APPENDIX J INUNDATION DAMAGE AND ECONOMIC EVALUATION

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J.1 Inundation Damage

J.1.1 Damage Survey

Interview surveys were conducted to grasp the situation of inundation in the Study area. The surveyed areas are selected among those frequently inundated on the basis of the information furnished by the district offices in Vientiane Municipality. The selected areas are shown in Fig. J.1. The sites are selected chiefly in the urbanized and low lying area where the side ditches of road are not adequate. The specifications of surveys are as summarized below;

Period:

from May 3, 1989 to May 8, 1989

No. of samples:

853

- Major survey items: Frequency of inundation
 - Water level and durations
 - Identifications of serious problems due to inundation on:
 - House
 - · Household goods
 - Disease
 - Casualty
 - · Trouble in traffic
 - Trouble in electricity supply
 - · Trouble in water supply
 - · Trouble in telecommunication
 - · Damage to business
 - · Damage to crops
 - Damage to livestock
 - Loss of wages
 - Value of house
 - Value of household goods
 - Income/sales
 - Assets of factory, farm and shops

Home visit interviews

Method:

J.1.2 Inundation Damage Potentials

The major damages in the Study area identified by damage survey are as follows:

- Damage to house
- Damage to household articles
- Damage to shop and factory
- Damage to public infrastructure
- Damage to traffic
- Sales loss
- Wage Loss
- Damage to daily life of inhabitants
- Damage to health condition
- Damage to crop
- Other damage

The damaged values of a house varies from place to place for each identified item. This is because of the difference in the values of a house, in case the house damage. another reason for the difference is the damage ratio which depend on the topographic condition and the durability of a house. The potential damage of one item, a house for instance, is defined as the unit value of damage potential (UVDP) and depends on the value of the unit and its damage ratio.

According to the results of the damage survey the unit value of damage potentials of each area are different according to the land use pattern in the relevant areas. This might be one of the reason why the inundation damage in the central city area is high as compared with that of rural area. In this connection, the Study area is classified into three groups, according to land use patterns and socio-economic features at present as follows:

Share of Built-up Ar	Sub-area (Present)		
Area I: More than 8 (Located in city of View	central	H, L	
Area II: 20%-85%		A, B, C, D, E, F, O, P, Q	G, I, J, K, M,
Area III: Less than 20	%	A.N	

The features of each classified area are presented below;

Area	Land Use
Area I:	Central, Public & Commerce Industrial Area
Area II:	Residential Area in Urban Area
Area III:	Residential Area in Rural Area

The unit value of damage potential of Area I are assumed to be that in central, public, commerce and industrial area in the Study area. The unit value of damage potential of Area III is assumed to be that in the residential area in the rural area. Meanwhile the unit value of damage potential in Area II is adopted to the residential area in the remaining area. The damage may be estimated applying this value to the lot number located in the inundated area.

As for the damage to crop, the unique unit value of damage potential is estimated and used to the entire inundated agricultural land in the Study area.

J.1.3 Assumed Inundation Area and the Lot Number Therein

The inundation areas to be incurred by the 10-year storm are estimated on the basis of Geomorphological Survey Map of the Mekong river basin and the field surveys which was conducted during the Study.

The inundation area is assumed to be 2,288 ha for the 10-year inundation as shown in Fig. J.2. The assumed inundation areas by land uses in 1989 and 2020 are estimated supervising the inundation map on the present and future land use maps.

Department of Agricultural service and the offices of four districts in the Study area assume that 70% of the green area are agricultural land. The assumption is adopted in this Study.

The inundation area by sub-area are summarized in Table J.1.

The population in the inundation area are estimated on the basis of the population density in each sub-area and the land use. The number of house, shop, factory and major public facilities are estimated by the following methods.

- (1) The number of house including small shop and factory except large market and industrial facility are estimated on the basis of population and average household size.
- (2) The estimated number are reviewed referring to the number of houses and building estimated with 1: 5000 Map prepared in 1983. The huge building including market, factory and major public facilities are identified by the above map and field survey.
- (3) The number of small shop and factory are estimated on the basis of following share of shop and factory against to total number of houses according to information of Department of Commerce and Industry, Vientiane Municipality.

Area	Share of Shops and Factories (%	
Area I	10	
Area II	40	
Area III	80	

The details of above estimation are shown in Table J.2 to J.5.

J.2 Damage for the 10-year Storm

The inundation damage potentials due to the 10-year storm are evaluated based on the past damage data and related informations collected by the damage survey and field survey. The damage potentials are estimated at economic price in 1989, adopting the following assumptions.

- The rate of 0.9 is adopted for the conversion factor to convert financial price to economic price same as the previous study of JICA.
- The rate of 0.37 is adopted for the shadow wage rate of unskilled labour same as the previous study of JICA.
- The unit price of a crop is evaluated by border price

The damage potentials at 1989 economic price by damage item are estimated in following sections.

J.2.1. Damage to House

According to the result of damage survey, 15% of sample households in inundated area were damaged due to inundation. The damaged households were forced to spend on the repair and reconstruction of their houses.

The economic damage potential to house in each sub-area is estimated on the basis of following function:

$Dh = Vh \times D \times N \times DR \times C.F.$

Where, Dh: Economic damage potential to house

Vh : Original value of house at 1989 year price

D: Depreciation ratio

N: Number of houses in the inundation area

DR: Damage Ratio

C.F.: Conversion Factor

Houses in the Study area are classified into 3 types according to the materials of house, that is, bamboo/wood, wood/brick and cement/brick as shown in following table. The share of houses by each type against total

number of house is estimated on the basis of the data obtained from the damage survey. The original value and the average durable year of house by material type are assumed according to the interview with the construction companies in Vientiane.

Material Type	Share by	Type of Ma	Original Value	Average	
	Area I	Area II	Area III	of House** (10 ³ kips)	Durable Year
Bamboo/Wood	5	5	5	1,770	10
Wood/Brick	95	85	80	3,540	30
Cement/Brick	0	10	15	10,620	50

Note: * The share against the total number of houses to be interviewed.

** Original value of house with 120 m² of average floor area

According to above data, the weighted average of house value and durable year in each area category are estimated. The average original value of house with 120 m^2 of floor area and 2 stories are estimated to be $3,452 \times 10^3$ kips for houses in Area I, $4,160 \times 10^3$ kips for houses in Area III. The average durable years of house are estimated to be 30 years for houses in Area II, 31 years for houses in Area III and 32 years for houses in Area III.

The depreciation rate is set on the basis of average depreciation period of house after construction according to the result of the damage survey and the average durable years of house in each area.

The average present value of house in each area are estimated on the basis of the original value of house and depreciation as shown below:

Area Category	I	H	Ш
Original Value (1,000 kip)	3,452	4,160	4,513
Depreciation Period (year)	11	12	13
Average Durable Years (years)	- 30	31	32
Depreciation Rate (%)	64%	61%	59%
Present Value	2,210	2,540	2,660

The damage ratios for the 10-year storm are set by adopting the figures obtained from the damage survey. In Area II and III where inundations mainly concentrated, the floor height of houses and buildings are estimated to be less than 50 cm in each sub-area according to the damage survey while that in Area I are estimated to be 130 cm. The damage ratios are estimated on the basis of the proportion of the average damage amount against the average present value of house per sample household to be damaged and the share of number of damaged household in total number of sample households in inundation area. The damage ratios are assumed to be 0.5% in Area I, 1.4% in Area II and 1.6% in Area III for the 10-year storm.

The unit economic value of damage potential for the 10-year storm per one household in inundation area is estimated as follow:

Area	Present Value (1,000 kip)	Damage Ratio	Conversion Factor	Unit Damage (1,000 kip/HH)
Area I	2,210	0.5%	0.9	10
Area I	I 2,540	1.4%	0.9	32
Area I	2,660	1.6%	0.9	38

The total economic damage potentials by sub-area are shown in Table J.6.

J.2.2 Damage to Household Article

The household articles are damaged for only 5% of the households in the inundated area. The cause of relatively small damages to household articles are

speculated that the inhabitants in the inundation area move their important articles in advance to safe places before the inundation occurs according to the experiences in every year.

The economic damage potential value of household articles is estimated on the basis of following function.

Dha = $Vha \times N \times DR \times C.F.$

Where, Dha: Economic damage potential to household article

Vha: Average value of household articles per household

N: Number of houses in the inundation area

DR: Damage Ratio

C.F.: Conversion Factor

The common household articles in the Study area are carpet, furniture, clothes, kitchen equipment and bicycle. In addition some luxury goods, such as, refrigerators, air conditioners, fan, radio, stereo set TV and Mobylette are owned in especially in central city in Vientiane.

The average value of these household articles per one household and damage ratio for the 10-year storm are estimated. The average value of household articles per one household is estimated on the basis of average amount of household articles owned by the sample households in the inundation area. The damage ratio is assumed to be proportion of the average damage amount against the average value of household articles per one sample household. The unit economic damage value per one household in inundation area is estimated as follow:

Area	Average Value of Household Article (1,000 kip)	Damage Ratio	Conversion Factor	Unit Economic Damage Value (1,000 kip/HH)
Area I	470	3.0%	0.9	13
Area II	500	4.1%	0.9	18
Area II.	810	4.5%	0.9	33

The total economic damage potentials of household articles for the 10-year storm are estimated and results are shown in Table J.7.

J.2.3 Damage to Shop and Factory

There are most important commercial zone and 15 major markets in the Study area. Small scale factories also concentrate in the Study area. The direct damages to shop and factory compose of damage to assets (machinery, display, equipment) and the stocked materials. These assets and stocked materials are liable to be the victim of inundation and have brought the most serious damage to economic activity.

The damage potential of shop and factory is estimated on the basis of following function.

 $Dsf = (Vsa \times DRsa + Vss \times DRss) \times N \times C.F.$

Where, Dsf: Economic damage potential to shop and factory

Vsa: Average value of assets per shop and factory
Vss: Average value of stocks per shop and factory

N: Number of shop and factory in the inundation area

DRsa, DRss: Damage Ratio

C.F.: Conversion Factor

average value of and the damage ratio due to inundation.

The average value of assets and stocks per one shop and factory are estimated as follows.

Unit: 1,000 kip

Area	Average Value of Assets	Average Value of Stock
Area I	730	430
Area II	962	600
Area III	1,134	640

Note: Average value of assets and stock owned by interviewed shop

For this study, the damage ratio are calculated on the basis of the share of damage amount per one damaged shop and factory in average amount of assets and stocks to be owned by one shop and factory and the proportion of damaged shops and factories against total number of shops and factories in the inundation area. These data were obtained from the damage survey. From the damage survey to shop owner, the inundation damages due to the 10-year storm are identified to be different by area categories. The damage ratios for the 10-year storm are estimated as follows.

Area	Damage Ratio to Assets	Damage ratio to Stock
Area I	3.2%	2.4%
Area II	1.3%	0.9%
Area III	3.6%	2.5%

The unit economic value of damage potential per one shop or factory in inundation area for the 10-year storm is estimated as below:

Unit: 1,000 kip

Area	Averag	e Damage	Value	Conversion	Unit
Aica	Assets	Stock	Total	Factor	Economic Damage
Area I	23	10	33	0.9	30
Area II	12	5	17	0.9	15
Area III	41	16	57	0.9	51

The total economic damage potentials to shop and factory for 10-year frequency inundation are estimated as shown in Table J.8.

J.2.4 Damage to Public Infrastructure

The existing public infrastructures in the Study area are road, bridge, hospital, school, government offices and public facilities of water supply system, electricity distribution system, sanitation and telecommunication

system. According to the information of Vientiane Municipality, the most serious damage to public infrastructure due to inundation is identified to be damage to road. As for the damages to electricity supply, water supply and telephone services are estimated as the indirect damage and data of damage to other public facilities are not available. In this study, the damage to road is adopted as the direct damage to public infrastructure.

The economic damage to road is estimated on the basis of following function.

$Dr = Cr \times L \times DR \times C.F.$

Where, Dr: Economic damage potential to road

Cr : Average repair cost of damaged road per meter

L : Length of road in the inundation area

DR: Damage Ratio

C.F.: Conversion Factor

In the Study area the road is classified into two categories, that is, the first grade road and the second grade road according to the road width. The first grade road is paved with asphalt and the second grade road is composed of asphalt pavement road, laterite pavement road and non-pavement road. According to Vientiane Municipality, the laterite pavement roads were damaged by inundation and the repair work was required while the damage to road of other type were relatively small. For this study, the repair cost of the second grade road paved with laterite is considered. The damage value of road in the inundation area is estimated on the basis of the average repair cost per meter and the average damage ratio due to inundation.

The average repair cost per meter for laterite pavement road is set on the basis of data from Vientiane Municipality. According to the criteria of Vientiane Municipality, the second grade road is classified to two types as follow:

Type I Width 6 m

Thickness of pavement 30 cm

Paved volume per meter 1.8 m³

Type II Width 4 m

Thickness of pavement 20 cm

Paved volume per meter 0.8 m³

The unit repair cost of damaged laterite pavement road is set to be 1,000 kips per square meter and the repair cost per meter is estimated to be 1,800 kips for type I and 800 kips for type II on the basis of above paved volume. The average repair cost of damaged road is estimated to be 1,400 kips by assuming that 60% of the damaged road is classified as type I and remaining 40% of the damaged road is classified as type II.

The total length of second grade road of each sub-area are estimated by measuring the road alignment in the inundation area utilizing with 1:5,000 Map covering Sub-area B, C, D, E, F, G, H, I, K, L, P and Q. The road length of remaining area are assumed by calculating the average road density of the second grade road in above sub-areas. In order to estimate the inundated road length, the proportion of inundated area to total area of each sub-area are assumed as the proportion of the inundated road length against total road length of each sub-area. In addition, 10% of inundated road is assumed to be damaged due to inundation according to the information of Vientiane Municipality. Adopting above assumption, the length of damaged road is estimated by multiplying the inundated road length and 10% of the damage ratio. The total economic value of damage potentials of road due to inundation are estimated by adopting 0.9 of conversion factor as shown in Table J.9.

J.2.5 Damage to Traffic

During the inundation period, the hindrance to the traffic system occur and the transportation of both passenger and cargo are disturbed. From the damage survey, this damage is identified to be the most serious damage for the inhabitants.

The economic damage potentials to traffic are estimated by calculating as the loss of traffic charge of bus, taxi and other transportation. The damage potential to traffic is estimated on the basis of following formula.

$Dt = Vt \times Ft \times Pt \times DR \times C.F.$

Where Dt: Total economic damage potential to traffic

Vt : Daily traffic Volume in the Inundation Area

Ft: Average traffic charge per persons km or t.km

Pt: Average traffic block period

DR: Damage ratio

C.F.: Conversion Factor

The damage potentials are estimated both for the passenger transportation and cargo transportation.

The daily traffic volume in the inundation area are calculated according to the information of Vientiane Municipality. In 1988 the total traffic volume in Vientiane city were 9,903,722 persons km and 80% of these traffic volume concentrated in the Study Area. The daily traffic volumes in the Study Area are estimated to be 21,707 persons km and 158,989 t.km.

The traffic volume is distributed to each sub-area with share of population in each sub-area against total population in the Study area and traffic volume in inundation area is also estimated according to share of population in inundation area to that of sub-area. The traffic volume of each sub-area is shown in Table J.10.

The average charges of transportation in the Study area are assumed to be 44 kip/persons•km and 25 kip/t.km according to Vientiane Municipality and UNDP data. The average period of hindrance for 10-year storm is set according to the result of the damage survey. The damage ratio is estimated as the proportion of number of household to be blocked of their traffic against the total number of household in inundation area. The above data are summarized in following table.

				
Area	Average Traffic Cost	Period of Hindrance	Damage Ratio(%)	Conversion Factor
Arca I		· · · · · · · · · · · · · · · · · · ·		
Passenger	44 kip/p.km	26 hour	70%	0.9
Cargo	25 kip/t.km	26 hour	70%	0.9
Area II				•
Passenger	44 kip/p.km	31 hour	62%	0.9
Cargo	25 kip/t.km	31 hour	62%	0.9
Area.III				
Passenger-	44 kip/p km	14 hour	71%	0.9
Cargo	25 kip/ t.km	14 hour	71%	0.9
	·····			

The total economic damage potentials to traffic for 10-year storm are estimated by adopting 0.9 of conversion factor as shown in Table J.11 and J.12.

J.2.6 Sales Loss

(1) Sales loss of shops

The sales of shops are decreased during the inundation period. The economic damage potential to sales loss of shop is estimated on the basis of following function.

 $Dss = Sd \times P \times N \times DR \times C.F.$

Where: Dss: Total economic damage potential to sale of shop

Sd: Average daily sale in the inundation area

P : Average damage period

N: Number of shops in inundation area

DR: Damage ratio

C.F.: Conversion Factor

The average proportion of average sales loss per one damaged shop against average daily sales per one shop in inundation area due to 10-year storm is estimated to be 20% in Area I, 27% in Area II and 32% in

Area III respectively according to the damage survey. The shops in inundation area lost their sales during the inundation period as well as the restoration period after inundation. The average periods to decrease sales of damaged shops are estimated to be 2 days in Area I and 3 days in Area II and III on the basis of results of the damage survey.

The average value of sale loss per one shop in inundation area for the 10-year storm is estimated on the basis of the average daily sales per shops in the Study Area obtained from Vientiane Municipality, 4 District offices and the damage survey. The average value is converted to economic value by adopting 0.9 of conversion factor.

Area	Average Daily Sales (kip)	Damage Ratio (%)	Damage Period	Conversion Factor	Average Value of Damage (kip)
Area I	4,300	20%	2 days	0.9	1,548
Area II	9,330	25%	2 days	0.9	4,199
Area III	15,200	27%	3 days	0.9	11,080

The total economic damage potentials of sales loss for the 10-year storm in each sub-area are calculated based on assumed number of shops as show in Table J.3. The results are summarized in Table J.13

(2) Sales loss of market

In addition above, inundation damages to the large markets were identified in the damage survey. The list of markets in inundation area are shown as below.

District	Name of Market	Sub-area	Number of Shop	Total Daily Sales (1,000 kip)
Chantabury	Thong Kham	Н	360	2,000
Chantabury	Phong Tong	K	30	150
Saysettha	That Luang	$\cdot_{i}\mathbf{P}$	222	740
Sikhotabong	Kok Pho	M	60	200
Sikhotabong	Si Kay	N	220	2,500
Sisatanak	Soune Mone	В	60	360
Sisatanak	Nong Chanh	G	170	850

Source: District office of Chantabury, Saysettha, Sikhotabong and Sisatanak.

The economic damage potential of each market for the 10-year storm is estimated on the basis of following function.

 $Dsm = Sd \times P \times DR \times C.F.$

Where: Dsm: Total economic damage potential to sale of market

Sd: Average daily sale of market in the inundation area

P: Average damage period

DR: Damage ratio

C.F.: Conversion Factor

The sales loss in economic price of each market is estimated by adopting 27% of the damage ratio and 2 days of damage period of shops in Area II and results are shown as follows.

Name of Market	Total Daily Sales (1,000 kip)	Damage Ratio	Damage Period (day)	Conversion Factor	Total loss of sales (1,000 kip)
Thong Kham	2,000	27%	2	0.9	972
Phong Thong	150	27%	2	0.9	73
That Luang	740	27%	2	0.9	360
Kok Pho	200	27%	2	0.9	97
Sikay	2,500	27%	2	0.9	1,215
Soune Mone	360	27%	2	0.9	175
Nong Chanh	850	27%	2	0.9	413
Total					3,305

J.2.7 Wage Loss

The wages of workers are lost not only in the inundation period but in the restoration period. The total wage loss in economic price due to 10-year storm is estimated on the basis of following function.

$Dw = W \times P \times N \times DR \times C.F.$

Where: Dw: Total wage loss in economic price

W: Average daily wage per one household

P: Average damage period

N: Number of household in inundation area

DR: Damage ratio

C.F.: Conversion Factor

The average daily wage per one household in the inundation area, average off-work period per one damaged household due to inundation are estimated according to the damage survey. The proportion of number of damaged household against total number of household in inundation area is adopted as the damage ratio. The average economic value of damage per one household in the inundation area is estimated by adopting 0.33 of the conversion factor. The results are shown as follows.

Area	Average Daily Wage(kip)	Off-work Period	Damage Ratio	Conversion Factor	Average Value of Damage(kip)
Area I	1,640	2 days	5.0%	0.33	54
Area II	1,780	2 days	7.0%	0.33	82
Area III	1,980	3 days	8.5%	0.33	167

- * Damage Ratio = No. of damaged household/No. of inundated household
- * Conversion Factor = 0.33 = 0.9 of Standard Conversion Factor x 0.37 of shadow wage rate

The economic damage potentials for the 10-year storm are estimated by above average value of wage loss per one household and the number of inundated population in sub-area and results are shown in Table J.14

J.2.8 Damage to Daily Life of Inhabitants

The daily life of inhabitants is affected by both inundation itself and indirect damage to economic activities such as shortage of food, luck of public services and closing of schools and hospitals. From the damage survey, the following damages are identified.

- Stop of water supply
- Stop of electricity supply
- Stop of telephone service

The damage to electricity supply is major problem of daily life of inhabitants due to the inundation and about 20% of households in the inundation area were affected by stop of electricity supply for the 10-year storm. The economic damage potential of stop of electricity supply is estimated according to following function:

$D_E = C \times R \times P \times H \times DR \times C.F.$

Where: DE: Damage potential of stop of electricity

C: Average daily charge of electricity

R : Propagation ratio

P : Period of stop of electricity

H : Households in inundation area

DR: Damage Ratio

C.F.: Conversion Factor

The average daily charge and the propagation ratio are estimated according to the damage survey as well as information from EDL. The average period of stop of electricity per one damaged household is estimated on the basis of damage survey. The damage ratio is calculated to be share of damaged household in total number of households in the inundation area. The above data are summarized as below:

Area	Average Charge	Daily (kip)	Propagation Ratio (%)		iod of of supply	Damage Ratio (%)
Area I	45	.5	92	6	hour	10%
Area II	57	.6	94	11	hour	20%
Area III	59	.0	99	12	hour	27%

Source: EDL, Damage survey

The average value of damage potential per one household in the inundation area is estimated to be 1.1 kip in Area I, 5.0 kip in Area II and 7.9 kip in Area III for the 10-year storm.

According to the damage survey, stop of water supply and telephone service occurred for less than 2% of households in the inundation area. The damage potential of above two damage is a most negligible and is thus excluded.

