type of Structure /Description	Topography	Dimension			Cost of Head works					Cost
		Height	Length	Command Area	Topo graphic mapping	Design	Soil invest nation	Hydrological Socio-economical Study	Documen-tation	
		(m)	(m)	(ha)	0.38	0.32	0.22	0.05	0.03	USD/ha
I Dam										
a) Reservoir	Mountainous									
1.Large		>30	>1,000	>1,000	20.90	17.60	12.10	2.75	1.65	55.00
2.Medium		15-30	500-1,000	500-1,000	19.76	16.64	11.44	2.60	1.56	52.00
3.Small		<15	<500	<500	19.00	16.00	11.00	2.50	1.50	50.00
b) Reservoir	Flatland									
1.Large		>30	>1,000	>1,000	19.00	16.00	11.00	2.50	1.50	50.00
2.Medium		15-30	500-1,000	500-1,000	18.62	15.68	10.78	2.45	1.47	49.00
3.Small		<15	<15	<15	18.24	15.36	10.56	2.40	1.44	48.00
II Diversion Weir										
a) Weir	Mountainous									
1.Large		>5	>100	500-1,000	17.48	14.72	10.12	2.30	1.38	46.00
2.Medium		3-5	50-100	>300<500	17.10	14.40	9.90	2.25	1.35	45.00
3.Small		<3	<50	<300	15.96	13.44	9.24	2.10	1.26	42.00
b) Weir	Flatland									
1.Large		>5	>100	500-1,000	17.10	14.40	9.90	2.25	1.35	45.00
2.Medium		3-5	50-100	>300<500	16.34	13.76	9.46	2.15	1.29	43.00
3.Small		<3	<50	<300	15.20	12.80	8.80	2.00	1.20	40.00

Note: The unit cost is to be used solely by government agencies. For other private enterprise this unit cost will vary from 80 to 120 USD/ha, depending on the survey area, topography and location (e.g. remote area)
Cost USD/ha for command area

I-5-1 Unit Price for Study, Survey and Design (2/2)

Unit Price for Study, Survey and Design – Fix and Mobile Pump

Type of Structure /Description	Topography	Dimension			Cost of Head works					Cost
		Power	Length	Command Area	Topo graphic mapping	Design	Soil investi gation	Hydrological Socio-economical Study	Documen-tation	
		(KW)	(m)	(ha)	0.38	0.32	0.22	0.05	0.03	USD/ha
I Fixed Pump										
a) Pump station	Mountainous									
1.Large		>1000	set	>1,000	18.62	15.68	10.78	2.45	1.47	49.00
2.Medium		500–1,000	set	>500	18.24	15.36	10.56	2.40	1.44	48.00
3.Small		<500	set	<,1000	17.86	15.04	10.34	2.35	1.41	47.00
b) Pump station	Flatland									
1.Large		>1000	set	>1,500	17.48	14.72	10.12	2.30	1.38	46.00
2.Medium		500–1,000	set	>1,000	16.72	14.08	9.68	2.20	1.32	44.00
3.Small		<500	set	<1,000	15.96	13.44	9.24	2.10	1.26	42.00
II Mobile pump/Pontoon type										
a)Pump station	Mountainous									
1.Large		<1000	set	<1,000	17.48	14.72	10.12	2.30	1.38	46.00
2.Medium		500	set	500	17.10	14.40	9.90	2.25	1.35	45.00
3.Small		<500	set	<500	15.96	13.44	9.24	2.10	1.26	42.00
b)Pump station	Flatland									
1.Large		<1000	set	<1,000	17.10	14.40	9.90	2.25	1.35	45.00
2.Medium		500	set	500–1,000	16.34	13.76	9.46	2.15	1.29	43.00
3.Small		<500	set	<500	15.20	12.80	8.80	2.00	1.20	40.00

Note: The unit cost is to be used solely by government agencies. For other private enterprise this unit cost will vary from 80 to 120 USD/ha, depending on the survey area, topography and location (e.g. remote area)
Cost USD/ha for command area

