APPENDIX

APPENDIX A.

WATER DEMAND FORECAST FOR PREAH SIHANOUK AND KAMPOT

APPENDIX A: WATER DEMAND FORECAST FOR PREAH SIHANOUK AND KAMPOT

A.1. Preah Sihanouk

A.1.1 Population forecast

Preah Sihanouk is experiencing rapid growth. The population has grown from 66,723 in 1998 to 89,846 in 2008, an increase of 3% percent per annum. Future growth will occur mainly to the southeast side of Preah Sihanouk, along NR4 and on remaining undeveloped land throughout Preah Sihanouk. This study estimates that the urban population will be 169,696 by the year 2030. Population history and projections for Preah Sihanouk are shown in Table A.1.1

Table A.1.1 Population History and Projections

Year	Urban Population
1998	66,723 a
2008	89,846 a
2020	128,592 b
2030	169,696 b

Source: (a) NIS Census Data/ (b) JICA study team projections, October 2009

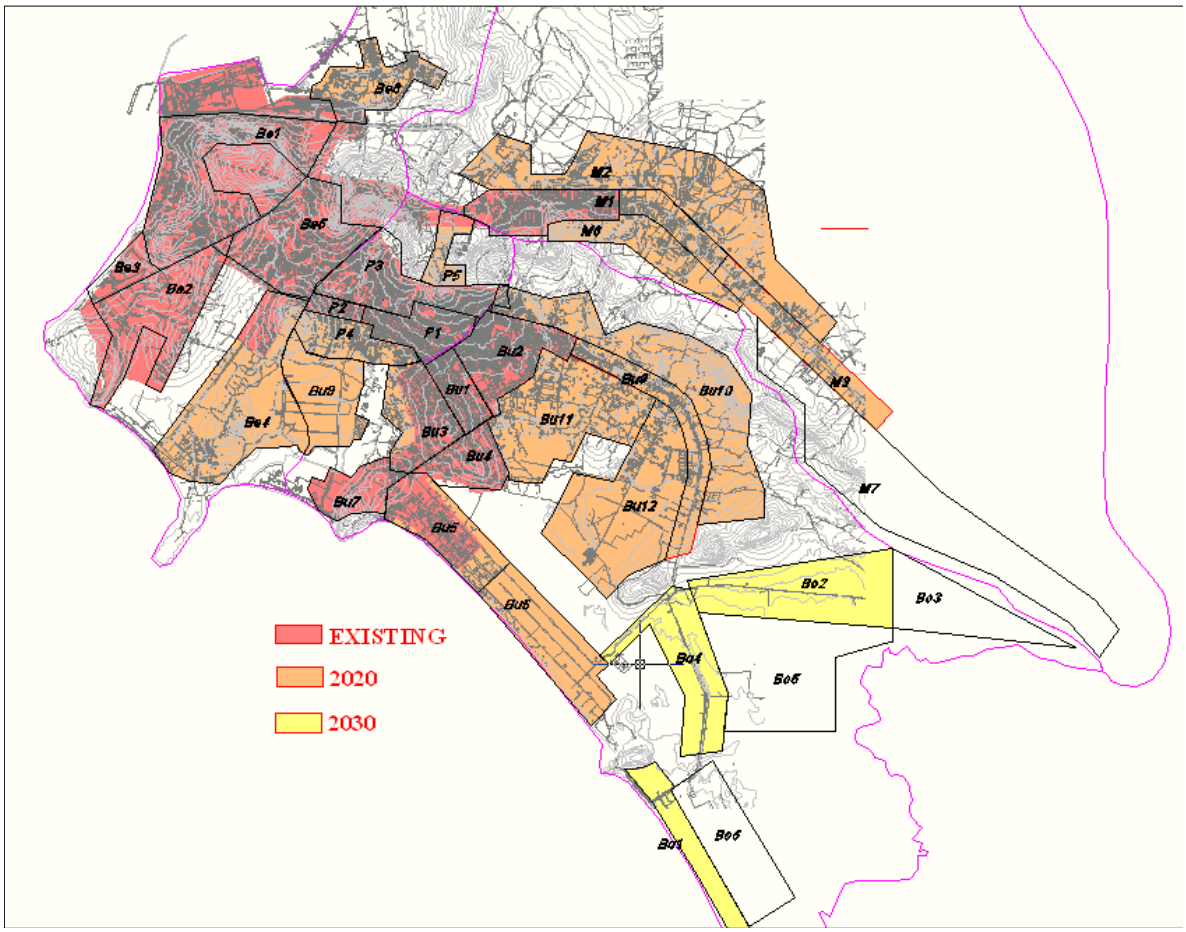
A.1.2 Population served by the water supply system