The total economic damage potential to daily life of inhabitants for the 10-year storm are estimated by adopting 0.9 of conversion factor as shown in Table J.15.

J.2.9 Damage to Health Condition

From the damage survey, it is found that the poor sanitary condition due to the inundation is the most serious problem for the inhabitants. Dysentery and diarrheal are typical epidemic diseases due mainly to the poor sanitation as well as the inundation.

In 1987, the number of patients of the dengue fervor amounted to 6,728 persons in Vientiane Municipality and 90% of total patient concentrated in the urban area according to the information furnished by the Department of Public Health, Vientiane Municipality. This figure enunciate that almost 3% of the inhabitant in the Study area suffer from the dengue fervor as well as malaria that is the most dangerous epidemic disease and related closely to inundation. The damage potential to health condition is estimated to be as the medical expenses and the income loss due to disease caused by the inundation.

The medical expense due to 10-year storm is estimated in economic price on the basis of following function.

 $Dme = Em \times DR \times N \times C.F.$

Where Dme: Total medical expenses in economic price

Em : Average medical expenses per one damaged

household

N : Number of household in inundation area

DR: Damage ratio

C.F.: Conversion Factor

The average medical expense of diseases per one damaged household due to the 10-year storm is estimated only for medicines according to the damage survey because the remaining medical expense is covered by the government.

The actual medical expense is assumed to be 3 times of that of medicine cost according to the Department of Public Health, Vientiane Municipality. In this study, above assumption is adopted and the average medical expense per one damaged household is estimated on the basis of the average expenditure for medicine obtained from the damage survey. The share of number of damaged

households in total number of households in inundation area are adopted as damage ratio.

The average economic cost of medical expenses per one household in inundation area for the 10-year storm are estimated by adopting 0.9 of conversion factor as follows:

Area	Average Medical Expenses(kip)	Damage Ratio	Conversion Factor	Average cost (kip)
Area I	18,200	3.0%	0.9	491
Area II	16,136	7.7%	0.9	1,118
Area III	9,320	21.6%	0.9	1,812

The income loss in economic price caused by bad health condition are estimated on the basis of the following function.

$Di = W \times P \times N \times DR \times C.F.$

Where: Di: Total wage loss in economic price

W : Average daily wage per one householdP : Average off-work period due to disease

N: Number of household in inundation area

DR: Damage ratio

C.F.: Conversion Factor

According to the Department of Public Health, Vientiane Municipality, almost patients of typical epidemic diseases caused by inundation, such as, dengue, dysentery and diarrheal were children or infants. The direct wage loss are not counted, so the wage loss of family member who nurse the patients are estimated for the this study.

The average period of wage loss are assumed to be one week per one damaged household according to interview to household and the share of number of damaged households in total number of households in inundation area are adopted as damage ratio. The average economic value of damage

potential of wage loss due to nursing per one household in inundation area for the 10-year storm is estimated as follow:

Area		Average Wage (kip/day)	Off-work Period	Damage Ratio	Conversion Factor	Average Damage Value (kip/HH)
Area	I	1,640	7 days	3.0%	0.33	114
Area	П	1,780	7 days	7.7%	0.33	317
Area	III	1,980	7 days	21.6%	0.33	988

The total economic damage potentials to health condition for the 10-year storm are estimated according following average damage value per one household in inundation area and results are shown in Table J.16

	Average Damage per Household(kip)
Area I	605
Area II	1,435
Arca III	2,800

J.2.10 Damage to Crop.

The damage to crop is evaluated by damage to paddy, vegetable, soybeans and other crop due to the inundation. The damage potential to crop is estimated on the basis of the average unit yield in the rainy season, the period of inundation and the average inundation depth for the 10-year storm.

The major damaged crop is paddy to be counted more than 95% of the damaged amount of crop on the basis of the damage survey. In this study, the damage to other crops than paddy is assumed to be negligible damage and damage to paddy is estimated as damage to crop in the Study area.

The damage to paddy is evaluated as the economic production foregone due to the inundation by adopting the unit damaged production of paddy per ha

of the the inundation area and inundation area in the study area. The unit damage production is estimated according following assumptions.

- (1) The economic farm gate price of paddy is estimated on the basis of the import parity price of rice calculated from "Price Prospects for Major Primary Commodities", World Bank. The estimation of the economic farm gate price of paddy is summarized in Table J.17.
- (2) The unit yield of paddy per ha is assumed to be 3 t/ha according to the estimation of the Department of Agricultural Service of Vientiane Municipality.
- (3) The production cost of paddy per ha is assumed to be 35% of gross production according to the the Department of Agricultural Service of Vientiane Municipality.
- (4) On the basis of damage survey, 50% of the cultivated area in the inundation area are damaged and 15% of net production in the damaged area is lost due to the 10-year storm. So the damage ratio against net production of the inundation area is assumed to be 7.5% by multiplying 15% and 50%.

Thus the unit economic damage production per ha in the inundation area is estimated as below:

Farm gate price	128,357 Kip/t	
Unit yield	3 t/ha	
Gross production	385,071 Kip/ha	
Net production (65% of Gross production)	250,000 Kip/ha	
Damage ratio per ha in inundation area	7.5%	
Damaged production per ha in inundation area	18,750 Kip/ha	

The cultivated land is assumed to be 70% of total green area on the basis of the present share of cultivated land in the green area in the Study area according to the Department of Agricultural Service of Vientiane Municipality.

The damage potential to crop in economic price is estimated as shown in Table J.18.

J.2.11 Other Damage

In above clauses, the tangible damage due to inundation are discussed in monetary terms. However, there are various intangible damage due to inundation, such as, effects on environment, amenity and comfortableness of inhabitants. In addition, ten persons were injured and one person was killed by inundation in 1988. In this study, the damage amount of other damage which can not be quantified is assumed to be 10% of total damage to be estimated in J.2.1 to J.2.11.

J.2.12 Summary of Inundation Damage

The damage potentials of the 10-year storm in each area are estimated on the basis of the unit damage value and inundation volume discussed in the previous subsections.

The future damages are estimated on the basis of land use projection and the unit value of damage potential of each item. The unit values of damage potential in each year are increased by adopting the growth rate of GRDP in the Study area as follows:

1989 - 2000	7.6%
2000 - 2010	8.1%
2010 - 2020	8.4%
Over all period	8.0%

The summary of damage potential for the 10-year storm at economic price is shown in Table J.19 and J.20.

J.3 Economic Benefit

J.3.1 Annual Economic Benefit

The economic benefit of the project is considered to be the damage reduction through provision of the drainage improvement works. The damage reduction is estimated as the difference in the possible damages in with and without the project cases.

The damage potentials of each inundation by probable storm are estimated on the basis of damage potentials for the 10-year storm. In this estimation, the damage potential is assumed to be proportional to the inundated area. A hydrologic and hydraulic study entailed the indices to estimate the inundation area corresponding to the probable rainfall as follows;

Prob Rair Frequ		Inundation Area (ha)	Index
	2	4.5	21
;	5	18	86
1	0	21	100
2	O	24	114
5	0	28	133

The expected reduction of damage amount is evaluated by the average annual damage amount reduced due to the projects. Although the project is designed against the 10-year storm, it is not expected that whole the damage due to the probable storm less than the 10-year storm is protected. Some damages should be considered to remain. This unprotected damage should be reduced from the estimated benefit. The unprotected indices were assumed on the basis of the hydrologic and hydraulic studies as follows:

Rainfall -	Inundation A	Inundation Area (ha)		Reduction
	Without Project	With Project	Reduction	Rate
2	4.5	0	4.5	100%
5	18	5	13	72%
10	21	11	10	48%
20	24	15	9	38%
50	28	21	7	25%

In addition above, the reduction of inundation damage due to small storm less than 2-year storm is to be considered. According to the automatic gauge records of the Study team in Vientiane, inundations due to the small storm less than 2-year storm were assumed to occur four times a year as discussed in Appendix A.10.4. Thus the average damage potential due to these small storm are estimated to be 5% of the damage due to 10-year storm and added to benefit calculation.

J.3.2 Economic Benefit for the Priority Projects

The economic benefits of following priority projects are estimated on the basis of economic benefit in each covered sub-area.

Priority Project	Sub-area C, E, F, G, H	
Hong-Ke System		
Nam Pasak System	L	
Sub-area I (Hong Kai Keo System)	I	
Sub-area K	K	

The economic benefits of the Priority Projects are assumed on the basis of following conditions.

(1) Each project is composed of both construction of main canal and construction of lateral canal. The main canal is assumed to be constructed from the first year of the master plan period. The lateral

canal is assumed to be constructed to cover the estimated built-up area by the year of 2020. So the lateral canal is constructed annually following the expansion of inundated built-up area. The construction of lateral canal is completed in year of 2020.

- (2) On the basis of above construction schedule, the benefit is accrued from the next year of completion of the main canal and increased according to progress of improvement of lateral canal up to year of 2020.
- (3) The inundation area except built up area at present is assumed to locate below El. 168 m which is inundated due to their topographical conditions. In this area the complete reduction of inundation is not expected even in with the project case. Thus 80% of the economic benefit in this area is reduced from benefit calculation.
- (4) The benefit after year of 2020 are assumed to be increased by the growth rate of GRDP in each sub-area.

On the basis of above mentioned conditions, the economic benefits by each priority project are estimated as follows:

Unit: US\$ 10³

				 :
	2000	2020	2030	2040
Hong-Ke System	306	1,996	5,177	13,429
Nam-Pasak	27	410	1,063	2,758
Area I (Hong Kai Keo System)	42	310	556	996
Area K	15	200	358	641

J.3.3 Economic Benefit for the Basic Plan

The annual economic benefits by each project in the Basic Plan are summarized in Table J.21. The procedures to be used in J.3.2. are adopted.

J.4 Economic Cost

J.4.1 Conversion of Financial Cost to Economic Cost

For the economic evaluation, all the costs involved in the project have to be measured as economic costs, i.e. the real resource costs or "opportunity costs" incurred from the view point of the nation's economy. The measurement of economic cost of any commodity depends on how it is likely to be produced - whether by increasing import, decreasing export, expanding domestic production or divesting from other uses.

In this study, the financial cost presented in previous chapter is converted to economic costs on the basis of above mentioned concept. The procedures of adjustment of financial costs to economic costs are as follows.

(1) Elimination of non-resource costs

The internal transfer among the national economy, such as, tax and subsidy of the government are excluded from the financial costs. In this study, 5% of the foreign portion cost is eliminated as the import tax.

(2) Adjustment of price distortions

All the financial costs of the project are adjusted their price distortion due to foreign exchange premium, overvalued labour costs and land acquisition cost of land in order to the real costs or "opportunity costs". For this adjustment, 0.9 of the conversion factor is assumed for traded goods. As for the land acquisition cost for cultivated land, the production foregone is estimated as the economic cost instead of adopting conversion factor for land. The real cost of labour is evaluated by applying 0.37 of the shadow wage rate.

The financial costs of the project are classified into three categories, construction materials plus equipment, labour and land acquisition cost. The financial costs are converted by each cost items.

The detailed adjustment of financial cost to economic cost of each cost items is summarized as follows.

(1) Foreign portion

All cost of the foreign portion are estimated at C.I.F. price plus import tax. The economic cost for the foreign portion is estimated by eliminating import tax from the financial cost.

(2) Local Portion

- Tradable goods

The financial cost of tradable goods in the local portion is converted to economic cost by adopting 0.9 of the conversion factor.

- Labour cost

The labour cost are converted by adopting 0.37 of the shadow wage rate and 0.9 of the conversion factor. The labour cost are assumed to be 20% of the local portion.

- Land acquisition cost

The present value of production foregone is estimated as economic cost of the land acquisition cost for cultivated land. The economic costs of the land acquisition cost for residential house and other facilities are estimated by multiplying 0.9 of the conversion factor with the financial land acquisition cost.

J.4.2 Summary of Economic Cost

The economic cost consists of the construction cost of main canal, construction cost of lateral canal and annual operation and maintenance cost for the project.

(1) Construction cost of main canal

The financial and economic costs of construction of the main canal by the priority project are summarized in Table J.22 to J.25.

The conversion method of the economic cost above mentioned are applied to cost categories such as direct cost, land acquisition,

government administration and engineering service. The economic cost of the excavation cost of the Nong Chanh retarding basin and the Nam Pasak shortcut canal are assumed to be 50% and 70% of their financial cost respectively, because the excavation materials should be used for the embankment materials.

The operation and maintenance equipment cost is deducted from the economic construction cost and the annual depreciation costs of these equipment are added to the annual operation and maintenance cost.

(2) Construction cost of lateral canal

The lateral canal are constructed in the inundated built-uparea following the expansion of the built-up area and completed in year of 2020. According to the land use projection, the built-up area in the inundated area increases by year to year as shown in Table J.26.

The unit direct cost of lateral canal is estimated to be US\$24,000 per ha and 30% of the direct cost is added as the indirect cost. Thus the construction cost is estimated by adopting above unit cost as shown in Table J.26.

(3) Operation and maintenance cost

The operation and the maintenance cost in economic term are assumed to be 1% of total economic construction cost of both the main canal and the lateral canal.

J.5 Economic Evaluation

J.5.1 Introduction

The economic viability of the project is analyzed from the point of view of the national socio-economy as a whole. The economic evaluation is carried out according to the following approach. In this study, the EIRR is adopted as the evaluation index

(1) Priority study

The evaluations of the priority projects are carried out and the implementation priority of the priority projects is decided on the basis of evaluation results. The each priority project is assessed by assuming that the project would be started in 1991.

(2) Evaluation of the Basic Plan

The economic justification of the Basic Plan is evaluated on the basis of the overall implementation schedule. The evaluation period is assumed to be 50 years from the year of 1991, the first year of the Basic Plan and the salvaged value at the end of the evaluation periods is counted in 2040.

J.5.2 Major assumption

The economic evaluation is made on the basis of the following assumptions:

- (1) The economic life of the project is taken at 50 years from the commencement of the construction.
- (2) The base period for the cost estimate is set in October, 1989.
- (3) The exchange rate of US\$ 1 = Kip 590 = Yen 141 is applied.
- (4) In estimating capital cost for construction, the physical contingency allowance is estimated to be 10% of the direct cost.

(5) In this study, the opportunity cost of capital is assumed to be 10% on the basis of the interest rate of long-term lending of the central bank.

J.5.3 Economic Internal Rate of Return

The economic internal rate of return (EIRR) of the projects is estimated on the basis of economic cost and benefit cashflow as shown in Table J.27 to J.31. The results are summarized as follows:

(1) Priority Project (Commenced in 1991)

Hong-Ke	7.3%
Nam Pasak	4.2%
Hong Kai Keo (Area I)	3.5%
Arca K	3.5%

(2) Overall Master Plan

Overall Master Plan	5.8%
Priority Project (Hong Ke System, Nam Pasak, Hong Kai Keo (Sub-area I)	6.3%
Sub-arca K)	
Sub-area D, J, M, O and P	4.8%
Sub-area A and B	5.5%

TABLES

Table J.1 Inundation Area in 1988 and 2020

Year: 1989

Sub-area	Central	Residential	Public & Commercial	Industrial	Water	Green	Other	Total
Α		0.0			74.7	87.3		162.0
В	•	49.8				211.3		261.1
С		11.3						11.3
D		23.5				80.3		103.8
B		18.1	4.7		5.0	33.8		61.6
F		9.0				3.8		12.8
G		13.3				•		13.3
H		42.7	1.9					44.6
I			7.1		•	133.3		140.4
J	*	58.1			10.0	60.0		128.1
·K		20.4		2.7	7.6	73.8		104.5
L		28.5	•					28.5
M		52.0				255.1		307.1
N		92.2	100			762.8		855.0
0		0.0						0.0
P		10.1				43.8		53.9
Q		0.0				•		0.0
Total	0.0	429.0	13.7	2,7	97.3	1,745.3	0.0	2,288.0

Year: 2020

Sub-area	Central	Residential	Public &	Industrial	Water	Green	Other	Total
	· · · · · · · · · · · · · · · · · · ·		Commercial		35.1	126.9		162.0
A		07.0			33.1		:	
В	-	97.8				163.3		261.1
С		11.3						11.3
D		85.1	5.1			13.5		103.7
Е		28.1	9.8		3.4	20.3		61.6
F		12.8						12.8
G	13.6					•		13.6
H	17.6	25.1	1.9					44.6
I		49.4	38.9		1 1	52.0		140.3
J		78.8	20.0		1.8	27.5		128.1
K		89.7		7.1	7.6			104.4
L	28.5							28.5
M		71.6				235.5		307.1
M N		112.2				703.5	39.3	855.0
0								0.0
p	÷	51.4	2.5	1,				53.9
Q								0.0
Total	59.7	713.3	78.2	7.1	47.9	1,342.5	39.3	2,288.0

le J.2 Inundation Area and Inundated Population in 1989

	Total		1.370	8.14	2,091	1,367	431	1,834	(C)		1,540		796		3,000		. 78			24,121				
Population	Area III	0	0	0	Ó	282	0	0	2,350	069	0	21	0	0	0	0	.0	0		3,343				
Inundation Population	Area II	0	1,370	814	2,091	1,085	431	1,834	3,025	0	1,540	155	796	3,852	0	0	785	0		17.778.	٠		148	
	Area I	0	0	0	0	0	0	0	0	0	0	0		0	3,000	0	0	0		3,000				
Population	Density (per ha)	42.3	27.5	72.0	89.0	59.9	47.9	137.9	120.5	97.2	26.5	7.6	27.9	74.1	32.5	192.8	77.8	47.1		57.2				
Total	Built-up Area(ha)	71.1	457.4	160.2	125.8	106.2	106.1	28.6	162.0	138.8	164.8	89.2	186.7	417.1	224.6	18.4	109.8	36.4		2,603.2				
Total	Population in Sub-area	3,004	12,584	11,537	11,191	6,363	5,084	3,944	19,522	13,487	4,369	629	5,213	30,898	7,309	3,547	8,538	1,716		148,985				
	Total	87.3	261.1	11.3	103.8	56.6	12.8	13.3	44.6	140.4	118.1	6.96	28.5	! ~	55	0.0	53.9	0.0	Į,	2,190.7	٠			
(ha)	Green	87.3	211.3		80.3	33.8	က လ			133.3	60.0	73.8		255.1	762.8		43.8		h	1.745.3		•		
Area	Area III					4.7			19.5	7.1		2.7								34.0				
Inundation	Area II		49.8	11.3	23.5	18.1	0.6	13.3	25:1	0.0	58.1	20.4	28.5	52.0			10.1			319.2			N ₂	
	Area I										•				92.2	1				92.2				
Sub-	area	4	M	ပ	Ω	山	ţţ,	Ö	H	}	- -	×	ᅱ	×	Z	0	ሷ	0		TOTAL	٠.			

Table J.3 Number of Inundated House in 1989

									•																		
	Total		0	.91	ارم 4	140) C	200		516	. 0	103	, –	, t	757	, L))	۰ <i>۲</i>) 1 C	> C	89	;					
and Factory	Are.		0	0	0	ے د) % (") C) C	3 14 4		0	er:) C	O	:		> <) C	>	447 1						
No. of Shop	ď		o o	91	54	140	72	29		202		103	10) (cr	257	1	C	5,5		 >	1,185						
	Area I		0	0	0	0	0	0	0	0	0	0	0	C	° 0	50	Ċ	¢	o C)	50	·				i	
	Total	·	* 1	137	8.2	0	11.8	4	184	380	23	154	17	08	385	450	0	7.9) .	2,341				÷		
intial House		. .	>	0	0	0	9.	0	0		23	0		0	0	0	0	0	0		111	en e			1.	,	
No. of Residential	Area II 🗚) t	137	0	\circ	109	4 6	184	302	0	154	16	80	385	0	0	79	0		1,780						
_	Area I	c	> <	>	0	0	0	0	0	0	0	0	0	0	٥	450	0	0	0		450						
	Total	C	•	877	(43)	4	228	<u>~</u>	306	Ò.		V)	30	S	642	Ç	0	131	0		4,023				:		
enold	Area III	C	> <	> (5	0	47	0	Ö	392	115	0	4	0	0	0	0	0	0		558						
No. of Household	Area II	C	C	4 (136	4	00	_	306	0		257	~ 1	133	642	0	0	131	0		2,965						
	Area I	C	· c		> (0	0	0	0	o ·	Q ·	0 (0	0	0	200	0	0	0		500						
Sub-	area	≪	ρ¢	۹ (۽ د	: : :	ш	II.	י ט	ц,	, , , , , , , , , , , , , , , , , , ,	unca j	×4 .	.ı	X	Z	0	Д	ø		Total			٠			

Table J.4 Inundation Area and Inundated Population in 2020

0010		זווחוות	inundation Area (na)	(na)	-	10131	lotal	Population	:	Inimdation Population	Population	
1		,				Population	Built-up	Density			i Champing	
	Area I	Area II	Area III	Green	Total	in Sub-area	Area(ha)	(per ha)	Area I	Area II	Area III	Total
₹				126.9	126.9	23 647	288.0	82.1				
м		97.8		163.3	261.1	30,880	503.2	61.4		6.002) C	6 002
ပ		11.3			11.3	18,797	175.7	107.0		1,209	, , ,	1 200
Д		85.1	5.1	13.5	103.7	22,927	230.0	7.66	0	8,483	508	8.991
щ		28.1	8.6	20.3	58.2	13,758	121.3	113.4	0	3,187	1,112	4.299
[I .		12.8			12.8	11,549	123.0	93.9	0	1,202	0	1.202
တ	٠	٠	13.6		13.6	4,487	29.1	154.2	0	0	2.097	2,097
H		25.1	-19.5		44.6	27,304	169.2	161.4	0	4.050	3,147	7 197
H		4.64	38.9	52.0	140.3	26,348	224.0	117.6	0	5.811	4.576	10.387
-		78.8	20.0	27.5	126.3	15,119	214.9	70.4	0	5.544	1,407	6.951
¥	-	89.7	7.1		8.96	9,237	158.5	58.3	0	5,228	4.4	5.642
ᆈ			28.5		28.5	13,996	186.7	75.0	0	0	2,137	2.137
Σ		71.6		235.5	307.1	41,861	417.1	100.4	0	7,186	0	7,186
Z	112.2			703.5	815.7	18,771	261.5	71.8	8,054	0	0	8,054
0					0.0	5,930	35.6	166.6	0	0	0	0
Д		51.4	2.5		53.9	16,018	153.6	104.3	0	5,360	261	5.621
0					0.0	4,371	49.4	88.5	0	0	0	0
TOTAL	112.2	601.1	145.0	1,342.5	2,200.8	305,000	3,340.8	91.3	8,054	53,262	15.659	76,975