I-5-2 Unit Price for Survey and Investigation

Dam (reservoir), diversion weir, gate and pump station

Item	Description	Quantity	Depth	Unit	Unit price USD	Amount USD
I	Geological map					
	Geological mapping					
	- Head work site - Canal - Structure - Borrow pit - Reservoir Map 1:2,000, 1:1,000, 1:500	ha		100	4	400
II	Geological investigation					
	a) Head work site					
	- SPT drilling	pit	>25	3	360	1,080
	- Roraty drilling machine	pit	>25	5	470	2,350
	- Rock drilling	pit	>2	5	32	160
	b) Spillway & intake					
	- SPT drilling	pit	>25	1	360	360
	- Roraty drilling machine	pit	>15	2	180	360
	c) Canal Structure					
	- Hand auger drilling	hole	>4	35	40	1,400
	d) Reservoir					
	- Cross-section 500-800m, length 100-300m/hole		>5	10	30	300
	- Hand auger drilling	hole	>8	20	80	1,600
	e) Percolation test					
	- Water ponding	point		10	8	80
	- Pumping test	point		3	13	39
	f) Borrow pit investigation					
	- 2-3 survey lines, each 100-200m long distance between holes 50-100m - 2-5 holes per pit, each >3m deep	hole		30	30	900
	2-5 borrow pits					
III	Field test and sampling					
	- Percolation test along canal (borrow pit)	point		12	8	96
	- Percolation test in command area	point		15	10	150
	- Pumping test at head works and reservo	point		4	14	56
	- Unconfined sampling 1.5m deep/sample	sample		280	1	140
	- Confined sampling 3-4m depth/sample	sample		35	3	112
	- Soil sampling for construction	sample		10	0	4
	- Rock, gravel and sand deposit sampling	sample		4	0	2
	- Groundwater sampling	sample		5	0	2
	- Rock and limestones sampling	sample		2	0	1
IV	Investigation and test					
	Unconfined ASTM					
	- Confined sample test	sample		35	8	280
	- Unconfined soil sample test	sample		280	5	1,344
	- Soil test for construction	sample		10	4	40
	- Water test for construction	sample		5	10	50
	- Rock, gravel and sand deposit test	sample		4	14	58
	- Rock and limestones test	sample		2	34	68

I-5-3 Unit Cost for Topographic Survey

Project site

Type 1 Mountainous area, including plateau, difficult for transport and communication, such as Phongsari, Bokeo, Luangnatha, udomxay, Howphane, Luang Phabuang, Xieng Chuang, Xayabouri and Xaysanbun

Type 2 Flatland (along Mekong) such as Vientiane, Xebangphai, Xebanghieng, Champhusuk and Attapue flatland

Percentage of forest cover in the survey area

1 No forest
2 25% forest cover
3 50% forest cover
4 80% forest cover
5 100% forest cover

Unit Price for Topographic Survey

The unit price is determined by project site of the survey area and forest cover.
Staff, materials, transport, execution & management of survey, tax and reporting are incluc

Mountaunous and Remote Area (Project site Type 1)

Unit: USD/ha or /km

Description	Percent of forest cover					Remarks
	<25%	25%<x<50%	50%<x<80%	80%<x<100%	100%	
Structure 1:200 to 1:500	100	150	200	250	300	per ha
Canal 1:1,000	100	150	175	200	300	per km
Irrigated area 1:2,000	15	20	30	50	70	per ha
Land 1:2,000	5	7	10	12	15	per ha
Dam 1:5,000	5	10	12	18	30	per ha

Flatland Area (Project site Type 2)

Unit: USD/ha or /km

Description	Percent of forest cover					Remarks
	<25%	25%<x<50%	50%<x<80%	80%<x<100%	100%	
Structure 1:200 to 1:500	80	100	120	150	200	per ha or km
Canal 1:1,000	80	130	170	200	250	per km
Irrigated area 1:2,000	10	12	15	30	50	per ha
Land 1:2,000	5	7	10	15	25	per ha
Dam 1:5,000	12	5	10	15	20	per ha

Note: The unit cost is to be used solely by government agencies.
For other private enterprise this unit cost will vary,
depending on the survey area, topography and location (e.g. remote area)

I-6 Other Major Unit Prices

An example of unit costs quoted for construction and installation of 2 units of 90kW in Khammouane is shown in I-6-1. The labor cost for foundation work and pump installation was 5%, materials for pump station (excluding the pump and accessories) was 88% and transport 8% of total cost.