The RGC's millennium goal is to provide service to 80% of the urban population by the year 2015. This goal is considered unachievable in Preah Sihanouk because there isn't enough time to implement the infrastructure required. This planning study will assume a more realistic implementation scenario whereby service coverage will increase gradually to 80% by the year 2030.

It is also assumed that services will only be extended into areas where population densities are high enough to justify the capital expenditure; typically this is 60-70 persons per hectare. A discussion of urban population distribution and planned densities is presented elsewhere in the urban master plan.

The future service area will be extended into growth areas adjacent to the existing core of the city which are already served and along NR4 to the East. The extent of the future water supply system and population is shown in Figure A.1.1.

Urban areas that will be serviced by the future water supply system are identified in Table A.1.2.



Source: JICA Study Team

Figure A.1.1 Water Supply Service Area

Table A.1.2 Urban Population in the Water Supply Service Area

Population zone ID	Habitable area (ha)	2020	2030
		Pop.	Pop.
Sangkat Pir		15,295	16,520
P1	39	5,460	5,850
P2	10	900	1,000
P3	71	5,325	5,680
P4	38	2,850	3,040
P5	19	760	950
Sangkat Bei		32,870	46,900
Be1	140	9,800	11,200
Be2	91	3,640	7,280
Be3	15	1,500	3,000
Be4	150	6,000	12,000
Be5	96	6,720	7,680
Be6	53	3,710	4,240
Be7	10	1,500	1,500
Sangkat Buon		43,990	64,980
Bu1 -Ochheuteal	26	3,510	3,900
Bu2 -Ochheuteal	61	6,710	7,320
Bu3 -Ochheuteal	55	4,950	6,600
Bu4 -Ochheuteal	36	2,520	2,880
Bu5 -Ochheuteal	64	3,840	5,120
Bu6 -Ochheuteal	78	3,120	4,680
Bu7 -Ochheuteal	35	1,400	2,100
Bu8 -Ochheuteal	61	4,880	4,880
Bu9 -Ochheuteal	56	4,480	4,480
Bu10 -Ochheuteal	152	6,080	9,120
Bu11 -Ochheuteal	123	*2,460**	3,690
Bu12 -Ochheuteal	147	*2,940**	4,410
Bo1 -Otres	71	1,420	2,840
Bo2 -Otres	108	1,080	2,160
Bo4 -Otres	80	*400**	800
Sangkat Muoy		13,840	17,870
M1	86	5,590	6,880
M2	185	5,550	5,550
M3	54	2,700	3,240
M6	55	*1650**	2,200
Total urban population within the proposed water supply service area		105,995	146,270

Note: * indicates areas that are not included in the total for 2020 because will not be serviced until later stages of development.
Source: JICA Study Team

Growth areas Bo3, Bo5, Bo6 and M7 (identified in Figure A.1.1) have not been included in the water supply improvement plan because population densities will likely remain too low until 2030. It is

reasonable to assume that these areas can be serviced in the long-term future by a separate distribution scheme supplied by gravity from the proposed water balancing tank at NR4. Service populations and coverage ratios used to develop water demands in this study are defined as shown in Table A.1.3.

Table A.1.3 Water Supply Target Service Connection Rates

	2008	2020	2030
Population in the service area	67,800	105,995 [1]	146,270
Service connection ratio	0.35	0.65	0.80
Population served	23,450	68,897	117,016

Note: Does not include Bu11, Bu12, Bo4 and M6 which will be serviced after 2020.
Source: JICA Study Team

Population served by Sangkat is presented in Table A.1.4 based on an estimate of existing service connection ratios and a probable evolution to target connection ratios.