			<u>[</u>	able J.5	Numbe	Number of Inundated House	lated Hous	se in 2020	20			
			:									
		No. of Household	sehold			No. of Resic	No. of Residential House			No. of Shop	n and Factor	
	Area I	Area II	Area III	Total	Area I	Area II	Area III	Total	Area I	Area II	Area III	Total
	0	0	0	0	0	0	C	C		c	C	O
	0	1,000	0	1,000	0	. 0) C	600	0	400	> C	700
	0	202	0	202	0	121	0	121		~	Ċ) ~) «
	0	1,414	85.	1,499	0	4	17	865) O	566	× × ×	יא ני
	0	531	185	716	0	319	37	356	0	212	148	360
	0	200		200	0	120	0	120	0	8.0	0	08
	0	0	350	350	0	0	7.0	7.0	0	0	∞	280
	0	675	525	1,200	0	0	105	510	0	270	420	069
	0	696	9	1,732	0	581	153	734	0	388	610	866
	0	924		1,159	0	554	47	601	0	370	188	558
*	0 (871		940	0	2		537	0	348	55	403
	0	0	356	356	0	0	7.1	7.1	0	0	285	285
	0	1,198	0	1,198	0	719	0	719	0	479	0	479
	1,342	0	0	1,342	1,208	0	0	1,208	134	0	0	134
	0	0	0	0	0	0	0	0	0	0	0	0
:	0	893	4 4	937	0	536	6	545	0	357	35	392
	0	 O	0	0	0	0	0	o :	0		0	0
Total	1,342	8.877	2,612	12,831	1.208	5.326	523	7.057	134	3 551	2 080	5774

Table J.6 Damage to House in 1989

Sub-	\ \	Unit value of Damage	mage	Ž	No. of House			-	Total Damage	or Potential	
area	Area I	Area II	Area III	Area I	Area II	Area III		Area I	1 171		Tota
<	-			(•					
< 1) ·			5	0	0		0	0	0	0
Σq	10			0	~	0			7.296	<u>_</u>	7 296
ပ	10		38	0	136	0		0	4.352		4 35.0
Ω	10			0	4	0		0	11,168	o C	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
ìπj	10		38	0	181	47		0	5.792	1 786	7 578
ഥ	10		38	0	.72	0		0	2.304	2	2304
Ö	10		38	0	306	0		0	9.792) C	0,201
H	10		38	0	504	392			16.128	14 896	31.024
jeord Jeord	10		38	0	0	115		C		4 370	4 270
} 6	10		80	0	257	O		· C	8 224)	0,00
×	10		တ က	0	26	4		· C	× × × × × × × × × × × × × × × × × × ×	150	777.0
<u>بــا</u>	10			0	133	C	٠.		4 2 5 5	•	O.V
Σ	10		80	0	4	i c .		· C	20.544	, c	007,400
Z	10			500	. –	· C		5 000	,		\$40.04 \$40.04
0	10			0	0) C		200	o c	O C	_
<u>с</u>	10	3.2	38	0	131		:	0	4.192	» с	4
~	10		က	0	0	0		0	0	0	0
Total				008	2700	0 2 2					

able J.7 Damage to Household Article in 1989

Sub-	Unit Valu	Unit Value of Damage	ge	Z	No. of House			Total Damage	age Potential	
area	Area I A	Area II A	Area III	Area I	Area II	Area III	Area I	Area II	1 1-4	Tota
			٠,					-		
¥	m Trad	18	33	0	0	0	0	C	O.	٠.
ρQ	13	18	က က	0	228	0	C	_		7
ر ا	13		en en	C	Çſſ			7.40), (7, 6
Д	5	~	י ני ני	0) 4) c		0,4)	7,448
ĻĹ		0 0			t	ο :	.	787.0	D _i	6,282
11	ń (• • • • • • • • • • • • • • • • • • •)	181	47	0	3,258	1,551	4,809
L , '	513	200	က <u>ဲ</u> က	0	72	0	0	1.296	C	1.296
Ů	т т		33	0	306	0	C	5.508		800
H	-		ω ω	0	504	392		0 070	12 026	000000
_		~		· C	, ,	! V		4 0	14,700	000.77
, -	, ,	9 6			>	211	>	>	3,795	3,795
¦ د ښا	∵	× -		0	257	0	0	4,626	0	4.626
×		₩ •	m m	0	26	4	0	468	132	600
H	13	~	in cu	C	13.3		· C	7000	10	
/					` (> 4	>	4,0,74	D	イ、ウンク
₹ 7	n .	×.		0	642	0	0	11,556	0	11.556
Z	E E	8	ဗ	500	0	0	6,500	0	0	6.500
0	13		i m	0	0	0	C	C) <u>_</u> C	
Д	13	18	რ რ	0	131	C	· C	2 2 6	· C	0 0
C	() F	0		• <		•	•	0,0,0	>	4,030
y	<u>ი</u>		υ. Ω	-	>	0	0	0	0	0
7019				200	2700	o b				
1 0 0 0				200	7,703	228	6,500	53,370	18,414	78.284

Table J.8 Damage to Shop and Factory in 1989

4,692 435 3,018 Total Damage Potential 4,692 797 153 16,014 Area ? 2,100 1,080 435 1,830 1,545 150 795 3,855 Area II 500 Area Area No. of House 103 103 10 140 72 29 122 202 Area II Area Area Unit Value of Damage Area II Area I area Sub-Total

Table J.9 Damage to Public Infrastructure in 1989

area	Unit Value of Damage	Length of 2nd Grade	Inundated Ratio	Length of Inundated	Damage Ratio	Length of Damage	Total Damage Potential
	(1,000 Kip)	Road (m)		Road (m)		Road (m)	(1,000 Kip)
Ą	1.3	64	0.00%	0	10.0%	0	
Д	1.3	3,417	10.89%	372	10.0%	37	47
ີບ	1.3	1,197	7.05%	84	10.0%	, 00	-
Ω	1.3	1,539	18.68%	287	10.0%	29	36
ப	1.3	806	21.51%	173	10.0%	7.1	22
Ш	1.3	329	8.49%	2 8	10.0%	, KN	1 4
Ö	£.3	254	45.86%		10.0%	12	
H	£4.	978	27.53%	269	10.0%	27	. w
₩.	1.3	1,647	5.11%	8 4	10.0%	• ••	, ,,,,,
)	1.3	1,233	35.21%	434	10.0%	43	, y.,
×	1.3	8 1	25.96%	2.1	10.0%	7) (1)
H	1.3	296	15.24%	91	10.0%	. 0	, ,
Σ	E. E.	3,115	12.47%	388	10.0%	39	. 4
Z	. H	203	40.98%	83	10.0%	00	0.1
0	 E	135	0.00%	0	10.0%	0	C
ሷ	1.3	122	9.18%		10.0%		
Ø ¹	1.3	297	0.00%	0	10.0%	0	0
Total		16.013		7 444		770	000

Table J.10 Traffic Volume in the Inundated Area in 1989

									TIALLIC III OLUGUA	ないなくない
rea	Area I	Area II	Arca III	Total	Area I	Area II	Area III	Total	Passenger	
⋖	0	0	0	O	0	0	·c	C	7	3000
ρ	c		<	0) (,	2	2,400
و ر	>	007	D (700	>	1,462	Ö	1,462	1,833	13,429
J	0	119	0	119	0	869	0	869	1,681	12,312
Ω	0	305	0		0	2,231	0	2,231	1,631	11,942
Щ	0	158	4	199	0	1,459	301	1,459	927	6.790
(L	0	63	0	63	0	460	0	460	741	5.425
Ö	0	267	0	267	0	1,957	0	1,957	575	4,209
H	0	441	342	783	0	5,736	2,508	5,736	2.844	20.833
) 1	0	0	101	101	0	736	736	736	1,965	14,393
,	0	225	0	225	0	1,643	0	1,643	637	4.622
¥	0	23	m	26	0	1.88	22	188	66	725
H	0	116	0	116	0	849	0	849	760	5.563
X	0	561	0	561	0	4,111	0	4,111	4.502	32,973
Z ,	437	0	0	437	3,202	3,202	0	6,404	1,065	7,800
0	0	0	0	0	0	0	0	0	517	3.785
a٠	0	114	0	114	0	838	0	838	1,244	6
0	0	• •	0	0	0	0	0	0	250	1,831
Total	20.4	001		, , ,						

Table J.11 Damage to Traffic (Passenger) in 1989

ea I Area III Area III 1297 0.0315 0.0162 1297 0.0315 0.0162 1297 0.0315 0.0162 1297 0.0315 0.0162	Irattic	Traffic Volume (person•km)	son•km)		Otal Dama	Total Damage Detential	
15 0 0 51 5 0 0 51 5 0 0 5 1 5 0 0 5 1 5 0 0 5 1 5 1	V	Area II	Area III	Area I	Area II	Area III	Total
112 0 0 0	C	C	¢	. (
115 0.0 115 0.0 115 0.0	>		5	>	0	0	0
0.0 51	0	200	0	0	.90	O	9
15 0.0	0	119	0	0	4	C	, 4
5 0 0 1K	0	305	0	0	0) C	
	0	158	4	· C	, ,) -) v
0.0315 0.0162	0	63	0			4 C) (
0.0315 0.0162	0			o c	1 ox	> C	4 0
	0	441	342) C	- -	o vo	,
0.0315 0.0162	0	0	101	0	; c	,	, , ,
0.0315 0.0162	0	225	0	0	7	1 (3 C
0.0315 0.0162	0	23	സ	0) C	
0.0315 0.0162	0	116	0	o C	' ব		
0.0315 0.0162	0	561	0	0	· «) c	+ OX
0.0315 0.0162	437	0	0). <u> </u>) C	, c
0.0315 0.0162	0	0	O	0	· C) C	ن د
0.0315 0.0162	0	114	.0	0) 4	C	> 4
0.0315 0.0162	0	0	0	0	0	.	0

Fable J.12 Damage to Traffic (Cargo) in 1989

	Total	c) 'C		4 0	2.4	90	33	, 00	<i>-</i>	3.0	m	15	74	5.5	0	1.5	0	429	
Damage Potential	Area III	c) C	0	0	m	0	0	23	-	0	0	0	0	0	0	0	0	ω Ω	
Total Damage	Area II A	, c	2 6	1 6	4.0	2 1	00	3.5	\$ 8	0	3.0	80	15	74	0	0	1.5	0	341	
To	Arca I	c) C		0	0	0	0	0	O	0	0	0	0	5.5	0	0	0	55	
																		:		
(t•km)	Area III	Ç	0	0	0	301	0	0	2,508	736	0	2.2		0	0	0	0	0	3,567	
Traffic Volume (t•km)	Area II	: •	1.462	8.69	2,231	1,158	460	1,957	3,228	0	1,643	166	849	4,111	0	0	838	0	18,972	
Traffi	Area I	C	0	0	0	0	0	0	0	0	0	0	0	3,202	437	0	0	0	3,639	
ම ම	Area III	0.009	0.000	0.000	0.009	0.009	0.009	600.0	0.009	0.009	0.000	0.00	0.000	600.0	0.009	0.009	0.009	600.0		
Unit Value of Damage	Area II	0.018	-	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	O	0.018	0.018	0.018	0.018		
Unit Va	Area I	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017		
Sub-	area	⋖	Ω	ت ت	Ω	щ	Щ	Ð	H		 	×	, m	M	z	0	Д	0	Total	

Table J.13 Sales Loss in 1989

	Area I			1	2010 10 .01.	٠	-	Lotal Damage Potential	Section 12	:
A W O O M F		Area II	Area III	Area I	Area II	Area III	Area I	Area II	Area III	Total
t m C D m i	9		, , , , , , , , , , , , , , , , , , ,						:	
ж С С ш г	o 4		11.080	0	0	0	0	0	0	0
O D M I	1.548	4.199	11.080	0	9 1	0	0	3.82	0	382
Опі	1.548	4.199	11.080	0	5.4	0	0	227	· C	700
ការ	1.548	4.199	11.080	0	140	0	0	· 00	с	
Ļ	1.548	4.199	11.080	0	72	о 60	0	· C	47	7.00
Ĭ.	1.548	4.199	11.080	0	2.9	0	0	122	_ C	1 20
တ	1.548	4.199	11.080	0	122	0	0	t	· c	1 C
H	1.548	4.199	11.080	0	202	314	0	4	3.479	
)— (1.548	4.199	11.080	0	0	9.2	0	C	1.019	
) ,	1.548	4.199	11.080	0	103	0	0	432		437
×	1.548	4.199	11.080	0	10	'n	0	4 2 2	(f)	
· 1	1.548	4.199	11.080	0	χ. Ω	0	C	223) C	200
Z	1.548	4.199	11.080	0	257	0	0	1.079	· C	1 070
Z	1.548	4.199	11.080	5.0	0	0	77	0	· C	71011
0	1.548	4.199	11.080	0	0	0	0	0	0	` C
Д	1.548	4.199	11.080	0	52	0	0	218	· C	2.0
0	1.548	4.199	11.080	0	0	0	0		0	• •
Total			-	C ¥	1 105		1		1	

Table J.14 Wage Loss in 1989

-030	onit v	Unit value of Damage	1ge	_	No. of House			Fotal Dama	Total Damage Potential	
area	Area I	Area II	Area III	Area I	Area II	Area III	Arca I	Area II	Area III	Total
								:		
¥	0.054	0.082	0.167	0	0	0	0	C	C	
æ	0.054	0.082	0.167	0	228	0	0	. 6) C	τ-
ပ	0.054	0.082	0.167	0	136	0	0	, -		•
Ω	0.054	0.082	0.167	0	3.49	0	0	2.9	· > C	4 C
四	0.054	0.082	0.167	0	181	47	0		» «	1 C
ㄸ	0.054	0.082	0.167	0	72	0	0	, ,) C	1
Ö	0.054	0.082	0.167	0	306	0	0	2.5	o	C
Ħ	0.054	0.082	0.167	0	504	3.9.2	0	4	\ \ \	1 C
-	0.054	0.082	0.167	0	0	115	°0	' C	0	, –
ь.	0.054	0.082	0.167	0	257	0	0	2.1	. 0	, ,
×	0.054	0.082		0	2.6	4		2) , -	l
H	0.054	0.082	0.167	0	133	0	0	, r=4	· C	
Z	0.054	0.082	0.167	0	642	0	0	53	, c	(V
Z	0.054	0.082		500	0	0	27	0	· c	, ,
0	0.054	0.082	0.167	0	0	0	0	0) C	l
Δ,	0.054	0.082	0.167	0	131	0	0	, , , , ,	· C	. Erue
0	0.054	0.082	0.167	0	0	0	0	0	0	
						4				
Total	4	:		500	2.965	558	27	244	0.3	264

Damage to Daily Life in1989 Table J.15

0 4 6				֡				•		LOLAL JAHLAND POSCILLAR	
arca	Area 1	Area II	Area III	Area I	Area II	Area III	*	Area I	Area II	Area III	Total
	,:										
Ą	0.001	0.005	0.007	0	0	0		C	C	c	
മ	0.001	0.005	0.007	0	2.28	0) C	· -	> c	,
ပ	0.001	0.005	0.007	0	136	C) C	4 gua)	:
Ω	0.001	0.005	0.007	0	349) C	, ,	o :c	٠
ш	0.001	0.005	0.007	0	181	47		· ·	۰ ۳	> c	
冮	0.001	0.005	0.007	0	7.2	0) C	٠ c		
Ö	0.001	0.005	0.007	0	306	0		· C	> - -) <u>C</u>	
I	0.001	0.005	0.007	0	504	392		» с	• ~	,	
pa-vil	0.001	0.005	0.007	0	0	115) C	≀ ⊂	t	
	0.001	0.005	0.007	0	257	0		· C	·	· c	
×	0.001	0.005	0.007	0	26	4		· c	٠.	, c	
a	0.001	0.005	0.007	0	133	0		· c	خ ب () C	
X	0.001	0.005	0.007	0	642	0		0	, (r) (C	
Z	0.001	0.005	0.007	500	0	0		0) C	> C	
0	0.001	0.005	0.007	0	0	0		0	o C	· C	
ሷ	0.001	0.005	0.007	0	131	0		0	,) C	
0	0.001	0.002	0.007	0	0	0		0	0	0	
								-			
Total				500	2,965	558		0	14	4	~

Table J.16 Damage to Health Condition in1989

Sub-	Unit V	Unit Value of Damage	ıage	Z	No. of House	۵		Potal Dama	Total Damage Potential	
area	Area I	Area II	Area III	Area I	Area II	Area III	Area I	Area II	Area III	Total
♥	0.605	1.435	2.800	0	0	0	0	0	C	С
B	0.605	1.435	∞.	0	228	0	0	327) (C)	327
ပ	0.605	1.435	2.800	0	3	0	0	195	0	195
Д	0.605	1.435	∞	0		0	0	501	0	501
ш	0.605	1.435	∞	0	181	47	0	260	132	
įr,	0.605	1.435	∞	0	72	0	0	103	0	
Ŋ	0.605	1.435	∞	0	306	0	0	439	0	3
щ	0.605	1.435	∞	0	504	392	0	723	1,098	C
FEE	0.605	1.435	∞	0	0	115	0	0	322	
lemaj	0.605	1.435	∞	0	257	0	0	369	0	9
×	0.605	1.435	00	0	26	4	0	37	t-ri	4
ļ	0.605	1.435	∞	0	133	0	0	191	0	161
×	0.605	1.435	∞	0	642	0	0	921	0	921
Z	0.605	1.435	00	500	0	0	303	0	0	303
Ó	0.605	1.435	∞	0	0	0	0	0	0	
<u>م</u>	0.605	1.435	∞	0	131	0	0	188	0	188
0	0.605	1.435	00	0	0	0	0	0	0	0
Total				2005	2.065	825	203	13C A	1 562	7 1 20

Table J.17 Import Parity Price of Rice in 1989

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1,	F.O.B. Banbkok (Thai 5% broken)	US\$	297
2.	Freight and Insurance (Bangkok - Thanaleng)	US\$	+35
:3.	Value C.I.F. Thanaleng (exchange rate: US\$ 1 = Kip 590)	US\$ Kip	332 195,880
4.	Port Handling Charge and Bagging	Kip	+800
5.	Transportation Cost from Thanaleng to Vientiane	Kip	+700
6.	Price of Milled Rice at Rice Mill	Kip	197,380
7.	Conversion from Rice to Paddy in the Husk (recovery rage: 65%)	Kip	128,297
8.	Milling Charge	Kip	-1,250
9.	Value of Bran	Kip	+1,430
10.	Handling and Transportation Cost from Farm Gate to Rice Mill	Kip	-120
11.	Economic Farm Gate Price of Paddy	Kip	128,357

Sources:

^{1.} Price Prospects for Major Primary Commodities, 1988 - 2000

^{2.} Unit prices or costs are obtained from MAF.