The unit prices of construction machines hire, materials and labor, as shown in I-6-2, were from the quotation of private company surveyed in June 1999. Due to inflation, these prices are subject to change. Fuel and lubricant prices were the market prices of the filling stations in Vientiane.

I-6-1 Major Unit Prices for Pump Installation

90KWx2 units

Item	Description	Unit	Unit Price
I . Labor Cost for Pump Station Construction			
1	Steel pipe installation 500	m	9,000
2	Bend installation	place	50,000
3	Pontoon installation	place	200,000
4	Switchboard installation	place	200,000
5	Valve installation	place	20,000
6	Foundation work (digging)	m3	2,400
7	Foundation work (earthfill and lining	m3	5,000
8	Foundation pile 12x12	set	25,000
9	Survey & design	set	500,000
II. Labor Cost for Pump Installation			
1	Pump base	set	200,000
2	Dynamo	set	215,000
3	Pump	set	135,000
4	Connect pump to motor	set	100,000
5	Bend pipe 90 °	set	100,000
6	Strainer	set	180,000
7	Suction pipe 200	place	125,500
8	Air control valve	set	200,000
9	Water hammer valve	set	195,000
10	Lubricant (Engine oil No.30)	set	8,000
III. Materials			
	Pontoon	set	21,759,892
	Intake pipe 500 - 250	m	315,000
	Delivery 500	m	233,380
	Suction pipe 200	m	130,000
	Valve	m	1,500,000
	Intake pipe from PIS	set	150,000
	Steel support	m	200,000
	Support 500 4m	set	15,000
	Welding	set	5,000
	Reinforced concrete	m3	530,000
	Reinforced concrete / stilling basin	m3	530,000
	Steel gate	set	1,941,350

Note: Pump and accessories not included
source: DAFSO/PIS Khammouane

I-6-2 Unit Price of Construction Machines Hire, Materials and Labor

Unit Price of Construction Machine Hire

Description	Hire rate USD per		Remarks
	Month	Day	
1. Bulldozer	6,000	250	Surveyed as of June 1999 Based on: 8 hrs/day, 26days/month <4hr=1/2day, >4 hr =1 day Overtime: After 18:00hr adds 20% Wages for operator: Item 1 to 5 = 1.0$/hr Item 6 to 9 = 0.5$/hr Fuel supply and hospitality of drivers/operators by the lessee
2. Motor grader	5,500	230	
3. Excavator	4,500	190	
4. Wheel loader	4,500	190	
5. Vibrator roller	4,500	190	
6. Dump truck	1,200	60	
7. Water tank truck	1,200	60	
8. Fuel tank truck	1,500	80	
9. Cargo truck/crane	1,000	40	
10. Air compressor	1,000	40	

Note: Fuel for Item 1 =20l/hr, item 2 to 5 =15l/hr, item 6 to 9 =10l/hr and item10 =2l/hr

Wages for operator not included in machine hire cost.

Unit Price for Construction Materials and labor

Description	Unit Price in USD		Remarks
	Unit	Price	
1. Cement	Ton	71	
2. Reinforce bar	Ton	380	
3. H-shaped steel	Ton	365	
4. Iron sheet	Ea	174	
5. Concrete	m^3	88	
6. Steel	m^3	239	
7. Pipes/piles ϕ60,80,100	m	36/69/83	
8. Sand	m^3	2.2	
9. Gravel	m^3	4.3	
10. Laterite	m^3	1.6	
11. Wood/planks	m^3	163	
12. Electricity	KW/hr	0.02	
13. Water	m^3	0.03	
14. Experienced job	Day	8.7	No distinction between man and woman
15. Common labor	Day	0.9	

Note: Surveyed in June 1999 (quotation of private company)

Unit Price for Fuel and Lubricant

Unit: K($) per liter

Gasoline		Diesel	Lubricant
Premium	Normal		Shell SAE40
2,275K(0.25$)	1,990K(0.21$)	1,795K(0.19$)	16,000K(1.72$)

Note: Surveyed in June 1999 (market prices of the filling stations in Vientiane)