Table A.1.4 Water Supply Population Served

Target connection ratio per Sangkat	**2010 Estimated**	**2020**	**2030**
Sankat Muoy	0.15	0.45	0.80
Sankat Pir	0.60	0.80	0.85
Sankat Bei	0.30	0.70	0.80
Sankat Buon - Ochheuteal	0.32	0.65	0.80
Sankat Buon - Otres	-	0.20	0.66
Target service population	2010	2020	2030
Sankat Muoy	1,721	6,184	14,296
Sankat Pir	8,034	12,236	14,042
Sankat Bei	5,165	23,009	37,520
Sankat Buon - Ochheuteal	8,531	26,969	47,344
Sankat Buon - Otres	-	500	3,814
Total Population served	23,450	68,897	117,016

Source: JICA Study Team

A1.3 Historical Water Use

Table A.1.5 summarizes yearly population and water use data for Preah Sihanouk for the period 1999-2008.

Table A.1.5 Historical Water Use

Year	Population	Water Use (m^3 / year)	Cambrew (m^3 /year)	[1]Per-Capita Use (lpcd)
1999	7,350	504,091	158,014	129
2000	7,805	611,193	195,430	146
2001	8,736	646,281	204,889	138
2002	9,128	580,474	112,636	140
2003	9,226	621,281	150,521	140
2004	19,068	992,609	183,083	116
2005	19,579	916,255	152,304	107
2006	20,468	1,074,707	203,637	117
2007	21,700	1,251,340	213,859	131
2008	23,450	1,504,036	324,290	138

Source: JICA Study Team

Per capita use includes large commercial industrial consumers such as the port authority, textile factories and large hotels

Removing other large consumers the current domestic per capita water consumption including commercial and institutional demand is estimated at 122 liter/capita/day. There could be a high degree of uncertainty in estimating the per capita demand based on metered consumption because demand is suppressed by restricted water resources during the dry season and distribution system constraints.

Table A.1.6 shows how water use in Preah Sihanouk compares to other cities in the Southeast Asian region.

Table A.1.6 Domestic Water Use Comparison

Area	Water Use (lpcd)
Kampot	121
Vung Tau, Vietnam	138
Hai Phong, Vietnam	99
Cebu, Philippines	98
Sarawak, Philippines	123

Source: South East Asian Water Utilities Network Data Book 2005

Domestic water use per capita in Preah Sihanouk is similar to that found in other coastal towns in Southeast Asia therefore appears to be reasonable.

Domestic per capita water demands used for planning in this study are indicated in Table A.1.7.

Table A.1.7 Domestic Water Demand

Year	Domestic Consumption (liter per person per day)
2020	140
2030	150

Source: JICA Study Team

These values are the same as those adopted for planning by the water supply authority in Preah Sihanouk and are consistent with unit water consumption values adopted for planning in Phnom Penh, in Vietnam and other Southeast Asian countries.

Per capita domestic consumption is assumed to increase over time to reflect an improved living standard and improved service levels.

A.1.4 Commercial and Institutional Water Consumption

Commercial consumers including hotels and guesthouses meet their water demands by supplementing water from SWSA with groundwater from their own wells. it is not possible to determine exactly the amount of water used by these consumers without a detailed inventory and survey of existing hotels.

Projections carried out by this study indicate that there will be a significant increase in tourism activity in Preah Sihanouk. This study adds 25% to the domestic demand as an allowance for future commercial and institutional demand.

The water supply authority indicates that the Sokha Hotel complex is a large consumer and will increase its consumption in the near future as it completes an expansion of their guest facilities. This study adopts the water demand estimates proposed by the water supply authority for the Sokha Hotel as indicated in Table A.1.8

TableA.1.8 Sokha Hotel Complex Water Consumption

	2008	2020	2030
Demand in m^3/day	173	500	650

Source: Sokha Hotel

A.1.5 Industrial demand

Industrial activity in Preah Sihanouk is limited to Cambrew and a few small textile and garment manufacturers.