Table J.18 Damage to Agriculture in 1989

	Unit Value of	Green	Total Damage
	Damage	Area	Potential
on the second se	(1,000 Kip)	(ha)	(1,000 Kip)
A	13.1	87.3	1,144
В	13.1	211.3	2,768
C	13.1	0.0	0
- D	13.1	80.3	1,052
E	13.1	33.8	443
F	13.1	3.8	50
G	13.1	0.0	0
H	13.1	0.0	0
· I	13.1	133.3	1,746
J	13.1	60.0	786
K	13.1	73.8	967
L	13.1	0.0	0
M	13.1	255.1	3,342
N	13.1	762.8	9,993
O	13.1	0.0	0
P	13.1	43.8	574
Q	13.1	0.0	0
Total	# V T-1 - CHIA-1-10-10-10-1-1-1-1-1-1-1-1-1-1-1-1-1-1	1745.3	22,863

Table J.19 Economic Damage Potential for the 10-year Storm in 1989

Year : 1989

area	House	Z CLEVICI	9 100	Dahiis	T-0.55:	-								
		Article	Factory	Facility	ırailic	Sales	Market	Wage	Daily Life	Health Condition	Crop	Sub-total	Other	Total
¥	0	0	0	0	0	C		٠.	c			•		:
ф	7,296	4.104	1.365	4.7	יי	367	96.	> 5	٠ د	>	1.144	1,144	114	1,258
Ü	4.352	2 448	0 0	· -		700	C / T	7	~-1	327	2,768	16,517	1,652	18,169
ב	071-11	0 0 0 0	5 6	→		177			 1	195	0	8,074	807	× × ×
) F	90111	787.0	2,100	36	20	288		2 9	7	501	1.052	21.808	, ,	100
I) !	7,578	4,809	3.018	22	29	723		23	-	106	7 7 7	11,000	101.7	70,70
նե	2,304	1,296	435	4	0	C			٠ ,	- () - ·	7 1	17,037	1,704	18,741
Ö	9.792	5.508	1 830	· •) <u> </u>	1 0	,	0	>	103	20.	4,330	433	4,763
Щ	31 024	300000	7 7 7 7	, († (2 L C	4 1 4	2.5	-	439	0	18,580	1.858	20.438
{· ►	1 0 0	000,44	14,044	ა 4	100	4.327	972	107	Ŋ	1,821	0	79.442	7 944	87.286
-r 1	4,570	5,795	4,692		∞	1,019		1.0		322	777	16.003	100	
 ,	8,224	4,626	1,545	S)	1.6	432	٠,	, r	(#	1 0	010	77,400	1,398	1/.581
×	984	009	303	; _{(*}	,	1 L	ţ	7 7	7	ر د و د د	786	16,096	1,610	17,706
,	736	0 0) 4) (ን '	5 '	0	. 3	m	0	4	64	3,061	306	3.367
1. 2	074.6	4,0,4	0 %	⊣	2	223		11	-	191	C	7.901	700	2 601
ĭ, ĭ	40,044	11,556	3,855	4 9	92	1.079	9.7	ζ. ζ.	ζ.	100	700	* * * * * * * * * * * * * * * * * * * *		H
Z	2,000	6.500	1.500		×	1.0	710) t		1	1,0,0	41,041	4.109	45:750
0	G			2		~ (1,413	7	5	303	9,993	24,693	2,469	27,162
ο Δ		> 6 6) (>	>	Þ		0	0	0	0	0	¢	C
ել (4,194	2,358	08/	- 4	61	218	360	1 1	-	188	574	8 702	0 4	0 C
יעכ	0	0	0	0	0	0		0	0	C	_	100	> c	7/5.6
)		>	> *.	>	>
Total	121,084	78,284	42.072	309	532	10.004	3.306	365	7 8	6 120	370 00	030700		

Table J.20 Economic Damage Potential for the 10-year Storm in 2020

Year : 2020

10 954 120	995.829	9.958.291	191.125	226.842	642	13,437	35,923	415,840	110,284	3,343	1,779,803	2,866,822	4,314,230	Total
,O	0	0	0	0	o ,	0	3	.	5	>	> .	>	>	
711,554	64,687	646,867	0	15,365	4 7	8 7 6	3,912	20,505	8,806	^ ·	186.//	70,061	066.030	
0	0	0		0	0	0	O !	5 0		> [\]	2 50	700	350 862	
568,459	51,678	516,781	100,154	8,824	ე (00	10,204	1 0		∢ "			C	
074,460	010,10	70,010	1 0	0,0	, u	700	13 204	2264	12 245		43.684	189,222	146,278	
400000	81 810	818 005	33,527	18,683	59	1.067	1,056	21,858	11,524	532	78,077	234,808	416,904	
528 432	48,039	480.393	0	10,833	27	646	0	34,318	1,723	124	157,890	127,804	147,028	. ;
729.256	66.296	662,960	0	15,683	4 8	901	792	22,503	8,718	29	87,194	190,487	500,166	₹,
1,018,015	92,547	925,468	3,915	21,561	63	1,250	0	39,522		594	164,462	265,469	418,607	
1,836,696	166,972	1,669,724	7,403	38,329	106	2,248	0	91,158	13,009	115	401,184	463,841	652,331	
1.276.197	116,018	1,160,179	0	26,502	7.4	1,554	10,563	62,895			276,690	320,775	451,725	
524.367	47.670	476,697	0	10.650	2.7	635	4.499	33,716		S	155,120	125,650	144,550	
143.829	13,075	130,754	0	3,119	.	178	0	3,651	1,927	oo M	13,040	39,200	009,60	ひ して
659,583	59,962	599,621	2,890	13,910	40	808	0	27,495	6.007	238	116,548	170,491	201,193	4 6
1,145,362	104,124	1,041,238	1,922	24,638	7.6	1,414	0	34,016	14,013	ς,	129,930	60,100	771111	_
145,399	13,218	132,181	0	3,150	10	180	0	3.696	1,939	21.5	13,203	39,592	067.07	
747.194	67,927	679,267	23,248	15,595	4 9	891	1,897	18,253	9,625	509	65,200	196,000	348,000	22 (
10 873	1 807	18.066	18.066	0	0	0	0	0	0	0	0	0	0	
Torai		19101-010	4 212	Condition		5				Facility	Factory	Article		area
Tosal	Other	Sub-total	Cron	Health	Daily	Wage	Market	Sales	Traffic	Public	Shop &	Honsehold	Honse	- 0 n c

Table J.21 Expected Benefit by Sub-area

US\$1,000

·	Sub-area	2020	2030	2040
	·		 	
Hong Ke System	C, E, F, G, H	1,996	5,117	13,429
Nam Pasak System	L	410	1,063	2,758
Sub Area I	I ·	310	556	996
Sub Area K	K	200	358	641
Sub Area M	M	532	1,806	6,133
Sub Area J	J	508	907	1,625
Sub Area D	D	330	712	1,539
Sub Area P	P	167	299	5 3 6
Sub Area A	A	1.5	2 5	4 6
Sub Area B	В	334	598	1,071

Table J.22 Financial and Economic Cost of Main Work in Hong Ke System (as of October, 1989 price)

			Financial cost				Ecconomic cost	Ost
		F.C. (J.Yen 1,000) (USS1,000)	; (USS1,000)	L.C. (US\$1,000)	Total (USS1000)	F.C. (USS1000)	L.C. (US\$1000)	Total (USS1000)
+	1. Direct cost total	704,253	4,995	3,896	8,891	4,630	2,803	7,433
2.	2. Land acquisition cost	0	0	122	122	• .	8	84
က်	Government administrarion		0	226	226	0	203	203
4	4. Enginering service	134,805	926	136	1,092	1,009	136	1,145
Ŋ,	5. Contingency	70,425	499	390	889	463	280	743
	Total	909,483	6,450	4,747	11,197	6,102	3,506	9,608

Note: O&M equipment cost is excluded in the financial cost

Table J.23 Financial and Economic Cost of Main Work in Nam Pasak System (as of October, 1989 price)

		Fin	Financial cost				Ecconomic cost	ost
ŧ		F.C.		TC	Total	F.C.	LC	Total
		(J.Yen 1,000) (US\$1,000) (US\$1,000)	15\$1,000)	(US\$1,000)	(US\$1000)	(US\$1000)	(US\$1000) (US\$1000)	(US\$1000)
_ ;	Direct cost total	313,903	2,226	2,440	4,666	1,918	1,668	3,586
2	2. Land acquisition cost	0	0	226	226		203	203
'n	Government administrarion		0	109	109	0	8	86
4.	Enginering service	61,617	437	& 4	521	255	3.9	294
'n	Contingency	31,390	223	244	467	192	167	359
	Total	406,910	2,886	3,103	5,989	2,365	2,175	4,540

Note: O&M equipment cost is excluded in the financial cost

Financial and Economic Cost of Main Work in Sub-area I (Hong Kai Keo System) (as of October,1989 price) Table J.24

			Financial cost				Ecconomic cost	ost
		F.C.	ci	TC	Total	F.C.	FC	Total
		(J.Yen 1,000)	(US\$1,000)	(US\$1,000)	.Yen 1,000) (US\$1,000) (US\$1,000) (US\$1,000)	(US\$1,000)	(US\$1,000)	(US\$1,000) (US\$1,000)
<u>,-</u> ;	1. Direct cost total	138,575	982	1,039	2,021	933	857	1,790
2.	2. Land acquisition cost	0	0	2.5	2.5		y(Prond Sound
ω.	3. Government administrarion		0	47	47	O .	5.0	5.0
4.	4. Enginering service	27,715	197	3 8	235	187	& 4	22
'n	5. Contingency	13,858	_ o v	104	202	60	8	179
	Total	180,148	1,277	1,253	2,530	1,213	1,038	2,251

Note: O&M equipment cost is excluded in the financial cost

able J.25 Financial and Economic Cost of Main Work in Sub-area K (as of October, 1989 price)

		Fir	Financial cost				Ecconomic cost	OST
		F.C.		LC	Total	F.C.	TC	Total
		(J.Yen 1000) (US\$1000)	US\$1000)	9	(US\$1000)	(US\$1000)	(US\$1000)	믜
<u>.</u>	Direct cost total	36,736	261	214	475	248	176	423
7	2. Land acquisition cost	. 0	0		. 0			0
က်	3. Government administrarion		0	- +(+(1 1	0	10	0
4.	Enginering service	7,050	5 0	, ∞	رج 8	5 0	7	57
s.	5. Contingency	3,674	26	2 2	4	2.5	1 8	4 2
	Total	47,459	337	25.5	593	322	210	532
					-			

Note: O&M equipment cost is excluded in the financial cost

Table J.26 Economic Cost of Lateral Canal

Unit: US\$10³

				992 - 200	00	2000	- 2020
<u> </u>							• .
1.	Hong Ke*1						·
	Target area (ha)			101	÷		9
	Annual financial	cost		180		·	23
	Annual economic	cost		157			20
2.	Nam Pasak						
	Target area (ha)			29			0
	Annual financial	cost		111	•		0
٠,	Annual economic			97	٠		0
					•		•
3.	Sub-area I				•		
e ^r	Target area (ha)			7	*.		81
	Annual financial	cost		27		1	27
	Annual economic	cost		24		1	11
4.	Sun-area K					:	1
	Target area (ha)			33			74
	Annual financial	cost		90			15
	Annual economic		•	78	*		10
	Annous Countino	VVII		, 0			

^{*1} In 1991, the following cost is disbursed for construction of 3 km of the model lateral canal in Hong Ke area.

Financial cost US\$1,174 x 10^3 Economic cost US\$1,025 x 10^3

After 1993, the construction cost of remaining area are disbursed as shown in above table.

Table J.27 Economic Cost and Benefit Stream of Hong Ke System

			Constant	~	· · · · · · · · · · · · · · · · · · ·	Unit USS	\$1,000	EIRR =	7.3%
		Main Car	Construction		······································		e tale of the first		
		FC.	L.C.	Lateral Car		Total	O & M cost	Benefit No	t Benefit
1	1991		28	FC.	LC.		-		
2		2,781	20	0	0	724	•		-724
3	1993	2,825	1,558	591	434	5,526			-5,526
4	1994		1,336	90	66	4,587			-4,587
5	1995			90	66	156	112	97	-171
6	1996			90	66	156	114	121	-149
7	1997			90	66		116	148	-124
8	1998			90	66	156	118	180	-94
9	1999			90	66	156	120	216	-60
				90	66	156	121	258	-19
10				11	8	19	122	306	165
11	2001			11	8	19	122		195
12	2002			1 1	8	19	122	369	228
13	2003			11	8	19	122	405	264
14	2004			1 1	. 8	19	122	445	304
15	2005			11	8	19	123	489	347
16	2006			. 11	8	19	123	537	395
17	2007			1 1	8	19	123	590	448
18	2008			1 1	8	19	123	648	506
19	2009			11	8	19	124	711	568
20	2010			11	8	19	124	781	638
21	2011			11	8	19	124	858	715
22	2012			11	8	19	124	943	800
23	2013			1.1	8	19	124	1,035	892
24	2014			11	. 8	19	125	1,137	993
25	2015	. :		11	8	19	125	1,249	1,105
26	2016			11	8	19	125	1,372	1,228
27	2017		:	1 1	. 8	. 19	125	1,507	1,363
28	2018			11	8	19	126	1,655	. 1,510
29	2019			1 1	8	19	126	1,817	1,672
3 0	2020			0	0	0	126	1,996	1,870
3 1	2021	•		0	0	0	126	2,196	2,070
32	2022			0	0	. 0	126	2,415	2,289
33	2023			0	0	0	126	2,657	2,531
34	2024			0	0	0	126	2,922	2,796
3.5	2025			0	0	. 0	126	3,215	3,089
36	2026	•		0	0	0	126	3,536	3,410
37	2027			0	0	0	126	3,890	3,764
38	2028			0	0	0	126	4,279	4,153
3 9	2029			0	0	0	126	4,707	4,581
40	2030			. 0	. 0	0	126	5,177	5,051
41	2031			0	0	0	126	5,695	5,569
42	2032		•	0	0	0	126	6,265	6,139
43	2033			. 0	o	0	126	6,891	6,765
44	2034			0	o	0	126	7,580	7,454
45	2035	٠.		. 0	0	0	126	8,338	8,212
46	2036		1000	0	Ö	· · 0	126	9,172	9,046
47	2037			0	0	Ő	126	10,089	9,963
48	2037			. 0	. 0	0	126	11,098	10,972
48				0	0	ő	126	12,208	12,082
	2039 2040			. 0	0	0	126	13,429	13,303

Table J.28 Economic Cost and Benefit Stream of Nam Pasak System

			1		Unit U	\$\$1,000	EIRR =	4.2%	
·		Constructio				0.034		87.4	
_	Main C	The property like and the little of	Lateral		Total	0&M	Benefit	Net	
	F.C.	L.C.	F.C.	LC.	222	Cost		Benefit -333	
1 1991	192	141	0		333			-2,242	
2 1992	1,078	1,067	5 6					-2,242 -2,158	
3 1993	1,095	966	5 6		2,158 97	4 8	3	-2,130	
4 1994			5 6			49		-141	
5 1995	*		5 6			50		-139	
6 1996			5 6			5 1		-137	
7 1997			5 6 5 6					-134	÷
8 1998			5 6 5 6			5 3		-130	•
9 1999					0	53		-26	
10 2000			. 0		0	53		-19	
11 2001			0		0	5 3		-14	
1 2 2002			0		0	5 3	and the second second	- 9	÷
13 2003			0		0	5 3		- 3	
14 2004			0		0	5 3		4	
15 2005			0	-	0	5 3		12	
16 2006			0			. 53		21	
17 2007		•	0		0	5 3		32	1.00
18 2008			0		0	53		44	
19 2009			0		0	5 3		57	10 mg - 10 mg
20 2010			0			5 3		73	
21 2011			0		0			90	
22 2012			0		0	5 3			
23 2013			0		0	5 3 5 3		111	
24 2014			- 0			5 3			
25 2015			0					160 189	
26 2016			0			5 3		224	
27 2017			0			5 3 5 3		262	
28 2018			0			5 3		307	
29 2019			0						+ +:
30 2020			0			5 3		357	
3 1 2021			.0		0	5 3		398	1,
3 2 2 0 2 2			0			5 3		443	
3 3 2 0 2 3			0			5 3		493	
34 2024			0			5 3			
35 2025			0			5 3		608	
36 2026			0			5 3		674	
37 2027			0			5 3		747	
38 2028			0			5 3		827	
39 2029			0			5 3		915	
40 2030			0			5 3		1,012	
41 2031			0			5 3		1,119	•
4 2 2 0 3 2			0			5 3		1,236	
43 2033			: 0			5 3		1,365	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4 4 2 0 3 4			0			5 3		1,507	
45 2035			0			5 3		1,663	
46 2036			0			5 3		1,835	
47 2037			0			5 3		2,024	•
48 2038			0			5 3		2,232	
49 2039			0			5 3		2,461	
50 2040			. 0	0	0	5 3	2,765	2,712	

Table J.29 Economic Cost and Benefit Stream of Sub-area I (Hong Kai Keo)

	~	onatm.oti.	0		Unit US	\$1,000	EIRR =	3.5%
	Main C	onstructio						
	F.C.	LC	Lateral Ca		Total	O&M	Benefit	Net
1 1991		67	F.C.	LC.		Cost	-	Benefit
2 1992			0	0	166			-166
3 1993	•	971	14	10	2,109		÷	-2,109
4 1994		0	14	10	2 4	24	3	- 4 5
			14	10	24	2 4	6	-42
5 1995			14	10	2 4	24	9	- 39
6 1996			14	10	2 4	24	14	- 3 4
7 1997			1 4	10	24	25	19	- 30
8 1998			14	10	2 4	2 5	26	- 23
9 1999			1 4	10	24	2.5	3 3	- 16
10 2000			6 4	4 7	111	26	4 2	- 95
11 2001			6 4	47	111	28	4 6	- 93
1 2 2002			6 4	: 47	1 1 1	29	5 1	- 89
13 2003			6 4	47	111	30	5 7	- 84
14 2004			6.4	47	111	3 2	6.3	- 8 0
15 2005			6 4	47	111	3 3	69	-75
16 2006			6 4	47	111	3 4	77	- 68
17 2007			6 4	47	111	3 5	8 5	- 6 1
18 2008			6 4	47	111	3 7	94	- 54
19 2009			6 4	47	111	38	103	-46
20 2010		•	6 4	47	111	39	114	- 36
21 2011			6 4	47	111	4 0	126	- 25
22 2012			6 4	47	111	4 2	140	-13
23 2013			6 4	47	111	43	154	0
24 2014			6 4	47	-111	44	170	1 5
25 2015			64	47	111	4.5	188	3 2
26 2016			6 4	47	1.1.1	4.7	208	5 0
27 2017			6 4	47	111	48	230	7 1
28 2018			6 4	47	111	49	254	9 4
29 2019			64	47	111	5 1	281	119
30 2020			0	0	0	5 1	310	259
31 2021	•		0	0	0	5 1	329	278
3 2 2022			0	0	0	5 1	349	298
3 3 2023			0	Ō	0	5 1	370	319
3 4 2024			0	0	0	5 1	392	341
3 5 2025			0	0	0	5 1	415	3.64
36 2026			0	Ö	ō	5 1	440	389
37 2027		•	o 0	ŏ	Õ	5 1	467	416
38 2028			Ö	0	0	5 1		444
3 9 2 0 2 9			0	ŏ	Ŏ	5 1	524	473
40 2030			0	0	ő	5 1	556	505
41 2031			0	ő	ő	5 1	589	538
42 2032			0	0	ő	5 1	625	574
4 2 2032			0	0	0	5 1	662	611
			0	0	0	51	702	651
44 2034			0	0	0	51	744	693
45 2035			0	0	0	51	789	738
46 2036				0	0	51	836	785
47 2037			0			51	886	
48 2038	•		0	0	0			835
49 2039			0	0	0	5 1	939	888
50 2040			0	0	0	5 1	996	945

An and the contract of the con					Unit US	\$1,000	EIRR =	3.5%
*good:	Main C	onstructio	n Cost Lateral C	'anal	Total	O&M	Benefit	Net
-	F.C.	LC.	F.C.	LC	i Otat	Cost	Deliciti	Benefit
1 1991	26	14	0	0	4 0	COSt		-40
2 1992	296	196	4.5	. 33	570		·	-570
3 1993	0	0	4.5	3 3	7 8	7	1.	-85
4 1994	U	v	4 5	3 3	78	8	2	-84
5 1995			4 5	3 3	78	. 9	3	- 8 4
6 1996			45	3 3	78	1.0	5	-83
7 1997			4 5	3 3	7 8	11	7	-82
8 1998			4 5	33	78	12	10	-80
9 1999			4 5	33	78	12	13	- 78
102000			58	4 3	100	14	13	-101
11 2001			58	43	100	15	15	-101
12 2002			58	43	100	16	17	-100
13 2003			5 8	43	100	17	20	-98
14 2004			5 8	43	100	.18	23	-96
15 2005				43	100	19	26	-94
			58	43	100	21	30	-91
16 2006			5 8					
17 2007			5 8	43	100	2 2	3.4	-88
18 2008			5 8	43	100	23	39	-84
19 2009	•		5 8	4 3	100	24	4.5	-79
20 2010			5 8	4 3	100	2.5	5 2	-74
21 2011			5 8	4 3	1.00	26	5 9	- 68
2 2 2 0 1 2			5 8	4 3	100	27	68	-60
23 2013			5 8	4 3	100	29	77	- 5 2
24 2014			5 8	4 3	100	3 0	8 9	- 42
25 2015			5 8	4 3	100	3 1	102	- 30
26 2016			5 8	4 3	100	3 2	116	- 1 6
27 2017			5 8	4 3	100	3 3	133	0
28 2018			5 8	4 3	100	3 4	153	18
29 2019			5 8	4 3	100	3 6	175	3 9
30 2020			0	0	0	3 6	200	164
31 2021			0	0	0	3,6	212	176
32 2022			0	0	0	36	2,25	189
33 2023			0	0	0	3 6	238	203
34 2024			0	0	0	3 6	253	217
35 2025			0	0	0	36	268	232
36 2026			0	. 0	0	3 6	284	248
37 2027			0	0	0	3 6	301	265
38 2028		•	0	. 0	0	3 6	319	283
39 2029			0	0	0	36	338	302
40 2030			0	. 0	0	3 6	358	323
4 1 2 0 3 1			0	0	0	3 6	380	344
42 2032			0	. 0	0	3 6	402	367
43 2033			· 0	0	0	3 6	427	391
44 2034			0	0	0	3 6	452	417
45 2035		-	0	0	0	3 6	479	444
46 2036			Ö	Ŏ	Ö	36	508	473
47 2037			0	Õ	0	3 6	539	503
48 2038			ő	ő	0	36	571	535
49 2039			Ö	ŏ	ő	3 6	605	570
50 2040			0	0	. 0	3 6	641	606

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Economic
Table J.31

Open Code Open Code <t< th=""><th> 10</th><th> DANISH St. Parell Com Oak Moos Bareff Not Bareff Com Oak Moos Com Com Oak Moos Com Com Oak Moos Oak Moos Oak Moos Com Oak Moos Oak Mo</th><th> DA Nicke Parall Car DA Nicke Bandin Na Bandin Car DA Nicke DA Ni</th></t<>	10	DANISH St. Parell Com Oak Moos Bareff Not Bareff Com Oak Moos Com Com Oak Moos Com Com Oak Moos Oak Moos Oak Moos Com Oak Moos Oak Mo	DA Nicke Parall Car DA Nicke Bandin Na Bandin Car DA Nicke DA Ni
0 0 -4/80	100 0 -4780 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 0 -4780 0 -4	0 0 -4786 0 0 -4786 0 0 -4786 110 110 110 110 110 110 11111111111111	724 0 0 -4,724 -4,726 0 0 -4,726 279 106 46 -3139 279 106 46 -3139 279 106 46 -3139 279 107 112 110 110 110 289 2003 274 274 88 2003 374 -312 88 203 378 -312 88 203 378 -312 88 203 378 -312 88 203 378 -312 88 203 378 -312 88 203 378 -312 89 203 378 -312 80 224 -376 -328 80 224 -376 -378 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -376 80 224 -3
0	106	100 - 4.780 110 - 4.662 111 - 110 - 4.662 112 - 113 - 4.030 113 - 2.03 114 - 2.04 115 - 116 - 4.030 116 - 4.030 117 - 4.030 118 - 4.030 119 - 2.04 119 - 2.04 110 - 4.030 111 - 4.030 110 - 4.030 111 - 4.030 112 - 4.030 113 - 4.030 114 - 4.030 115 - 4.030 116 - 4.030 117 - 4.030 117 - 4.030 118 - 4.030 119 - 4.030 110	4,780 0 -4,780 279 106 -4,780 279 110 -4,780 279 110 -4,780 279 110 -4,780 279 110 -4,780 279 110 -4,280 279 110 -4,280 279 110 -4,280 279 110 -4,280 279 110 -4,280 279 110 -4,776 88 205 549 -28 88 210 623 114 127 428 88 210 624 4,22 117 76 4,175 88 210 625 1,475 127 56 1,175 88 210 625 1,475 137 166 1,275 88 210 1,475 147 178 148 28 88 210 1,478 178 24
100 46 4462 101 1462 102 1462 103 1462 103 1462 104 1462 105 1463 105 1463 106 129 129 107 422 107 422 107 422 107 422 107 423 107 423 107 424 107	109	109	2,662 0 -4,662 2,79 109 7.5 -4,662 2,79 109 7.5 -339 2,99 116 115. -3,560 9,61 196 -288 -89 9,61 196 -288 -89 9,10 1,12 -20. -3,246 9,11 196 -288 -89 8 205 419 126 -0.0 8 205 419 126 -0.0 8 207 462 -0.0 -0.0 8 207 463 -0.0 -0.0 8 207 463 -0.0 -0.0 8 207 463 -0.0 -0.0 8 207 463 -0.0 -0.0 8 207 463 -0.0 -0.0 8 207 -0.0 -0.0 -0.0 8 207 -0.0 -0.0
100	100	100	279 100 46 -339 279 100 46 -339 279 110 -653 -653 3-591 112 -16 -176 961 123 -2946 -289 962 139 -2,846 -28 962 139 -2,846 -28 963 209 -2,846 -28 88 205 419 167 -6,030 0 88 205 419 167 -6,030 0 -6,175 88 205 542 117 20 -6,175 0 0 88 210 625 342 117 76 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6,175 0 0 -6
15	112 110 -683 -684 -685 -686 -6	172 110 -652 -6	172 110 -652 -6
116 155 3.560	116 155 15.560	116 155 1560 15	116 1955 2.9.560 1959 2.9.560 1950 2.98 2.9.560 2.98 2.9.560 2.98 2.9.560 2.98 2.9.56 2.98 2.99 2.98 2.99
134 209 -2,946 105 -2,946 0 -4,030 0 0 -4,030 0 0 -4,030 0 0 -4,030 0 0	136 2.89 2.946 136 2.89 2.946 203 374 452 2400 204 240 2400 205 379 410 206 410 216 4030 207 402 216 208 516 208 428 117 21 513 208 516 208 428 117 21 513 209 516 208 428 117 21 513 211 762 248 428 117 21 510 212 1022 548 548 548 548 548 213 932 631 548 548 548 548 214 1022 578 526 137 166 485 215 1102 578 578 526 527 539 216 1102 578 578 526 527 539 217 1032 578 578 526 527 539 218 1401 1,095 578 528 578 527 539 219 1,032 578 578 528 578 527 539 219 1,032 578 578 528 527 539 210 1,095 578 578 528 527 539 211 1,095 578 578 528 527 527 224 2,106 1,995 578 578 528 527 224 2,106 1,995 578 578 578 527 224 2,106 2,109 578 578 578 578 224 2,106 2,109 578 578 578 578 224 2,106 2,109 578 578 578 224 2,106 2,109 578 578 578 224 2,106 2,109 578 578 578 224 2,106 2,109 578 578 224 2,107 2,107 0 143 580 224 2,107 2,107 0 143 580 224 2,107 2,107 0 143 591 224 2,107 2,107 0 143 591 224 2,107 2,107 0 143 591 224 2,107 2,107 0 143 591 224 2,107 2,107 0 143 591 224 2,107 2,107 0 143 591 225 2,107 2,107 0 143 591 226 2,107 2,107 0 143 591 227 2,107 2,107 0 143 591 228 2,107 2,107 2,107 2,107 229 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2,107 2	136 2.89 2.946 137 20 2.946 203 374 375 0 0 -4,030 203 374 375 0 0 -4,030 203 379 4.030 1.04 203 419 126 4,030 0 0 -4,030 203 544 2.88 117 21 -5,134 203 544 2.88 117 21 -5,134 203 544 2.89 378 379 -4,513 211 762 325 1,441 127 37 -5,135 213 932 542 378 242 249 -5,108 214 1,42 378 242 247 169 -4,539 215 1,032 2.99 2.48 2.27 -3,59 2.48 216 1,42 3.88 3.78 2.48 2.27 -3,59 3.47 217 1,42 3.88 3.78 2.48 2.27 -3,59 3.47 218 1,030 1,594 578 2.64 4 10 219 1,523 1,444 5.78 2.84 3.47 -1,514 0 1.43 3.47 224 2,560 2,382 0 310 1,443 3.54 0 1.43 3.47 224 2,560 2,382 0 310 1,443 3.54 0 1.43 3.47 224 3,42 2,524 0 310 1,443 3.47 0 143 3.47 224 3,42 2,524 0 310 1,43 3.47 0 143 3.47 224 3,43 2,43 0 310 3,43 3,43 0 1.43 3.47 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 310 3,43 3,43 0 1.43 3,43 224 3,43 3,43 0 3,43 3,43 0 143 3,43 224 3,43 3,43 0 3,43 0 3,43 0 143 3,43 224 3,43 3,43 0 3,43 0 3,43 0 1,43 3,43 224 3,43 3,43 0 3,43 0 3,43 0 1,43 3,43 224 3,43 3,43 0 3,43 0 3,43 0 1,43 3,43 224 3,43 3,43 0 0 0 0 0 0 0 224 3,44 3,45 0 0 0 0 0 0 224 3,48 3,43 0 0 0 0 0 224 3,48 3,44 0 0 0 0 0 224 3,48 3,44 0 0 0 0 0 224 3,44 3,45 0 0 0 0 224 3,44 3,44 3,44	136
196 288 -889 205 378 -889 205 379 86 -776 0 -4,030 207 462 167 0 -6,175 0 -6,175 208 510 214 428 117 21 -524 208 560 284 288 117 21 -524 208 560 288 117 21 -524 203 211 689 390 578 124 127 -5,108 211 762 190 -6,173 0 -6,173 0 211 762 137 106 -4,933 0 0 -6,133 211 762 578 242 177 148 578 249 468 -379 444 248 0 0 0 0 -6,133 0 0 0 10 0 -6,133 0 10 0	196 278 -869 205 278 -869 205 419 126 -776 205 419 126 -6175 207 402 117 0 -4030 207 402 117 0 -6172 208 510 214 428 117 21 -224 210 623 325 1141 127 56 -132 21 -1312 211 689 390 3056 137 76 -5108 0 0 -172 578 248 25 -5108 0	196 288 -3689	196 238 238 238 238 238 238 238 238 238 239 230
205 379 86 776 0 -776 205 419 126 4,030 0 -4730 205 419 126 4,030 0 -4730 208 510 121 -22 175 208 510 204 208 117 21 -514 210 659 205 131 79 -5108 0 0 211 689 205 131 79 -5108 0 0 0 211 689 205 131 79 -5108 0 </td <td>205 379 876 776 0 -776 205 479 877 6 -776 0 -6775 205 442 117 21 -524 226 226 208 564 268 117 21 -513 22 211 689 325 1141 127 56 -1,212 211 689 326 131 79 -5108 211 762 463 131 79 -5108 211 762 468 131 79 -5108 213 1032 578 226 129 -588 32 216 1,142 578 226 295 -519 32 22</td> <td>205 779 87 776 0 -776 205 419 126 4,030 0 -6,175 208 540 264 268 117 21 -524 208 564 268 117 21 -516 211 689 396 5056 131 79 -5108 211 689 396 5056 131 79 -5118 211 689 396 578 242 169 -519 213 1032 578 248 179 -599 38 216 1,142 88 256 295 359 38 23 216 1,142 878 269 256 295 359 38 38 35 216 1,142 878 278 277 184 27 29 24 10 218 1,462 188 278 28 10<!--</td--><td>205 377 0 0 -776 205 419 126 4000 0 -6030 205 419 126 4000 0 -6030 208 510 127 0 0 -6030 208 560 268 428 117 21 -524 210 623 322 131 793 -813 -813 211 622 131 106 -635 -635 -635 213 843 222 137 106 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 468 -638 278 261 278 262 278 262 278 262 278 262 278</td></td>	205 379 876 776 0 -776 205 479 877 6 -776 0 -6775 205 442 117 21 -524 226 226 208 564 268 117 21 -513 22 211 689 325 1141 127 56 -1,212 211 689 326 131 79 -5108 211 762 463 131 79 -5108 211 762 468 131 79 -5108 213 1032 578 226 129 -588 32 216 1,142 578 226 295 -519 32 22	205 779 87 776 0 -776 205 419 126 4,030 0 -6,175 208 540 264 268 117 21 -524 208 564 268 117 21 -516 211 689 396 5056 131 79 -5108 211 689 396 5056 131 79 -5118 211 689 396 578 242 169 -519 213 1032 578 248 179 -599 38 216 1,142 88 256 295 359 38 23 216 1,142 878 269 256 295 359 38 38 35 216 1,142 878 278 277 184 27 29 24 10 218 1,462 188 278 28 10 </td <td>205 377 0 0 -776 205 419 126 4000 0 -6030 205 419 126 4000 0 -6030 208 510 127 0 0 -6030 208 560 268 428 117 21 -524 210 623 322 131 793 -813 -813 211 622 131 106 -635 -635 -635 213 843 222 137 106 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 468 -638 278 261 278 262 278 262 278 262 278 262 278</td>	205 377 0 0 -776 205 419 126 4000 0 -6030 205 419 126 4000 0 -6030 208 510 127 0 0 -6030 208 560 268 428 117 21 -524 210 623 322 131 793 -813 -813 211 622 131 106 -635 -635 -635 213 843 222 137 106 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 1022 137 106 -635 -635 -635 213 468 -638 278 261 278 262 278 262 278 262 278 262 278
205 419 126 4,030 0 0 0.4,136 208 562 157 6,175 0 0 6,175 208 562 167 6,175 10 4,535 210 653 396 5,054 137 10 4,535 211 762 463 4,922 137 106 4,535 213 843 578 248 227 -539 382 0 213 1,422 878 248 227 -539 382 0 0 215 1,422 878 248 227 -539 382 0 0 216 1,426 878 248 227 -548 0 <t< td=""><td>205 419 126 4,030 0 -4,030 207 419 126 -6,175 0 -6,175 208 516 214 122 37 -513 208 516 214 122 37 -513 210 623 325 1,141 27 -6,132 211 762 463 578 248 227 -519 212 325 1,141 79 -6,132 382 0 213 578 226 137 -646 2488 0 0 215 1,142 378 248 227 -519 0 0 0 215 1,142 578 261 375 246 2488 0</td><td>205 419 126 4,030 0 -4,010 207 419 126 6,175 0 -4,010 208 516 214 122 37 -513 208 516 214 122 37 -5132 210 623 325 1141 21 -5108 211 762 465 4922 131 79 -5108 213 542 518 227 248 27 -5108 213 542 518 248 227 -5108 -5108 213 142 518 248 247 -5108 -5108 0 0 218 142 518 249 247 548 247 -5108 0</td><td>205 419 126 4,030 0 -4,030 207 419 126 -6,175 0 -6,175 208 564 216 -6,175 0 -6,175 210 623 325 1,41 122 -5,13 211 762 462 217 76 -6,53 211 762 492 131 79 -5,102 212 492 131 79 -6,13 9 213 403 578 242 127 169 -6,53 215 1,401 578 242 177 16 -6,53 216 1,402 961 476 29 -64 4 10 216 1,401 578 242 177 444 10 10 4 10 10 4 10 10 10 4 10 10 4 10 10 4 10 10</td></t<>	205 419 126 4,030 0 -4,030 207 419 126 -6,175 0 -6,175 208 516 214 122 37 -513 208 516 214 122 37 -513 210 623 325 1,141 27 -6,132 211 762 463 578 248 227 -519 212 325 1,141 79 -6,132 382 0 213 578 226 137 -646 2488 0 0 215 1,142 378 248 227 -519 0 0 0 215 1,142 578 261 375 246 2488 0	205 419 126 4,030 0 -4,010 207 419 126 6,175 0 -4,010 208 516 214 122 37 -513 208 516 214 122 37 -5132 210 623 325 1141 21 -5108 211 762 465 4922 131 79 -5108 213 542 518 227 248 27 -5108 213 542 518 248 227 -5108 -5108 213 142 518 248 247 -5108 -5108 0 0 218 142 518 249 247 548 247 -5108 0	205 419 126 4,030 0 -4,030 207 419 126 -6,175 0 -6,175 208 564 216 -6,175 0 -6,175 210 623 325 1,41 122 -5,13 211 762 462 217 76 -6,53 211 762 492 131 79 -5,102 212 492 131 79 -6,13 9 213 403 578 242 127 169 -6,53 215 1,401 578 242 177 16 -6,53 216 1,402 961 476 29 -64 4 10 216 1,401 578 242 177 444 10 10 4 10 10 4 10 10 10 4 10 10 4 10 10 4 10 10
207 462 167 6,175 0 -6,175 208 541 214 428 117 21 -524 208 541 284 218 121 56 -11212 210 683 325 1,41 127 51 -51,08 211 762 463 4,922 137 106 -4,553 213 843 542 492 137 106 -4,553 213 843 542 137 106 -4,553 242 109 213 1032 72 492 137 106 -4,553 261 274 281 0 0 215 1,142 578 242 137 164 253 12 10 -651 27 21 10 0 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21	208 510 6175 6175 6175 208 510 617 6175 6175 208 510 11 7 512 524 208 564 268 428 112 56 112 211 653 396 5141 127 56 121 211 663 396 592 137 59 5108 213 678 248 227 589 681 578 261 213 1022 729 578 261 75 546 248 27 5108 61 109 578 261 378 261 378 261 378 27 118 58 38 <td>207 462 167 6,175 0 -6,175 208 510 214 428 112 37 -512 210 652 325 1,141 127 56 -1,121 211 689 390 5066 131 79 -5,108 211 689 390 5066 137 79 -5,108 213 843 542 137 79 -5,108 0 213 1032 137 79 -5,108 0 0 215 1,042 217 79 -5,108 0 0 216 1,044 578 248 227 -64 288 0 0 216 1,045 578 261 278 279 184 56 278 279 184 56 278 279 184 26 278 279 184 27 274 184 27 274 <</td> <td>207 462 6475 6475 6475 208 510 214 428 112 31 -512 210 623 324 428 122 37 -513 211 689 390 5056 137 79 -5108 211 689 390 5056 137 79 -5108 213 843 542 137 16 -4,953 213 1032 137 16 -4,953 213 1032 137 16 -4,953 215 1,142 838 248 227 -649 248 216 1,463 578 224 27 369 37 219 1,531 1,444 578 224 27 144 56 23 219 1,401 1,444 578 224 27 144 37 31 17 210 1,444 578</td>	207 462 167 6,175 0 -6,175 208 510 214 428 112 37 -512 210 652 325 1,141 127 56 -1,121 211 689 390 5066 131 79 -5,108 211 689 390 5066 137 79 -5,108 213 843 542 137 79 -5,108 0 213 1032 137 79 -5,108 0 0 215 1,042 217 79 -5,108 0 0 216 1,044 578 248 227 -64 288 0 0 216 1,045 578 261 278 279 184 56 278 279 184 56 278 279 184 26 278 279 184 27 274 184 27 274 <	207 462 6475 6475 6475 208 510 214 428 112 31 -512 210 623 324 428 122 37 -513 211 689 390 5056 137 79 -5108 211 689 390 5056 137 79 -5108 213 843 542 137 16 -4,953 213 1032 137 16 -4,953 213 1032 137 16 -4,953 215 1,142 838 248 227 -649 248 216 1,463 578 224 27 369 37 219 1,531 1,444 578 224 27 144 56 23 219 1,401 1,444 578 224 27 144 37 31 17 210 1,444 578
208 510 214 428 117 524 208 510 224 428 122 37 -513 210 623 325 1,41 127 56 -1,212 211 769 492 492 131 79 -5,108 213 843 542 578 242 169 -651 215 1,032 729 578 248 225 -539 382 0 0 216 1,625 961 578 264 279 -548 0 0 0 216 1,625 961 578 264 464 248 0 <	208 510 214 428 117 23.4 -52.4 208 564 428 117 -52.4 -52.4 -52.4 210 623 32.5 1,41 127 -51.08 -51.08 211 762 462 131 106 -4,953 -65.1 213 88.4 57.2 49.2 13.7 106 -4,953 213 93.2 61.2 10.2 49.9 -6.5 10.0 -65.1 213 10.2 45.2 178 24.2 10.0 -6.5 -6.2 -6.	208 510 214 428 117 23.4 -52.4 208 566 428 117 -51.2 -51.2 -51.2 210 623 32.5 1,141 127 -5,108 -5,108 211 659 32.2 1,141 127 -5,108 -5,108 213 93.2 63.1 463 4,922 137 106 -4,933 213 1002 729 578 242 277 -5,108 -65 215 1,022 738 246 279 -5,29 -5,29 -5,29 -68 379 -64 279 -68 23 -2,10 0	208 564 268 117 224
21 62 71<	210 629 768 728 122 51 751 751 751 751 751 751 751 751 751	210 659 709 709 122 37 -513 211 689 505 131 79 -5138 212 1032 242 492 151 79 -5138 213 992 5055 131 79 -5138 214 1032 242 492 -651 215 1042 542 542 169 -651 216 1142 541 578 248 109 -651 217 1042 541 578 249 168 -379 468 277 218 1140 1,095 578 281 700 -159 184 56 23 219 1,533 1,444 578 288 845 -213 527 61 52 220 1,721 1,444 578 288 845 -213 527 61 52 221 1,909 1,599 578 298 1,011 138 315 65 177 224 2,892 1,999 1,892 578 295 1,011 138 315 65 224 2,892 1,992 1,992 1,992 1,992 1,992 1,992 1,992 224 2,892 1,992 1	210 659 750 122 37 513 211 668 750 122 37 56 1212 212 1002 729 505 131 79 5108 213 1002 729 505 131 79 5108 214 1002 729 578 242 169 -651 215 1002 729 578 242 169 -651 216 1,142 578 256 295 -559 382 0 0 0 217 1,142 578 256 295 -464 2488 0 0 0 218 1,401 1,095 578 258 274 -277 184 56 23 219 1,721 1,444 578 288 845 -277 184 56 23 224 2,116 1,695 578 295 1,011 138 3151 65 102 224 2,116 1,695 578 295 1,011 138 3151 65 102 224 2,116 1,095 578 295 1,011 138 3151 65 102 224 2,116 1,095 578 295 1,011 138 3151 65 102 224 2,116 1,095 578 298 10,011 138 3151 65 102 224 2,116 1,095 578 298 10,011 138 3151 65 102 224 2,116 1,095 578 298 10,011 138 3151 65 102 224 2,116 1,095 578 298 10,011 138 3151 65 102 224 3,475 5,525 0 310 1,080 1,070 0 143 550 224 3,475 5,525 0 310 2,187 0 143 550 224 4,444 4,144 578 5,534 0 310 2,187 1,012 131 3151 65 224 3,475 5,525 0 310 2,187 0 143 575 224 4,444 6,175 6,175 0 310 2,187 1,012 131 3151 65 224 1,005 578 0 310 2,187 0 143 575 224 1,005 578 0 310 2,187 0 143 575 224 1,005 578 0 310 2,187 0 143 1109 224 1,005 578 0 310 2,187 0 143 1109 224 1,005 578 0 310 2,187 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0 143 1109 224 1,005 578 0 310 6,335 0,023 0,034 0 143 1109 224 1,005 578 0 310 6,335 0,035 0 143 1109 224 1,005 578 0 310 6,335 0,035 0 143 1109 224 1,005 578 0 310 6,335 0,035 0 143 1109 224 1,005 578 0 310 6,335 0,035 0 143 1109 224 1,005 578 0 310 6,335 0,035 0 143 1109 225 1,005 578 0 310 6,335
211 689 5,056 137 19 1,14 19 1,14 19 2,02 137 106 -4,953 382 0	211 689 390 5,086 137 79 -5,108 213 845 4,922 137 106 4,953 382 0 213 843 578 248 227 -599 -651 0 213 1,032 778 256 225 -539 382 0 0 216 1,142 578 261 375 -464 2288 0 0 0 216 1,263 1,721 1,721 1,814 578 269 -468 -379 244 10 0 <td>211 689 390 5,086 137 79 -5,1642 213 762 463 4,922 137 106 4,453 213 11 762 463 4,922 137 106 -4,553 213 1,142 838 278 248 227 -559 -539 216 1,142 838 578 269 468 -279 -254 4 216 1,142 838 578 224 159 -864 288 0 0 219 1,751 1,491 578 274 575 284 0 0 0 219 1,791 1,792 578 295 1,011 138 58 23 121 237 254 26 23 23 122 23 102 23 23 103 23 103 23 23 103 23 23 23 23 23</td> <td>211 689 390 5,636 127 79 5,108 213 762 463 4,922 137 106 -4,953 213 863 578 248 106 -651 213 1032 729 137 146 248 0 0 216 1,265 196 578 264 277 184 5 23 216 1,265 196 578 269 468 -379 2454 4 10 216 1,265 378 281 70 1184 56 29 219 1,265 378 281 70 1184 55 10 22 21 10 10 10 22 21 10 38 28 28 27 21 27 18 38 38 38 38 38 38 38 38 38 38 38 38 38 3</td>	211 689 390 5,086 137 79 -5,1642 213 762 463 4,922 137 106 4,453 213 11 762 463 4,922 137 106 -4,553 213 1,142 838 278 248 227 -559 -539 216 1,142 838 578 269 468 -279 -254 4 216 1,142 838 578 224 159 -864 288 0 0 219 1,751 1,491 578 274 575 284 0 0 0 219 1,791 1,792 578 295 1,011 138 58 23 121 237 254 26 23 23 122 23 102 23 23 103 23 103 23 23 103 23 23 23 23 23	211 689 390 5,636 127 79 5,108 213 762 463 4,922 137 106 -4,953 213 863 578 248 106 -651 213 1032 729 137 146 248 0 0 216 1,265 196 578 264 277 184 5 23 216 1,265 196 578 269 468 -379 2454 4 10 216 1,265 378 281 70 1184 56 29 219 1,265 378 281 70 1184 55 10 22 21 10 10 10 22 21 10 38 28 28 27 21 27 18 38 38 38 38 38 38 38 38 38 38 38 38 38 3