(1) Cambrew

Cambrew is the largest single consumer in Preah Sihanouk. Cambrew manufactures “Angkor” brand beers as well as soft drinks “Pepsi” and “7-up”. Cambrew has steadily increased its market share and the demand at present is on average 1800 m^3/day. Cambrew is at present obtaining 50% of its water supply from SWSA. The balance is obtained from a separate treated water pipeline from the Kbal Chay water supply scheme.

(2) Port SEZ

A Special Economic Zone (SEZ) is being constructed next to Preah Sihanouk port. The forecast demand is 2000 m^3/day by 2020. A total of 4 wells with a yield of 500 m^3/day have been drilled to supply the SFPZ in the short-term until the city’s water supply network can be extended.

(3) Other factories

This study does not foresee the development of any large industries within the urban area that would impose a unusual demand on water supply. Most of the industrial activity will occur in the special economic zones that are being developed outside of Preah Sihanouk. However this study makes an allowance of 150 m^3/day in the demand forecast for smaller factories that may choose to locate outside the special economic zones. This number is the same as that proposed by the water supply authority.

A.1.6 Unaccounted for Water

Unaccounted for water (UFW) represents the difference between "net production" (volume of water delivered into a network) and "consumption" (the volume of water that can be accounted for by legitimate consumption, whether metered or not). UFW falls into two categories:

(i) Non physical Loss which is water consumed but not recorded by the consumer's meters or otherwise accounted for by government or other public use. It is reflected as a loss of revenue. It includes water consumed through illegal connections.

(ii) Physical loss which is water lost through leakage

The current (2008) figure for UFW in Preah Sihanouk is 15.6% which is low relative to the average value of 28% reported in a survey of 40 utilities in Southeast Asia (SEAWUN 2005). It is assumed that most of the UFW is due to leakage caused by high pressures in the system. The percentage of UFW water is expected to remain low because most of the piping is relatively new. This study assumes a typical planning value of 20%.

A.1.7 Peaking Factors

Water use varies with the time of year and the time of day. To account for these variations, peaking factors are commonly used in evaluating water system operating characteristics. Peaking factors are multipliers that are applied to the average day demand to approximate other peak water demands. Peaking factors are often estimated because of the lack of detailed water use data. Peak water demands and associated peaking factors that are important in evaluating water system performance are discussed below.

The average day demand (ADD) is the total volume of water used during a year divided by 365 days, usually expressed in terms of cubic meters per day (m^3/day). In order to estimate future demands based on population growth, ADD is also expressed in terms of liters per capita per day (lpcd). Peaking factors are applied to the ADD to estimate the other peak demands.

The maximum day demand (MDD) is the highest daily water use rate during the year. The MDD peaking factor is the ratio of MDD to ADD and normally occurs during the dry season. Records maintained by the Preah Sihanouk water supply authority indicate a MDD factor of 1.25.

The peak hour flow (PHF) is the highest hourly water use rate during the day. The hourly peaking factor is the ratio of PHF to ADD. This factor is usually estimated based on engineering judgment, since it is difficult to determine the actual maximum hour demand in the system. The water supply authority in Preah Sihanouk and Phnom Penh have adopted a MHD peaking factor of 1.8 and this is considered appropriate for planning purposes.

A.1.8 Water Demands for Existing and future conditions

For the purposes this study, water demands for the existing and future conditions are defined as shown in Table A.1.9.

Table A.1.9 Water demands for existing and future conditions

Parameter	Units	2008	2020	2030
Population		23,450	68,897	117,016
Domestic Demand	lpcd	122	140	150
	m^3/day	2,858	9,646	17,552
	m^3/hour	119	402	731
Tourism/commercial demand	multiplier	0.25	0.25	0.25
	m^3/day	Included in domestic demand-	2,411	4,388
	m^3/hour		100	183
Large consumers	m^3/day	1,263	3,450	4,600
	m^3/hour	53	144	192
Leakage	ratio	16%	20%	20%
	m^3/day	643	3,101	5,308
	m^3/hour	27	129	221
Average Day Demand	m^3/day	4,763	18,608	31,849
	m^3/hour	198	775	1,327
Maximum Day Demand	multiplier	1.25	1.25	1.25
	m^3/day	6,812	23,260	39,811
	m^3/hour	284	969	1,659
Maximum Hour Demand	multiplier	1.8	1.8	1.8
	m^3/hour	12,261	41,869	71,659
	liter/sec	511	1,745	2,986
Total Annual Demand	million m^3	1.74	6.79	11.62