211 762 463 4,922 137 106 -4,933 213 98.4 542 578 242 169 -651 213 98.2 631 578 242 169 -651 216 1,142 83.8 878 261 237 -646 288 0 0 216 1,142 878 261 478 -646 288 0 0 0 218 1,401 1,095 578 269 468 289 269 488 273 244 10 0	211 762 463 4922 137 106 -4,953 213 9843 542 578 242 169 -651 215 1,032 712 578 242 169 -651 216 1,1032 729 578 226 259 -539 9 216 1,262 96 978 269 468 -579 248 0 0 219 1,203 578 269 468 -579 248 4 10 219 1,504 578 281 70 184 56 23 219 1,504 578 281 1,21 184 56 23 222 2,136 2,98 1,011 138 315 163 167 224 2,76 2,98 1,011 138 315 163 163 224 2,038 578 310 1,443 555 104 </td <td>211 762 452 137 106 -4,552 213 843 542 4,922 137 109 -4,553 213 843 542 578 242 169 -651 215 1,032 778 242 169 -651 2243 0 0 216 1,142 878 266 295 -539 264 4 10 218 1,631 1,095 578 269 468 -27 52 23 219 1,501 1,899 578 281 70 -15 58 23 219 1,501 1,899 578 281 101 184 56 23 23 23 22 23</td> <td>211 762 4,922 137 106 -4,953 213 943 643 4,922 137 109 -651 213 943 641 578 242 109 -651 216 1,142 78 242 275 -549 269 216 1,142 78 278 269 -549 -549 269 216 1,142 78 281 269 -549 269 4 10 219 1,553 1,246 578 281 70 -269 4 10 219 1,553 1,241 578 281 70 -23 23 23 23 23 23 23 23 23 23 23 23 24 269 -269 -269 269 23 23 23 23 23 23 23 23 23 23 23 23 23 23 23</td>	211 762 452 137 106 -4,552 213 843 542 4,922 137 109 -4,553 213 843 542 578 242 169 -651 215 1,032 778 242 169 -651 2243 0 0 216 1,142 878 266 295 -539 264 4 10 218 1,631 1,095 578 269 468 -27 52 23 219 1,501 1,899 578 281 70 -15 58 23 219 1,501 1,899 578 281 101 184 56 23 23 23 22 23	211 762 4,922 137 106 -4,953 213 943 643 4,922 137 109 -651 213 943 641 578 242 109 -651 216 1,142 78 242 275 -549 269 216 1,142 78 278 269 -549 -549 269 216 1,142 78 281 269 -549 269 4 10 219 1,553 1,246 578 281 70 -269 4 10 219 1,553 1,241 578 281 70 -23 23 23 23 23 23 23 23 23 23 23 23 24 269 -269 -269 269 23 23 23 23 23 23 23 23 23 23 23 23 23 23 23
213 843 542 578 242 169 -651 213 932 631 578 248 257 -559 216 1,142 838 578 261 375 -464 2488 0 0 216 1,265 961 578 261 375 -464 2488 0 0 218 1,265 961 578 269 468 -379 2454 4 10 219 1,563 1,246 578 281 700 -159 382 23 221 1,509 578 295 1,011 184 56 23 23 1,212 315 163 36	213 843 542 578 242 169 -651 215 1,032 778 248 2-79 -599 382 0 0 216 1,142 838 578 26 255 -539 382 0 0 216 1,265 961 578 264 279 2454 4 10 218 1,404 578 274 575 277 184 56 23 219 1,533 1,246 578 281 700 -159 245 58 23 219 1,531 1,444 578 281 700 -159 245 58 23 222 2,116 1,805 578 310 1,442 578 310 1,443 578 310 224 2,805 2,325 0 310 1,384 1,67 0 143 517 224 2,805 2,325 </td <td>213 843 542 578 242 -651 215 1,032 723 578 246 -559 382 0 0 216 1,142 838 578 246 227 -599 38 0 0 0 216 1,140 578 248 247 575 246 2288 0 <td< td=""><td>213 843 542 578 242 -651 215 1,032 721 578 248 227 -599 38 0 0 216 1,142 878 266 226 -539 382 0 0 0 216 1,142 878 269 468 278 26 227 184 56 23 21 10 0</td></td<></td>	213 843 542 578 242 -651 215 1,032 723 578 246 -559 382 0 0 216 1,142 838 578 246 227 -599 38 0 0 0 216 1,140 578 248 247 575 246 2288 0 <td< td=""><td>213 843 542 578 242 -651 215 1,032 721 578 248 227 -599 38 0 0 216 1,142 878 266 226 -539 382 0 0 0 216 1,142 878 269 468 278 26 227 184 56 23 21 10 0</td></td<>	213 843 542 578 242 -651 215 1,032 721 578 248 227 -599 38 0 0 216 1,142 878 266 226 -539 382 0 0 0 216 1,142 878 269 468 278 26 227 184 56 23 21 10 0
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215 1,032 729 578 256 295 -539 382 0 0 216 1,142 78 261 375 -464 2488 0 0 216 1,265 961 578 269 468 -454 2488 0 0 218 1,265 961 578 274 575 184 58 23 219 1,553 1,246 578 281 77 184 56 23 221 1,721 1,446 578 295 1,011 138 315 63 77 224 2,565 0 310 1,443 557 163 57 224 2,666 2,982 0 310 1,443 557 143 547 224 2,472 0 1,432 5,53 0 310 1,432 547 0 143 547 224 2,425	215 1,022 878 256 295 -539 382 0 0 216 1,022 878 261 375 -646 288 0 0 218 1,261 978 269 468 -379 244 10 218 1,401 1,995 578 288 845 -277 184 56 23 219 1,523 1,246 578 281 70 184 56 23 222 2,116 1,895 578 295 1,011 138 315 63 177 224 2,566 2,932 0 310 1,432 55 102 143 347 224 2,566 2,932 0 310 1,882 1,574 0 143 347 224 2,582 0 310 1,882 1,574 0 143 347 224 2,582 0 310 <td>215 1,032 729 578 256 255 -539 382 0 0 216 1,142 838 578 261 375 -464 2488 0 0 218 1,261 1,035 578 281 777 184 56 23 219 1,521 1,444 578 281 77 184 56 23 221 1,509 1,539 578 295 1,011 138 3151 63 77 224 2,505 2,011 138 3151 63 77 224 2,505 2,011 138 3151 63 77 224 2,606 2,932 0 310 1,443 555 1043 347 224 2,705 0 310 1,884 1,570 0 143 347 224 2,505 0 310 1,884 1,571 0 143</td> <td>215 1,032 729 578 256 255 -539 382 0 0 216 1,242 838 578 261 375 -464 0 0 218 1,245 958 578 274 457 184 56 38 23 219 1,539 1,246 578 281 77 184 56 38 38 23 4 10 184 58 38 38 23 4 10 184 58 38</td>	215 1,032 729 578 256 255 -539 382 0 0 216 1,142 838 578 261 375 -464 2488 0 0 218 1,261 1,035 578 281 777 184 56 23 219 1,521 1,444 578 281 77 184 56 23 221 1,509 1,539 578 295 1,011 138 3151 63 77 224 2,505 2,011 138 3151 63 77 224 2,505 2,011 138 3151 63 77 224 2,606 2,932 0 310 1,443 555 1043 347 224 2,705 0 310 1,884 1,570 0 143 347 224 2,505 0 310 1,884 1,571 0 143	215 1,032 729 578 256 255 -539 382 0 0 216 1,242 838 578 261 375 -464 0 0 218 1,245 958 578 274 457 184 56 38 23 219 1,539 1,246 578 281 77 184 56 38 38 23 4 10 184 58 38 38 23 4 10 184 58 38
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218 1,601 1,004 578 274 468 23 478 279 253 4 10 218 1,553 1,246 578 234 70 -159 184 56 23 221 1,553 1,246 578 281 70 -159 184 56 18 58 38 23 1212 313 1315 63 167 22 22 22,24 2,381 63 102 22 22 2,381 63 163 157 63 162 23 162 22 22 22,482 2,912 0 310 1,824 1,514 315 163 315 1643 35 102 316 1643 317 22 44 4,924 4,514 3,525 0 310 2,847 2,037 0 143 85 316 143 316 316 316 316 317 317 316 31	2.18 1,05 578 279 462 27 425 4 21 2.19 1,54 578 274 462 -27 184 56 23 2.19 1,553 1,246 578 281 70 -159 184 56 18 58 38 2.21 1,599 578 295 1,011 315 63 162 58 38 27 22 22 22 2038 578 310 1,443 55 1072 143 347 22 22 25 1,011 311 315 65 102 23 102 22 22 25 1,011 313 315 65 102 22 22 23 10 1,43 34 28 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 <td< td=""><td>218 1,401 1,031 578 279</td><td>218 1,401 1,025 578 259 49 10 218 1,401 1,025 578 281 700 -159 184 56 23 219 1,533 1,246 578 281 700 -159 184 58 38 219 1,721 1,805 578 295 1,011 138 315 65 102 224 2,316 1,805 578 310 1,43 555 1072 143 547 224 2,166 2,982 0 310 1,824 1,514 0 143 547 224 2,166 2,982 0 310 1,824 1,574 0 143 547 224 3,176 3,520 0 310 1,824 1,734 0 143 547 224 4,144 5,920 0 310 1,824 0 143 547 224</td></td<>	218 1,401 1,031 578 279	218 1,401 1,025 578 259 49 10 218 1,401 1,025 578 281 700 -159 184 56 23 219 1,533 1,246 578 281 700 -159 184 58 38 219 1,721 1,805 578 295 1,011 138 315 65 102 224 2,316 1,805 578 310 1,43 555 1072 143 547 224 2,166 2,982 0 310 1,824 1,514 0 143 547 224 2,166 2,982 0 310 1,824 1,574 0 143 547 224 3,176 3,520 0 310 1,824 1,734 0 143 547 224 4,144 5,920 0 310 1,824 0 143 547 224
219 1,553 1,246 578 281 700 -159 184 58 38 221 1,721 1,444 578 281 845 -21 527 61 55 221 2,116 1,805 578 295 1,212 331 3115 63 77 224 2,551 2,038 578 310 1,443 555 1072 143 347 224 2,859 2,635 0 310 1,824 0 143 580 224 3,746 3,232 0 310 1,824 1,514 0 143 580 224 3,746 3,232 0 310 2,347 2,037 0 143 580 224 4,944 3,920 0 310 2,347 2,037 0 143 375 224 4,944 3,970 0 310 2,347 2,047 0 143	219 1,553 1,246 578 281 700 -159 184 58 28 221 221 1,246 578 281 700 -159 184 58 28 221 221 221 1,246 578 281 77 227 61 52 63 102 222 22,116 1,805 578 310 1,443 580 63 102 224 2,525 0 310 1,443 1570 0 143 347 224 2,532 0 310 1,882 1,672 0 143 347 2,244 1,672 0 143 347 250 0 143 347 250 0 143 347 250 0 143 347 250 0 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 14	219 1,553 1,246 578 281 700 -159 184 58 28 221 221 1,246 578 281 700 -159 184 58 28 221 221 221 1,246 578 281 77 222 2,116 1,805 578 291 20 310 1,443 587 102 224 2,525 0 310 1,443 587 102 224 2,525 0 310 1,443 1,570 0 143 587 310 1,443 1,574 0 143 587 310 1,443 1,574 0 143 587 310 1,443 1,574 0 143 587 320 0 310 1,443 1,574 0 143 587 320 0 143 652 322 4,444 4,591 0 310 2,477 0 143 652 324 4,444 4,504 4,50	219 1,553 1,246 578 281 700 -159 184 58 25 22 22 22,106 1,599 578 288 845 -21 527 61 58 28 <t< td=""></t<>
219 1,721 1,414 578 288 845 -21 527 61 53 221 1,909 1,599 578 295 1,011 133 315; 63 77 224 2,315 2,038 578 310 1,443 555 1072 143 347 224 2,606 2,382 0 310 1,684 1,570 0 143 547 224 2,842 2,912 0 310 1,884 1,672 0 143 580 224 3,742 3,218 0 310 2,347 0 143 652 224 4,144 3,520 0 310 2,347 0 143 690 224 4,991 4,767 0 310 2,475 0 143 692 224 4,991 4,767 0 310 3,462 3,775 0 143 175	219 1,721 1,444 578 288 845 -21 527 61 53 221 1,909 1,599 578 295 1,011 1315 65 177 222 2,116 1,895 578 310 1,443 555 1072 143 347 224 2,566 2,912 0 310 1,884 0 143 516 224 2,842 0 310 1,887 0 143 516 224 3,742 0 310 2,187 0 143 516 224 4,144 3,920 0 310 2,187 0 143 517 224 4,144 3,920 0 310 2,187 0 143 617 224 4,547 4,777 0 143 617 143 617 224 4,547 4,777 0 143 2,747 0	219 1,721 1,414 578 288 845 -21 527 61 53 221 1,909 1,599 578 295 1,011 1315 65 102 222 2,116 1,899 578 310 1,443 555 1072 143 347 224 2,505 0 310 1,882 1,570 0 143 516 224 2,842 0 310 1,882 1,574 0 143 516 224 3,742 0 310 1,882 1,574 0 143 516 224 4,742 0 310 2,187 0 143 517 224 4,747 0 1,887 1,677 0 143 517 224 4,547 4,747 0 1,43 1,43 517 224 4,547 0 310 2,57 2,747 0 143 <	219 1,721 1,414 578 288 845 -21 527 61 53 221 1,909 1,599 578 295 1,011 1315 65 102 222 2,116 1,895 578 310 1,443 555 1072 143 347 224 2,505 0 310 1,884 1,514 0 143 516 224 2,842 0 310 1,882 1,574 0 143 516 224 3,742 0 310 1,882 1,672 0 143 580 224 3,742 0 310 2,187 0 143 517 224 4,144 3,920 0 310 2,187 0 143 617 224 4,547 4,771 0 143 2,173 0 143 821 224 5,478 0 310 3,474 <t< td=""></t<>
22 1,509 1,559 578 295 1,011 138 3151 63 77 22 2,116 1,805 578 310 1,412 331 3115 65 102 224 2,516 2,038 0 310 1,824 1,572 143 516 224 2,842 2,538 0 310 1,824 1,672 0 143 547 224 3,746 3,522 0 310 2,187 0 143 615 224 3,746 3,522 0 310 2,187 0 143 652 224 4,547 4,547 4,547 0 143 652 224 4,547 4,547 0 310 2,789 0 143 652 224 4,548 0 310 2,789 0 310 3,671 0 143 672 224 4,549 4,767	221 1,909 1,599 578 295 1,011 138 3151 63 77 224 2,116 2,038 578 310 1,421 555 1072 143 347 224 2,566 2,538 0 310 1,680 1,370 0 143 516 224 2,666 2,538 0 310 1,682 1,572 0 143 516 224 3,746 0 310 1,682 1,572 0 143 516 224 3,746 0 310 2,187 0 143 652 224 4,144 3,920 0 310 2,187 0 143 652 224 4,144 3,920 0 310 2,187 0 143 652 224 4,547 4,547 0 310 2,187 0 143 715 224 4,747 0 <	221 1,909 1,599 578 295 1,011 138 3151 63 77 224 2,116 2,038 578 310 1,422 3313 65 102 224 2,566 2,382 0 310 1,680 1,370 0 143 516 224 2,656 2,382 0 310 1,682 1,370 0 143 516 224 3,425 0 310 1,682 1,572 0 143 580 224 3,746 3,920 0 310 2,187 0 143 652 224 4,144 3,920 0 310 2,187 0 143 652 224 4,144 3,920 0 310 2,187 0 143 775 224 4,547 4,747 0 310 3,183 3,27 0 143 123 224 5,736	221 1,909 1,599 578 295 1,011 138 3151 63 77 224 2,116 1,805 578 310 1,412 331 3115 65 102 224 2,536 2,038 0 310 1,680 1,370 0 143 347 224 2,656 2,382 0 310 1,882 1,572 0 143 516 224 3,746 3,218 0 310 2,187 0 143 517 224 3,746 3,920 0 310 2,187 0 143 615 224 4,144 3,920 0 310 2,577 0 143 615 224 4,144 3,920 0 310 2,577 0 143 615 224 4,547 4,374 0 310 3,575 0 143 775 224 4,756
224 2,51 3,68 3,78 3,68 1,212 33115 65 102 224 2,56 2,038 0 310 1,680 1,370 0 143 517 224 2,565 0 310 1,824 1,514 0 143 547 224 3,136 0 310 1,824 1,514 0 143 547 224 3,746 3,522 0 310 2,347 0 143 580 224 4,744 6,520 0 310 2,347 0 143 652 224 4,991 4,767 0 310 2,789 2,479 0 143 652 224 4,991 4,767 0 310 3,647 3,732 0 143 821 224 4,991 4,767 0 310 3,647 0 143 821 224 4,991 4,767	224 2,51 4,80 378 1,21 3115 65 102 224 2,56 2,982 0 310 1,480 1,370 143 510 224 2,695 0 310 1,824 0 143 547 224 2,695 0 310 1,824 0 143 547 224 3,746 3,532 0 310 2,187 0 143 547 224 3,746 3,522 0 310 2,187 0 143 652 224 3,746 0 310 2,187 0 143 652 224 4,547 0 310 2,789 0 143 652 224 4,591 4,767 0 310 3,475 0 143 652 224 4,591 4,767 0 310 3,475 0 143 173 224 6,013	224 2,541 3,780 378 1,212 33115 65 102 224 2,556 2,982 0 310 1,480 1,370 143 516 224 2,656 2,982 0 310 1,822 1,370 143 547 224 2,642 0 310 1,822 1,571 0 143 547 224 3,742 3,512 0 310 2,187 0 143 547 224 3,747 3,520 0 310 2,187 0 143 652 224 4,547 4,547 0 143 652 224 6,037 0 143 652 224 4,547 4,547 0 310 3,637 0 143 652 224 4,547 0 310 3,637 3,737 0 143 173 224 6,013 6,013 6,013 6,013 <td>224 2,510 4,800 578 310 1,412 553 107 143 511 55 102 224 2,505 2,038 0 1,480 1,370 0 143 517 214 0 143 516 224 2,505 0 310 1,882 1,574 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 517 0 143 517 518 0 143 517 518 518 0 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 1</td>	224 2,510 4,800 578 310 1,412 553 107 143 511 55 102 224 2,505 2,038 0 1,480 1,370 0 143 517 214 0 143 516 224 2,505 0 310 1,882 1,574 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 516 0 143 547 517 0 143 517 518 0 143 517 518 518 0 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 143 1
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2.24 3,521 0 310 2,157 1,847 0 143 615 2.24 4,744 3,522 0 310 2,537 2,037 0 143 615 2.24 4,547 4,323 0 310 2,557 2,247 0 143 652 2.24 4,547 4,324 0 310 2,789 2,479 0 143 732 2.24 5,478 0 310 3,637 3,107 0 143 775 2.24 5,078 0 310 3,637 3,107 0 143 870 2.24 5,078 0 310 3,637 3,627 0 143 972 2.24 7,056 7,732 0 310 4,635 0 143 1037 2.24 7,056 7,732 0 310 4,636 0 143 1037 2.24 1,568 11,344 </td <td>224 3,741 0 310 2,187 0 143 615 224 4,144 3,920 0 310 2,187 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,347 4,767 0 310 2,789 0 143 732 224 5,478 6,578 0 310 3,637 3,017 0 143 821 224 5,478 0 310 3,637 3,327 0 143 873 224 7,246 7,022 0 310 3,647 0 143 873 224 7,246 7,022 0 310 4,781 4,471 0 143 1037 224 7,246 7,022 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 5,451 0 143 1235 224 10,533 10,309 0 310 6,538 6,628 0 143 1235 224 11,368 11,349 0 310 6,545</td> <td>224 3,741 0 21,57 1,847 0 143 615 224 3,726 0 310 2,157 2,037 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,547 4,767 0 310 2,789 0 143 690 224 5,478 6,135 0 310 3,637 3,017 0 143 821 224 5,478 0 310 3,637 3,17 0 143 871 224 7,646 7,022 0 310 3,637 3,327 0 143 872 224 7,646 7,022 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 310 4,781 4,471 0 143 1156 224 10,533 10,309 310 6,968 6,658 0 143 1309 224 11,364 0 310 6,968 6,658 0 143 1235 224 15,326 0 310 6,968 6,658</td> <td>224 3,741 0 310 2,157 0 143 615 224 4,144 3,522 0 310 2,157 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,547 4,767 0 310 2,789 0 143 732 224 5,478 5,784 0 310 3,677 0 143 775 224 5,478 0 310 3,677 0 143 821 224 7,246 7,022 0 310 3,677 0 143 876 224 7,246 7,022 0 310 4,781 4,471 0 143 109 224 7,956 7,722 0 310 4,481 4,471 0 143 109 224 10,533 10,309 310 4,781 4,471 0 143 136 224 10,533 10,309 310 6,968 6,658 0 143 136 224 11,349 0 310 6,968 6,658 0 143 1309</td>	224 3,741 0 310 2,187 0 143 615 224 4,144 3,920 0 310 2,187 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,347 4,767 0 310 2,789 0 143 732 224 5,478 6,578 0 310 3,637 3,017 0 143 821 224 5,478 0 310 3,637 3,327 0 143 873 224 7,246 7,022 0 310 3,647 0 143 873 224 7,246 7,022 0 310 4,781 4,471 0 143 1037 224 7,246 7,022 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 5,451 0 143 1235 224 10,533 10,309 0 310 6,538 6,628 0 143 1235 224 11,368 11,349 0 310 6,545	224 3,741 0 21,57 1,847 0 143 615 224 3,726 0 310 2,157 2,037 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,547 4,767 0 310 2,789 0 143 690 224 5,478 6,135 0 310 3,637 3,017 0 143 821 224 5,478 0 310 3,637 3,17 0 143 871 224 7,646 7,022 0 310 3,637 3,327 0 143 872 224 7,646 7,022 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 310 4,781 4,471 0 143 1156 224 10,533 10,309 310 6,968 6,658 0 143 1309 224 11,364 0 310 6,968 6,658 0 143 1235 224 15,326 0 310 6,968 6,658	224 3,741 0 310 2,157 0 143 615 224 4,144 3,522 0 310 2,157 0 143 615 224 4,144 3,920 0 310 2,787 0 143 652 224 4,547 4,767 0 310 2,789 0 143 732 224 5,478 5,784 0 310 3,677 0 143 775 224 5,478 0 310 3,677 0 143 821 224 7,246 7,022 0 310 3,677 0 143 876 224 7,246 7,022 0 310 4,781 4,471 0 143 109 224 7,956 7,722 0 310 4,481 4,471 0 143 109 224 10,533 10,309 310 4,781 4,471 0 143 136 224 10,533 10,309 310 6,968 6,658 0 143 136 224 11,349 0 310 6,968 6,658 0 143 1309