Source: JICA Study Team

A.2 Kampot

A.2.1 Population forecast

The urban population in Kampot province is growing at a relatively slow pace. The urban population has grown from 45,240 in 1998 to 48,310 in 2008, an increase of 0.7% percent per annum. Future growth is expected to be stronger and will occur mainly to the East along NR3 and North of the urban center. This study estimates that the urban population will be 57,200 by the year 2030. Population history and projections for Kampot are shown in Table A.2.1.

Table A.2.1 Population History and Projections

Year	Urban Population
1998	45,240 [a]
2008	48,310 [a]/ 32,300 [b]
2020	43,700 [b]
2030	57,200 [b]

Source: (a) NIS Census Data/ (b) JICA study team projections, October 2009

A.2.2 Population served by the water supply system

The water supply system serves 57% of the urban population (2008).

The GOC's millennium goal is to provide service to 80% of the urban population by the year 2015. This goal is considered unachievable in Kampot because there isn't enough time to implement the infrastructure required. This planning study will assume a more realistic implementation scenario whereby service coverage will increase gradually to 80% by the year 2030.

It is also assumed that services will only be extended into areas where population densities are high enough to justify the capital expenditure; typically thi sis 60-70 persons per hectare. A discussion of urban population distribution and planned densities is presented elsewhere in the urban master plan.

The future service area will be extended into growth areas adjacent to the existing core of the city which is already serviced and along NR3 to the East and West. The extent of the future water supply system and population is shown in Figure A.2.1.

Urban areas that will be serviced by the future water supply system are identified in Table A.2.2

Table A.2.2 Urban population in the Water Supply Service Area

Commune	Service area	Area (ha)	Population		
			2008	2020	2030
Chum Kriel	Existing	27.5	500	1000	2000
Krang Ampil	Existing	100.8	4600	4800	5000
Krang Ampil	Future	147		1100	2000
Kampong Bay	Existing	93.3	6500	6700	6900
Kampong Bay	Future	71.8		1500	2900
Kampong Kandal	Existing	143	8200	9800	12400
Kampong Kandal	Future	34.5		2000	4000
Kampong Kraeh	Future	144			4,455
Subtotal district no.1			19800	26900	39655
Andoung Khmer	Existing	67	11000	13800	16400
Andoung Khmer	Future 2020	88.3		3000	
Andoung Khmer	Future 2030	210.2			5500
Trey Koh	Future 2020	65.3		1500	
Trey Koh	Future 2030	144.6			3000
Subtotal district no.2	11000	18300	24900		
Total	30800	45200	64555		

Source: JICA Study Team

Service coverage ratios in this study are defined as shown in Table A.2.3.

Table A.2.3 Water Supply Target Service Connection Rates

	2008	2020	2030
Population in the urban area	30,800	45200	64555
Service connection ratio	0.60	0.68	0.80
Population served	18,382	30,970	51,644

Source: JICA Study Team

Population served by Sangkat is presented in Table A.2.4 based on an estimate of existing service connection ratios and a probable evolution to target connection ratios.

Table A.2.4 Water Supply Target Population Served

Target Connection ratio per Sangkat	2010 estimated	2020	2030
Chum Kriel	-	0.65	0.80
Krang Ampil	0.63	0.80	0.80
Kampong Bay	0.73	0.80	0.80
Kampong Kandal	0.76	0.80	0.80
Kampong Kreah		-	0.80
Andoung Khmer	0.36	0.50	0.80

Trey Koh	-	0.80	0.80
Target Service Population	2008	2020	2030
Chum Kriel		650	1,600
Krang Ampil	2,910	4,720	5,600
Kampong Bay	4,742	6,560	7,840
Kampong Kandal	6,618	9,440	13,120
Kampong Kreah		-	3,564
Andoung Khmer	4,110	8,400	17,520
Trey Koh		1,200	2,400
Total	18,380	30,970	51,644

The growth areas where the water supply system should be extended in the future are shown in Figure A.2.1.