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224 4,847 4,323 0 2789 2,479 143 979 224 4,991 4,767 0 310 2,789 2,479 0 143 772 224 6,914 5,254 0 310 3,637 3,671 0 143 775 224 6,013 5,789 0 310 3,671 0 143 775 224 6,000 6,376 0 310 3,691 3,671 0 143 821 224 7,956 6,005 6,376 0 310 3,694 4,781 0 143 978 224 7,956 7,732 0 310 5,245 0 143 1099 224 10,533 10,309 0 310 5,745 0 143 1036 224 11,648 0 310 5,751 5,451 0 143 1235 224 12,953 <td>224 4,547 4,523 0 2,789 2,479 0 143 991 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 6,013 5,789 0 310 3,647 0 143 775 224 6,013 5,789 0 310 3,637 0 143 821 224 6,013 5,789 0 310 3,671 0 143 978 224 7,056 7,732 0 310 4,781 0 143 1099 224 7,056 7,732 0 310 4,781 0 143 1166 224 1,056 7,732 0 310 5,784 0 143 1166 224 1,056 7,679 0 310 6,783 6,023 0 143 1309 224 11,349 0 310</td> <td>224 4,547 4,523 0 2789 2,479 0 143 991 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 5,789 0 310 3,647 0 143 775 224 6,013 5,789 0 310 3,637 0 143 775 224 6,013 5,780 0 310 3,637 0 143 873 224 7,246 7,732 0 310 4,935 0 143 978 224 7,956 7,732 0 310 5,245 0 143 1109 224 1,053 10,393 10,394 0 310 5,485 0 143 1136 224 11,368 11,349 0 310 6,988 6,688 0 143 1309 224 13,953 13,729 0</td> <td>224 4,847 4,323 0 2789 2,479 0 143 939 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 6,013 5,534 0 310 3,637 0 143 775 224 6,013 5,789 0 310 3,637 0 143 871 224 6,015 6,772 0 310 3,637 0 143 978 224 7,246 7,732 0 310 4,950 0 143 978 224 7,956 7,732 0 310 5,245 0 143 1099 224 10,533 10,309 0 310 5,245 0 143 1166 224 10,532 10,309 0 310 6,968 6,658 0 143 1369 224 11,344 0 310 6,968 6,658 0 143 138 224 15,953 13,729 0 310 9,324 9,014 0 143 138 224 15,953 15,102 0 310 9,</td>	224 4,547 4,523 0 2,789 2,479 0 143 991 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 6,013 5,789 0 310 3,647 0 143 775 224 6,013 5,789 0 310 3,637 0 143 821 224 6,013 5,789 0 310 3,671 0 143 978 224 7,056 7,732 0 310 4,781 0 143 1099 224 7,056 7,732 0 310 4,781 0 143 1166 224 1,056 7,732 0 310 5,784 0 143 1166 224 1,056 7,679 0 310 6,783 6,023 0 143 1309 224 11,349 0 310	224 4,547 4,523 0 2789 2,479 0 143 991 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 5,789 0 310 3,647 0 143 775 224 6,013 5,789 0 310 3,637 0 143 775 224 6,013 5,780 0 310 3,637 0 143 873 224 7,246 7,732 0 310 4,935 0 143 978 224 7,956 7,732 0 310 5,245 0 143 1109 224 1,053 10,393 10,394 0 310 5,485 0 143 1136 224 11,368 11,349 0 310 6,988 6,688 0 143 1309 224 13,953 13,729 0	224 4,847 4,323 0 2789 2,479 0 143 939 224 4,991 4,767 0 310 2,789 2,479 0 143 775 224 6,013 5,534 0 310 3,637 0 143 775 224 6,013 5,789 0 310 3,637 0 143 871 224 6,015 6,772 0 310 3,637 0 143 978 224 7,246 7,732 0 310 4,950 0 143 978 224 7,956 7,732 0 310 5,245 0 143 1099 224 10,533 10,309 0 310 5,245 0 143 1166 224 10,532 10,309 0 310 6,968 6,658 0 143 1369 224 11,344 0 310 6,968 6,658 0 143 138 224 15,953 13,729 0 310 9,324 9,014 0 143 138 224 15,953 15,102 0 310 9,
224 4,991 4,767 0 310 3,045 2,735 0 143 775 224 5,478 5,254 0 310 3,327 0 143 821 224 6,013 5,789 0 310 3,981 3,671 0 143 871 224 7,026 6,310 3,981 3,671 0 143 972 224 7,956 7,732 0 310 4,981 0 143 978 224 8,735 8,511 0 310 4,935 0 143 1037 224 10,533 1,349 0 310 5,761 5,451 0 143 1166 224 11,368 11,344 0 310 5,761 5,451 0 143 1235 224 12,68 1,344 0 310 7,671 7,361 0 143 1369 224 13,953<	224 4,991 4,767 0 310 3,045 2,735 0 143 775 224 5,789 0 310 3,327 3,017 0 143 821 224 6,003 6,378 0 310 3,981 3,671 0 143 822 224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 7,246 7,732 0 310 4,781 0 143 978 224 7,356 7,732 0 310 4,781 0 143 1037 224 8,592 9,368 0 310 5,761 5,451 0 143 1039 224 11,368 0 310 5,761 5,451 0 143 1235 224 11,368 0 310 6,761 6,638 0 143 1236 224 11,368 0 310 6,761 0 143 1471 224 11,363 0 310 9,324 8,144 0 143 1471 224 11,326 15,326 0 310 9,3	224 4,991 4,767 0 310 3,045 2,735 0 143 775 224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,003 6,378 0 310 3,981 3,671 0 143 870 224 7,246 7,022 0 310 4,780 4,050 0 143 978 224 7,246 7,732 0 310 4,781 0 143 1037 224 7,246 7,732 0 310 4,741 0 143 1039 224 10,533 10,309 0 310 5,745 4,935 0 143 1039 224 10,533 10,309 0 310 5,745 4,545 0 143 1236 224 11,368 11,344 0 310 6,548 6,628 0 143 130 224 12,706 13,729 0 310 8,454 8,144 0 143 147 224 15,326 15,326 0 310 9,324 0 143 147	224 4,991 4,767 0 310 3,045 2,735 0 143 775 224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,003 6,378 0 310 3,981 3,671 0 143 870 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,732 0 310 4,781 0 143 978 224 7,246 7,732 0 310 4,781 0 143 1037 224 10,592 9,592 9,368 0 310 4,781 0 143 1039 224 10,533 10,309 0 310 6,745 4,545 0 143 1235 224 11,548 0 310 6,761 0 143 1236 224 11,549 0 310 7,711 0 143 138 224 11,549 0 310 8,454 8,144 0 143 1471 224 15,326 0 310 9,324 0 </td
224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,561 0 143 922 224 7,956 7,732 0 310 4,781 4,471 0 143 1037 224 7,956 7,732 0 310 4,781 4,471 0 143 1099 224 8,735 8,511 0 310 4,781 4,471 0 143 1166 224 10,533 10,309 0 310 5,245 0 143 136 224 11,364 0 310 6,968 6,688 0 143 136 224 11,364 0 310 6,968 6,688 0 143 138 224	224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 6,789 0 310 3,637 3,617 0 143 821 224 7,246 7,022 0 310 4,560 4,050 0 143 821 224 7,246 7,732 0 310 4,781 4,471 0 143 978 224 7,325 0 310 4,781 4,471 0 143 1037 224 10,533 10,309 0 310 5,761 5,451 0 143 1039 224 11,568 11,344 0 310 6,628 6,638 0 143 1309 224 12,704 12,480 0 310 6,638 6,638 0 143 1309 224 13,953 13,729 0 310 7,717 7,361 0 143 15,88 224 15,326 15,102 0 310 9,324 8,144 0 143 15,88 224 16,834 17,457 -6,192 310 10,293 16,175 5053 </td <td>224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,732 0 310 4,781 4,471 0 143 978 224 7,246 7,732 0 310 4,781 4,471 0 143 1037 224 9,592 9,392 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 6,633 6,023 0 143 1235 224 11,704 0 310 6,638 6,628 0 143 1309 224 12,704 12,480 0 310 6,638 6,638 0 143 1309 224 15,326 15,102 0 310 8,454 9,014 0 143 15,18 224 16,834 17,457 -6,192 310 9,324 9,014 0 143 <td< td=""><td>224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 1037 224 9,592 9,368 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 6,333 6,023 0 143 1235 224 11,768 11,344 0 310 6,588 6,658 0 143 1309 224 12,704 12,480 0 310 6,588 6,658 0 143 138 224 15,326 15,102 0 310 8,454 9,014 0 143 1471 224 16,834 17,457 -6,192 310 10,293 14,174 0</td></td<></td>	224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,732 0 310 4,781 4,471 0 143 978 224 7,246 7,732 0 310 4,781 4,471 0 143 1037 224 9,592 9,392 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 6,633 6,023 0 143 1235 224 11,704 0 310 6,638 6,628 0 143 1309 224 12,704 12,480 0 310 6,638 6,638 0 143 1309 224 15,326 15,102 0 310 8,454 9,014 0 143 15,18 224 16,834 17,457 -6,192 310 9,324 9,014 0 143 <td< td=""><td>224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 1037 224 9,592 9,368 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 6,333 6,023 0 143 1235 224 11,768 11,344 0 310 6,588 6,658 0 143 1309 224 12,704 12,480 0 310 6,588 6,658 0 143 138 224 15,326 15,102 0 310 8,454 9,014 0 143 1471 224 16,834 17,457 -6,192 310 10,293 14,174 0</td></td<>	224 5,478 5,254 0 310 3,327 3,017 0 143 821 224 6,013 5,789 0 310 3,637 3,637 0 143 821 224 7,246 7,022 0 310 4,781 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 978 224 7,246 7,022 0 310 4,781 4,471 0 143 1037 224 9,592 9,368 0 310 4,781 4,471 0 143 1039 224 10,533 10,309 0 310 6,333 6,023 0 143 1235 224 11,768 11,344 0 310 6,588 6,658 0 143 1309 224 12,704 12,480 0 310 6,588 6,658 0 143 138 224 15,326 15,102 0 310 8,454 9,014 0 143 1471 224 16,834 17,457 -6,192 310 10,293 14,174 0
224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 6,000 6,376 0 310 3,981 3,671 0 143 922 224 7,245 7,732 0 310 4,781 0 143 1937 224 7,956 7,732 0 310 5,245 4,935 0 143 1037 224 10,533 10,309 0 310 5,745 0 143 1166 224 11,568 11,344 0 310 6,968 6,658 0 143 1369 224 13,953 13,729 0 310 6,968 6,658 0 143 138 224 13,953 13,729 0 310 9,344 0 143 147 224 15,326 15,102 0 310 9,344 0 143 143 158	224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,640 6,500 6,376 0 310 4,681 3,671 0 143 922 224 7,640 7,732 0 310 4,781 4,471 0 143 978 224 8,735 8,431 0 310 5,745 4,471 0 143 1099 224 10,533 10,309 0 310 5,745 5,451 0 143 1166 224 10,533 10,309 0 310 6,745 6,628 0 143 136 224 11,304 0 310 6,745 0 143 136 224 12,704 0 310 7,671 7,361 0 143 1309 224 15,326 15,102 0 310 9,324 8,144 0 143 1471 224 16,834 17,457 -6,192 310 10,293 16,175 5053 143 16,53 224 16,834 17,457 -6,192 310 10,293 16,175 5053 <td< td=""><td>224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,240 6,000 6,376 0 310 4,081 0 143 922 224 7,245 7,732 0 310 4,781 4,471 0 143 978 224 8,735 8,735 0 310 5,245 4,471 0 143 1099 224 10,533 10,309 0 310 5,451 0 143 1166 224 11,349 0 310 6,583 6,623 0 143 1309 224 12,704 0 310 7,741 7,361 0 143 1309 224 15,729 0 310 8,454 8,144 0 143 1471 224 15,326 15,102 0 310 9,324 8,144 0 143 1471 224 16,834 17,457 -6,192 310 9,324 9,04 0 143 15,58 224 16,834 17,457 -6,192 310 10,293 16,178 5053 143 16,53 <td>224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,040 6,000 6,376 0 310 4,051 0 143 922 224 7,956 7,732 0 310 4,781 4,471 0 143 193 224 8,735 8,735 0 310 4,781 4,471 0 143 1099 224 10,533 10,309 0 310 5,745 0 143 1166 224 11,349 0 310 6,588 6,658 0 143 1309 224 11,349 0 310 6,968 6,658 0 143 1309 224 12,704 0 310 7,671 0 143 1309 224 15,326 15,729 0 310 8,454 8,144 0 143 1471 224 16,334 17,457 6,192 310 10,293 16,176 5053 143 16,53 224 16,834 17,457 6,192 310 10,293 16,176 5053 143 16,53</td></td></td<>	224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,240 6,000 6,376 0 310 4,081 0 143 922 224 7,245 7,732 0 310 4,781 4,471 0 143 978 224 8,735 8,735 0 310 5,245 4,471 0 143 1099 224 10,533 10,309 0 310 5,451 0 143 1166 224 11,349 0 310 6,583 6,623 0 143 1309 224 12,704 0 310 7,741 7,361 0 143 1309 224 15,729 0 310 8,454 8,144 0 143 1471 224 15,326 15,102 0 310 9,324 8,144 0 143 1471 224 16,834 17,457 -6,192 310 9,324 9,04 0 143 15,58 224 16,834 17,457 -6,192 310 10,293 16,178 5053 143 16,53 <td>224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,040 6,000 6,376 0 310 4,051 0 143 922 224 7,956 7,732 0 310 4,781 4,471 0 143 193 224 8,735 8,735 0 310 4,781 4,471 0 143 1099 224 10,533 10,309 0 310 5,745 0 143 1166 224 11,349 0 310 6,588 6,658 0 143 1309 224 11,349 0 310 6,968 6,658 0 143 1309 224 12,704 0 310 7,671 0 143 1309 224 15,326 15,729 0 310 8,454 8,144 0 143 1471 224 16,334 17,457 6,192 310 10,293 16,176 5053 143 16,53 224 16,834 17,457 6,192 310 10,293 16,176 5053 143 16,53</td>	224 6,013 5,789 0 310 3,637 3,327 0 143 870 224 7,040 6,000 6,376 0 310 4,051 0 143 922 224 7,956 7,732 0 310 4,781 4,471 0 143 193 224 8,735 8,735 0 310 4,781 4,471 0 143 1099 224 10,533 10,309 0 310 5,745 0 143 1166 224 11,349 0 310 6,588 6,658 0 143 1309 224 11,349 0 310 6,968 6,658 0 143 1309 224 12,704 0 310 7,671 0 143 1309 224 15,326 15,729 0 310 8,454 8,144 0 143 1471 224 16,334 17,457 6,192 310 10,293 16,176 5053 143 16,53 224 16,834 17,457 6,192 310 10,293 16,176 5053 143 16,53
224 6,000 6,376 0 310 3,981 3,671 0 143 922 224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 7,345 8,511 0 310 5,245 4,535 0 143 1099 224 9,592 9,368 0 310 5,751 5,451 0 143 1099 224 11,568 11,344 0 310 6,638 6,638 0 143 1399 224 12,68 0 310 7,671 7,361 0 143 1399 224 12,953 13,729 0 310 7,671 7,361 0 143 138 224 15,126 0 310 9,324 9,144 0 143 1471 224 16,347 0 310 9,324 9,04 0 143 15,88	224 6,000 6,376 0 310 3,981 3,671 0 143 922 224 7,246 7,022 0 310 4,960 4,050 0 143 978 224 7,956 7,732 0 310 5,245 4,935 0 143 1037 224 8,512 0 310 5,741 4,471 0 143 1099 224 10,532 10,338 0 310 5,745 0 143 1235 224 11,548 0 310 6,533 6,023 0 143 1399 224 12,704 12,480 0 310 7,671 7,361 0 143 139 224 15,326 15,102 310 9,324 8,144 0 143 1471 224 15,326 15,102 310 9,324 9,014 0 143 15,88 224 16,334 17,457 6,192 310 10,293 16,175 -5053 143 16,53 224 16,334 17,457 6,192 310 10,293 16,175 -5053 143 16,53	224 6,000 6,376 0 310 3,981 3,671 0 143 922 224 7,246 7,732 0 310 4,660 4,636 0 143 978 224 7,732 0 310 5,245 4,935 0 143 1099 224 8,531 0 310 5,245 4,935 0 143 1099 224 10,533 10,309 0 310 6,333 6,023 0 143 1136 224 11,368 11,349 0 310 6,968 6,658 0 143 136 224 12,704 13,729 0 310 6,968 0 143 138 224 15,953 13,729 0 310 8,444 8144 0 143 158 224 16,834 17,457 6,192 310 10,293 16,175 -5053 143 16,53 224 16,834 17,457 6,192 310 10,293 16,175 -5053 143 16,53	224 6,000 6,376 0 310 3,981 3,671 0 143 922 224 7,246 7,732 0 310 4,360 0 143 978 224 7,732 0 310 4,781 0 1471 0 143 1099 224 8,512 0 310 5,245 4,935 0 143 1099 224 10,533 10,309 0 310 6,333 6,023 0 143 1166 224 11,368 11,344 0 310 6,968 6,658 0 143 1235 224 13,953 13,729 0 310 8,471 0 143 138 224 15,953 15,102 0 310 9,324 9,014 0 143 1471 224 16,314 17,457 6,192 310 10,293 16,175 -5053 143 16,53
224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 8,735 8,511 0 310 4,781 0 143 1037 224 8,735 8,511 0 310 5,245 4,935 0 143 1037 224 10,533 10,333 6,023 0 143 1235 224 11,568 11,344 0 310 6,533 6,638 0 143 1235 224 12,704 12,480 0 310 7,671 7,361 0 143 139 224 13,953 15,122 0 310 7,671 7,361 0 143 1471 224 15,126 0 310 9,324 9,144 0 143 1471 224 16,334 17,457 6,192 310 10,293 10,173 5053 143 16,38	224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 8,735 7,732 0 310 4,781 4,781 0 143 1037 224 8,735 8,511 0 310 5,781 4,935 0 143 1099 224 10,533 10,309 0 310 5,781 5,481 0 143 1099 224 11,568 0 310 6,333 6,023 0 143 1236 224 12,704 12,480 0 310 7,671 7,361 0 143 138 224 15,326 15,102 0 310 9,524 8,144 0 143 1471 224 16,334 17,457 6,192 310 9,524 9,014 0 143 15,58 224 16,334 17,457 6,192 310 10,293 16,175 -5053 143 16,53	224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 8,735 7,732 0 310 4,781 4,781 0 143 1037 224 8,735 8,511 0 310 5,761 4,535 0 143 1039 224 10,533 0,536 0 310 5,761 5,451 0 143 1099 224 10,533 10,349 0 310 6,533 6,023 0 143 1236 224 12,704 12,480 0 310 7,671 7,361 0 143 138 224 13,729 0 310 8,454 8,144 0 143 1471 224 15,326 15,102 310 9,724 9,014 0 143 15.58 224 16,834 17,457 -6,192 310 10,293 16,175 -5053 143 16,53	224 7,246 7,022 0 310 4,360 4,050 0 143 978 224 8,735 8,511 0 310 4,781 0,143 1037 224 8,735 8,511 0 310 5,245 4,935 0 143 1037 224 10,533 10,309 0 310 5,761 5,451 0 143 1059 224 10,739 0 310 6,533 6,023 0 143 1235 224 12,704 12,480 0 310 7,771 7,361 0 143 1388 224 12,704 12,480 0 310 7,771 0 143 1471 224 15,326 15,102 0 310 9,324 9,014 0 143 1471 224 15,326 15,457 6,192 310 10,293 16,175 5,055 143 1653
224 7,556 7,732 0 310 4,781 4,471 0 163 1637	224 7/35 0 310 4/781 6471 0 163 224 8/35 8,511 0 310 5,451 0 143 1039 224 9,592 9,368 0 310 5,751 5,451 0 143 1039 224 10,563 10,369 0 310 6,538 6,628 0 143 1235 224 12,704 12,480 0 310 7,671 7,361 0 143 1369 224 13,953 13,729 0 310 8,454 8,144 0 143 147 224 15,102 0 310 9,324 9,014 0 143 15,8 224 15,326 15,102 0 310 9,324 9,014 0 143 15,8 224 15,334 17,457 -6,192 310 10,293 16,175 -5053 143 16,53	224 7/35 0 310 4/781 4,471 0 163 224 8/35 8,511 0 310 5,451 0 143 1039 224 9,592 9,368 0 310 5,751 5,451 0 143 1039 224 10,533 10,309 0 310 6,638 0 143 1235 224 11,568 11,344 0 310 6,638 0 143 1309 224 12,704 12,480 0 310 7,671 7,361 0 143 138 224 13,953 13,729 0 310 8,454 8,144 0 143 15,8 224 15,326 15,102 0 310 9,324 9,014 0 143 15,8 224 16,834 17,457 -6,192 310 10,293 16,175 -5053 143 16,53	224 7/35 0 310 4/781 4,471 0 163 224 8/35 8,513 0 310 5,451 0 143 1039 224 9,592 9,368 0 310 5,761 5,451 0 143 1039 224 10,568 10,309 0 310 6,638 0 143 1235 224 12,704 0 310 6,638 0 143 1309 224 12,704 0 310 7,671 7,361 0 143 1398 224 15,326 13,729 0 310 8,454 8,144 0 143 15,88 224 15,326 15,102 0 310 9,324 9,014 0 143 15,88 224 15,834 17,457 -6,192 310 10,293 16,175 5053 143 16,53
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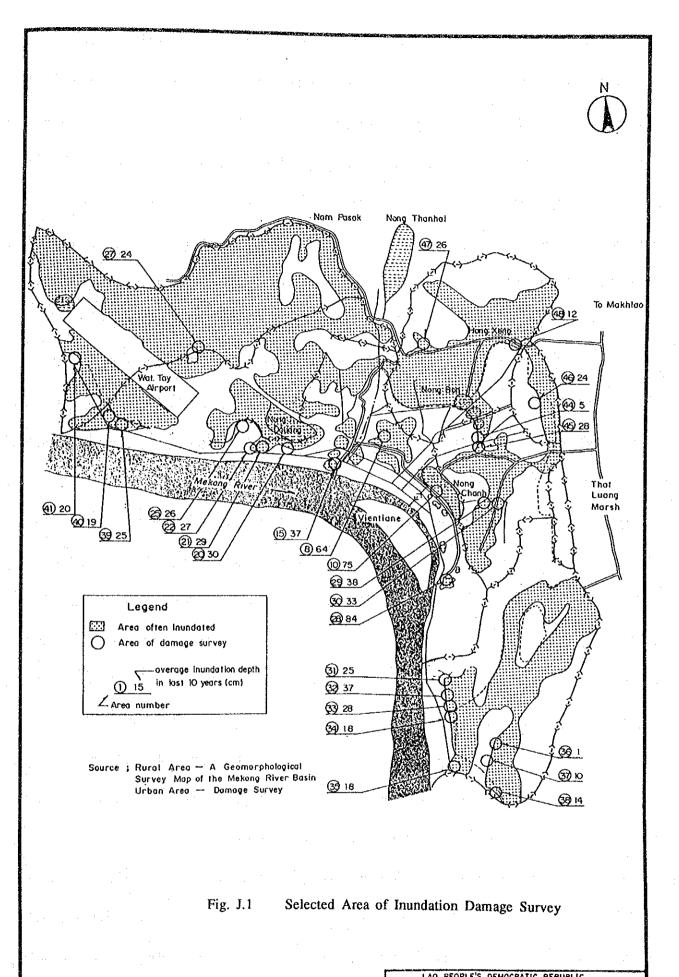
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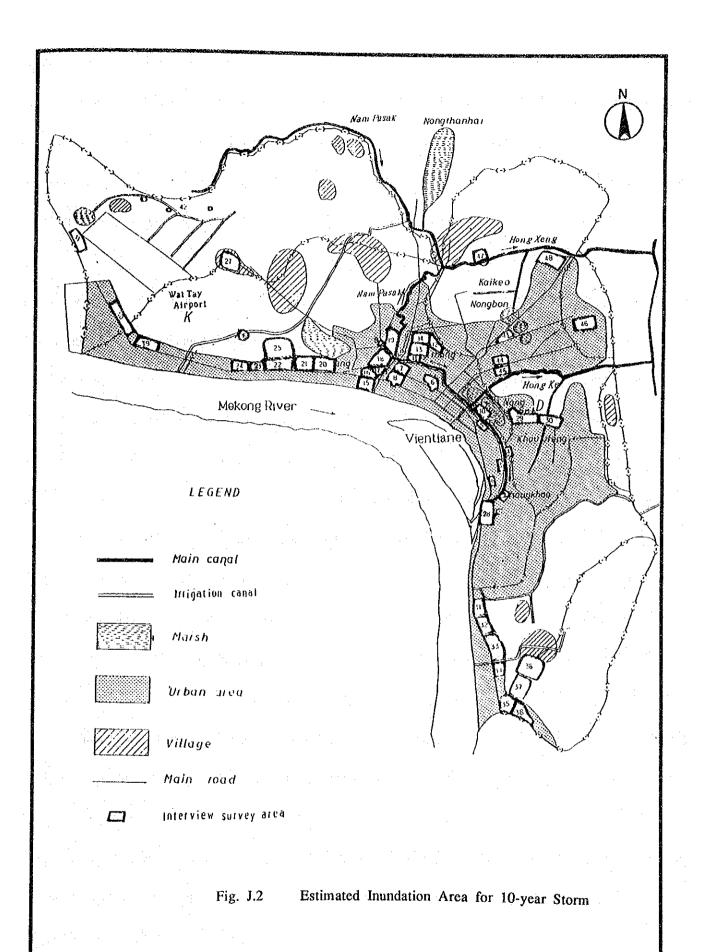
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LAD PEOPLE'S DEMOCRATIC REPUBLIC FEASIBILITY STUDY ON IMPROVEMENT OF DRAINAGE SYSTEM IN VIENTIANE

JAPAN INTERNATIONAL COOPERATION AGENCY

APPENDIX K INSTITUTION AND ORGANIZATION

APPENDIX K. INSTITUTION AND ORGANIZATION

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K.1 Introduction

The reinforcement of the institution and organization related to construction, operation and maintenance work of the drainage system is important to ensure the success of the proposed projects. In this study, the analysis on the institution and organization related to the drainage system are conducted according to the following procedures.

- Examinations of the present situations
- Identification of the existing constraints
- Recommendation on the reinforcements

The data and informations about the institution and organization were obtained from the interview survey with the concerned personnels of the related organizations. The obtained data were compiled and analyzed under four categories classified as follows:

- Organization
- Personnel ,equipment and budget
- Institution and regulation
- Monitoring and data management

K.2 Present Conditions

In this section, the present condition of the institution and organization of the responsible agency for the drainage work in the Study area is examined according to above 4 aspects, that is, organization, personnel, equipment and budget, institution and regulation and monitoring and data management.

K.2.1 Existing Related Organization

The existing related organizations of the drainage work in the Study area are identified through the interview with the concerned organizations. The results are presented in the following sections and the competent organizations according to work items are shown in Table K.1.

K.2.1.1 Drainage Work

The responsible organization for the drainage work in the Study area is the Department of Communication, Transportation and Construction of the Municipality of Vientiane. The Municipality of Vientiane is composed of 18 departments and 8 districts as of 1989 and the Department of Communication, Transportation and Construction is responsible for mainly the construction, maintenance, operation and management of the road, bridge, transportation system, drainage, waste disposal and sanitation in the Vientiane Municipality area. The organizational chart of the Municipality of Vientiane is shown in Fig. K.1.

The Department of Communication, Transportation and Construction of the Municipality of Vientiane is engaged in planning, study, construction, operation, maintenance and repair of the drainage facilities including drainage canal and gate. The Department of Communication, Transportation and Construction of the Municipality of Vientiane is composed of 7 bureaus, 12 state enterprises/companies, 2 workshops, 2 factories and 1 technical school as shown in Fig. K.2. The sections of the Department of Communication, Transportation and Construction, that is, Bureau of Bridge and Road, State Enterprise of Survey and Design and State Enterprise of Bridge and Road carry out the drainage works. The present demarcation of the main work items of each section is summarized as follows:

(1) Bureau of Bridge and Road

- Drainage canal : Planning and finance

- Drainage gate : Planning, survey and finance

(2) State Enterprise of Survey and Design

- Drainage canal : Survey, construction, operation and maintenance

- Drainage gate : Construction, operation and maintenance

(3) State Enterprise of Bridge and Road

- Drainage canal: Construction

- Drainage gate: Construction

The district offices in the Study area, that is, Shikhottabong, Chanthabouly, Xaissettha and Sisattanak are the related organizations of the drainage work. The Department of Communication, Transportation and Construction of the 4 districts concern with the maintenance of the drainage system in the district area by cooperating with the Municipality of Vientiane. The district office monitors the drainage conditions in the district area and informs the situations and problems to Municipality of Vientiane.

K.2.1.2 Related Work

The organizations to be responsible for the related works of the drainage system are also studied and the results are summarized as follows:

(1) Road and Bridge

- Bureau of Bridge and Road, Municipality of Vientiane
- State Enterprise of Survey and Design, Municipality of Vientiane
 - State Enterprise of Bridge and Road, Municipality of Vientiane
- State Enterprise of Rural Road and Bridge, Municipality of Vientiane

(2) Dike of Mekong River

- Ministry of Agricultural Service
- (3) Irrigation facilities (canal, pump, gate)
 - Department of Agriculture, Forest, Irrigation and Agricultural Cooperative, Municipality of Vientiane
 - Ministry of Agricultural Service
- (4) Data management of rainfall gage
 - Ministry of Agricultural Service

(5) Waste disposal

- Bureau of Environment Protection
- Sanitation State Company

(6) Sanitation

- Sanitation State Company

K.2.2 Personnel, Equipment and Budget

The number of stuff of the Department of Communication, Transportation and Construction of Municipality of Vientiane is presented in Table K.2. The number of the stuff of the Bureau of Bridge and Road is 3 persons and that of the State Enterprise of Survey and Design is 75 persons.

The major equipments to be used for the drainage work at present are the excavation equipment and truck and the list of the available equipment owned by the Department of Communication, Transportation and Construction, the Municipality of Vientiane is shown in Table K.3.

The budget of the Department of Communication, Transportation and Construction of the Municipality of Vientiane was amounted to be 200 million kips in year of 1989 and 210 million kips in year of 1990. In 1989, 98.4 million kips was disbursed for the improvement of drainage system including following work items:

- (1) 8 million kips for repair of drainage canals including to change the corrugate pipes, to repair the defects of lateral canals and change the cover of lateral canal
- (2) 10 million kips for the newly construction of lateral canal, box culvert and walk way
- (3) 5 million kips for the maintenance of drainage canal including the remove of garbage and dredging of deposits in Hong Tong (about 800 m from Hong Si Noi Road to Morning Market)
- (4) 73 million kip for special project for the construction of lateral canal from Wat Tay Airport to Nam Pasak along Luang Prabang Road

The budget for the construction of lateral canal from Wat Tay Airport to Nam Pasak along the Luang Prabang Road was the development budget and remaining budget was the current budget. The current budget for the drainage project has been amounted to be 25 million kip to 30 million per year in the past. Table K.4 shows the annual budget of the Department of Communication, Transportation and Construction during year of 1978 to 1990 and the breakdown of the budget in 1989 is shown in Table K.5.

K.2.3 Institution and Regulation

The regulations related to the drainage work have been prepared to maintain the drainage canal. There is the regulation to prohibit the dumping of the waste and garbage into the drainage canals, however it is not so effective because of the poor waste disposal system in the Study area. The regulation to prohibit the construction of the houses and other structures on the inspection yard or slope of the drainage canal had not been effective. As for the water quality control there is no regulation to control the water quality of the waste water of the residentials as well as the factories.

According to the Department of Communication, Transportation and Construction, Municipality of Vientiane about 30% of total lateral canal in the Study area was cleaned in their ditches by volunteers of the inhabitants per one year. However, these utilization of the volunteers in the maintenance work of the drainage canal is insufficient due to luck of the propagation.

K.2.4 Monitoring and Data Management

The detail historical data on hydrology, meteorology, topography, flood, inundation and socio-economy in the Study area have not been collected and compiled by the Department of Communication, Transportation and Construction, Municipality of Vientiane. Part of the data are available by collecting from various organizations. For example, the records of the rainfall gage at the main canals to be the basic data for the monitoring the condition of the canals are collected by the Ministry of Agriculture and Forest while there is no systematic access to that data in the Department of Communication, Transportation and Construction, Municipality of Vientiane. The data collection covering all over the drainage system both inside and outside of the Study area are not conducted.

K.3 Identification of the Existing Constraints

The present conditions of the institution and organization for the drainage work are discussed in the above section and the existing institutional and organizational constraints of the drainage work are examined. According to the existing conditions, the following constraints are identified.

K.3.1 Luck of Budget, Stuff and Equipment

The luck of budget is identified as the major constraint to carry out smooth implementation of the drainage work on the basis of the proposed plan. The luck of the stuff to be engaged in the drainage work in quantity as well as in quality are also the serious problems. Besides, the equipments available for the drainage work are not enough for implementation of the proposed improvement work.

K.3.2 Luck of the Inter-organizational Coordination

There are various organization related to the drainage work. However, the communication between these organization is not enough so that some troubles due to the luck of communication occur. The gate at the outlet of Hong Ke canal to That Luang Marsh is usually operated by the farmers under the control of the Department of Agriculture, Forest, Irrigation and Agricultural Cooperative, Municipality of Vientiane. However, there are some inadequate operations for the drainage side, because the farmer is apt to close the gate to keep high water level at the outlet of Hong Ke for their fishing in the rainy season. This problem is caused by the luck of the coordination between the Department of Agriculture, Forest, Irrigation and Agricultural Cooperative and the Department of Communication, Transportation and Construction.

K3.3 Luck of Waste Disposal and Sanitary Improvement Work

The waste disposal and sanitary improvement work in the Study area are important aspects for the smooth implementation of the drainage improvement work. The dumping of waste to drainage canal is serious problem from the point of view of environment as well as the operation and

maintenance of the canal. The removal of the waste in the drainage canal has required the huge budget in every year while the dumped waste have effected negatively on the water quality and amenity. The main cause of these illegal dumping of the waste is the poor waste disposal system in the Vientiane.

At present the sanitation system in the Study area depends on the traditional sanitary facilities and there are no regulation of water quality of waste water from the factories. So the disposal water from the residential houses as well as the factories are not treated at present and the negative impacts on the water quality are identified.

K.3.4 Insufficient Utilization of Non-structural Measure

The non-structural measures to implement the drainage work are not utilized sufficiently at present. The arrangement of institution and regulation related to the drainage work is not sufficient and the existing regulations are not effective. The enlightenment of the inhabitants to inform the importance of the drainage work in order to improve their environmental conditions is not carried out. The luck of the propagation of the drainage work causes the insufficient utilization of the volunteers in the maintenance work of the drainage canal.

K3.5 Poor Data Management System

The poor data management system causes to the poor maintenance work by providing inadequate informations. The required data for the preparation of the survey and design of the drainage system are not available due to the luck of the basic data, such as, hydrologic, meteorologic, topographic and other engineering data. Besides, the socio-economic data, such as, land use, population, production and property to be required for preparation of long-term planning are not available.

K.4 Recommendation

The following reinforcements of institution and organization are recommended on the basis of above analysis.

(1) Reinforcement of the Responsible Organization

The required budget, stuff and equipment according to the proposed long-term basic plan should be prepared for the reinforcement of the Department of Communication, Transportation and Construction, Municipality of Vientiane. The required stuff for the operation and maintenance of the basic plan is shown in Table K.6 and required budget and equipment for the overall implementation of the Basic Plan are discussed in Appendix H.

(2) Establishment of the Inter-organization Coordination

The inter-organization coordination among the related organizations for the drainage work should be established to clarify the demarcation of the responsibility of each organization in overall drainage work and to strengthen the relation among the organizations.

(3) Improvement of the Waste Disposal and Sanitation System

The improvement of the waste disposal and sanitation system should be carried out accompanied with the drainage improvement work in order to ensure of sufficient effects of the proposed drainage work.

(4) Utilization of Non-structural Measure

The non-structural measures to implement the drainage work should be utilized including of the arrangement of institution and regulation related to the drainage work, the enlightenment of the inhabitants to inform the importance of the drainage work and the attendance of inhabitants as the volunteers in the maintenance work of the drainage canal.

(5) Establishment of Data Management System and Monitoring System

The data management system and monitoring system on various aspects including water quality, other environment conditions, hydrology, meteorology, topography, socio-economy to be required for the planning, study, implementation, operation and maintenance of the drainage system.

TABLES

Table K.1 Competent Organization for the Drainage Work

Authority Bureau State Enterprise State Company and Agricultural In MOV Trainings Canal Bridge A Road Survey & Design of Bridge Front Cooperative, MOV Agricultural In MOV Agricultural In MOV Agricultural In MOV State S	Compe	Pent	Department of Communication, Transportation and Construction of MOV	munication, Tran	sportation and Co.	nstruction of M	٥٨	Department	District office	Ministry
P, F S, C, O&M, T C P, F, S C, O&M, T C P, F, S, C O&M, T P, F, S, C	Autho Work item			itate Enterprise of Bridge & Road	State Enterprise of Rural Road & Bridge		Sanitation State Company	of Agriculture, Forest, Irrigation and Agricultural Cooperative, MOV	of the districts in MOV	of Agricultural Service
Careal P, F, S C, O&M, T C Gate P, F, S C, O&M, T C Data Management (Rainfall gage) P, F, S C, O&M, T C, O&M, T Intigation (ringation drainage P, F, S, C, T O&M, T Canal/Pump Canal/Pump P, F, S, C, T O&M, T Rate Disposal P, F, S, C, T O&M, T Sanitation P, F, S, C, M, T F	Drainage								:	
Gate P, F, S C, O&M, T P, F, S, C COM, T P, F, S, C COM, T COM, T P, F, S, C T O&M, T P, F, S, C, T O&M, T P, F, S, C, T O&M, T P P, F, S, C, T O&M, T P F SAMI, T P F SAMI, T F P F SAMI, T F P F SAMI, T F	Canal	e. ir	S, C, O&M, T	O						:
Data Management (Rainfall gage) (Rainfall gag	Gate	a, n,	C, 0&M			ŧ.				
load and Bridge P, F S C, O&M, T C, O&M, T Dike (Mekong) Pire (Mekong) P, F, S, C O&M, T Canal/Pump Cate P, F, S, C P, F, S, C, T O&M, T Gate Pringation drainage P, F, S, C, T O&M, T F Sanitation Sanitation O&M, T F		¥ ^	14.							P, F, S, C O&M, T
Irrigation Canal/Pump Canal/Pump Gate Irrigation drainage Irrigation drainage P, F, S, C O&M, T P, F, S, C O&M, T F Sanitation O&M T O&M T P, F, S, C O&M T F F Sanitation	Road and Bridge	u.	v)	C, O&W, T	С, О&М, Т					
Canal/Pump Canal/Pump Cate Gate Irrigation drainage Irrigation drainage P, F, S, C, T O&M P, F, S, C, T O&M Aste Disposal P, F, S, C O&M, T F Sanitation O&M O&M	Dike (Mekong)									φ, π, ο,
Canal/Pump Gate Irrigation drainage. P, F, S, C, T O&M P, F, S, C, M P, F, S, O&M, T F Sanitation O&M	Irrigation									O&M, T
Gate Irrigation drainage P, F, S, C, T O&M P, F, S, C, M, T F Sanitation O&M								Р, F, S, C О&М, Т		ກ. ດຸ ເ
Pr.F.S.C O&M., T Vaste Disposal P.F.S.O&M., T								P, S, C, T	O&M	P, F, S, C, T
Waste Disposal P, F S, O&M, T Sanitation		ම විස						ે કે લુ છે. મેં ક્રેજી		
	Waste Disposal					u. a.	S, O&M, T	:	lt.	
	Sanitation						MPO			

Note: P. Planning, S. Study, C. Construction, O&M. Operation and Maintenance, T. Stuff training, F. Finance Source: Department of Communication, Transportation and Construction of MOV

Table K.2 Number of Stuff by Bureau and State Company

	List of Bureau and State Company	Stuff	Remarks
.1	Bureau of Planning, Statistic and Finance	7	4.
2	Bureau of Administration and Establishment	1:3	
3	Bureau of Bridge and Road	3	
4	Bureau of Housing and Urban	. 5	
5	Bureau of Transportation	4	•
6	Bureau of Environmental Protection	8	
7	Bureau of Cetion Equipment	2 4	
8	Technical School	1.5	51 students
9	State Enterprise of Bridge and Road	n.a.	
10	State Enterprise of Rural Road and Bridge	n.a.	e de la companya del companya de la companya del companya de la co
. 11	State Enterprise of Design and Survey	7 1	
12	State Company of Transport	n.a.	
13	State Bus Company	9 1	
14	Lao Shipper Company	n.a.	
15	State Enterprise of Vientiane Construction	117	
16	Decoration and Construction State Company	n.a.	
17	International Construction State Company	n.a.	
18	State Enterprise of Design Municipality Housing	n,a.	
19	Sanitation State Company	5 6	
2 0	Workshop of Light Equipment	n.a.	
2 1	Workshop of Heavy Equipment	n.a.	
2 2	Factory of Brick and Tile	125	
2 3	Factory of Mable	n.a.	
2 4	Draw and Decoration State Company	9	

Source: Department of Communication, Transportation and Construction

Municipality of Vientiane

n.a.: not available

Table K.3 List of Equipment for Drainage Work

	Designation	Athen to = =	3.5		1st Service	Wear
	Designation	Number	Manufacturer	H.P.	Year	%
	Heavy Equipment			•		
	Heavy Edupment					
1	Bulldozer		SSSR	160	1986	3 0
2	Motor Crader	1.	SSSR	100	1986	3.5
3	Whell Loader	1	SSSR, Maz		1980	10
4	Whell Loader	1	Kawasaki	8 0	1982	5 5
5	Hydrolic Excavator	1	SSSR	8.0	1982	1 0
6	Makadam Roller	1	Sakai	7.5		5.5
Ü	Mukadam Konor		Jakai	13	1902	3 3
	Transport Vehicles					
		·				
7	Dump Truck	2	Zil, SSSR	90	1986	4 4
8	Dump Truck	3	Zil, SSSR	90	1985	5 (
9	Dump Truck	1	Zil, SSSR	90	1985	5.5
10	Dump Truck	2	Maz, SSSR	125	1987	1 (
1 1	Water Tanker	1	Zil, SSSR		1985	4.5
12	Cargo Truck	2	KAZ 52		1980	5 5
13	Maintenance Truck	. 1	-		1982	5 (
1 4	Pick Up	1	Toyata	•	1987	1 0
	Miscellaneous					
15	Truck Crane	1	Maz, SSSR	15	1987	1 (

Source: Department of Communication, Transportation and Construction

Municipality of Vientiane

Table K.4 Annual Budget, 1978 - 1990

Unit: Kip

**************************************	Budget Execution	Year .
••	2,100,000	1978
	1,600,000	1979
	5,000,000	1980
	4,000,000	1981
	13,000,000	1982
	24,000,000	1983
	35,500,000	1984
	70,000,000	1985
	110,000,000	1986
	140,000,000	1987
	160,000,000	1988
4	200,000,000	1989
	210,000,000	1990

Source: Department of Communication, Transportation and Construction, Municipality of Vientiane

Table K.5 Distribution of Budget in 1989

No.	Description of Projects	Budget (kip)
1	Construction of canal along Louang Prabang Road	73,000,000
2	Bitumen Access Roads	28,000,000
3	Expenditure for debt of the year of 1988	32,000,000
4 % ₁₂ 8	Bitumen Roads shouldersonly left side (That Khao - Chinaimo)	4,000,000
5	Excavation Route Khokhe - Phaya Lat	5 202 222
	Kaolieo - Nam tone	5,000,000
6	Reconstruction and repair road bitumed Ho Kham -km 6 Roads in municipality	2,000,000 2,000,000
7	Repair access road into Nam Kieng - Naxab	3,000,000
8	Bank protection, 100m	4,000,000
9	Improvement of the drainage system	25,400,000
10	Hydrographic and hydrologic survey	5,600,000
1 1	Continue work shop's construction of heavy equipments	5,000,000
12	Construction of mable factory	10,000,000
	Total amount of budget in 1989	200,000,000

Source: Department of Communication, Transportation and Construction Municipality of Vientiane

Table K.6 Requird Staff and Labour of Operation and Maintenance

Unit M/M	Q'ty
M/M	
1417.141	1 2
M/M	3 0
M/M	70
M/M	3 0
M/M	60
M/M	4 0
M/day	310
M/day	310
M/day	310
M/day	270
M/day	270
M/day	310
M/day	520
M/day	1,650
	M/M M/M M/M M/M M/M M/day M/day M/day M/day M/day M/day M/day

FIGURES