A.2.3 Historical Water Use

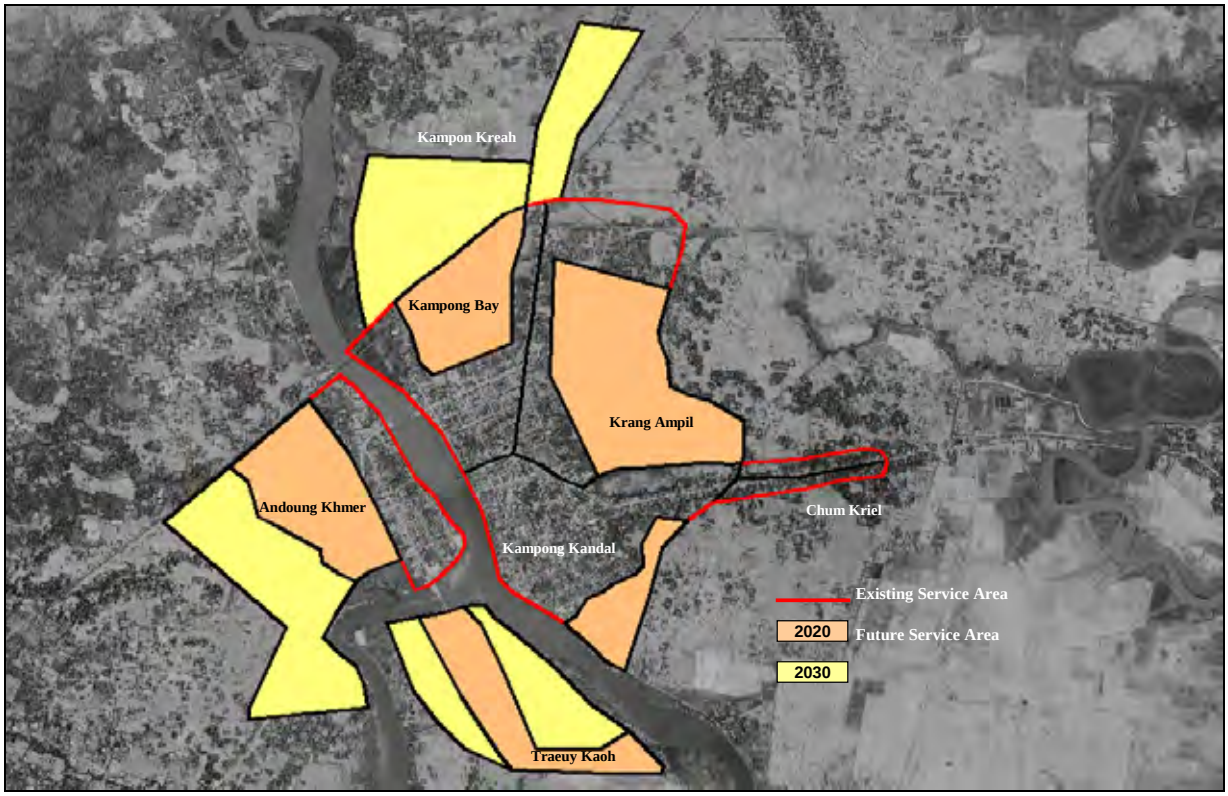
Table A.2.5 summarizes yearly population and water use data for Kampot for the period 2007-2008.

Table A.2.5 Historical water use

Year	Population	Water Use (m^3 / year)	Cambrew (m^3 /year)	[1]Per-Capita Use (lpcd)
2007	13,000	831,088	175	2007
2008	18,382	815,099	121	2008

Source: JICA Study Team

Per capita use includes a small percentage of commercial and institutional consumers. There are no industrial consumers. The current average daily consumption per person including commercial and institutional demand is 121 liters/capita/day. There could be a high degree of uncertainty in estimating the per capita demand based on metered consumption because demand is suppressed by restricted water resources during the dry season and distribution system constraints.



Source: JICA Study Team

Figure A.2.1 Water Supply Proposed Network Expansion

Table A.2.6 shows how water use in Kampot compares to other cities in the region.

Table A.2.6 Water Use Comparison

Area	Water Use (lpcd)
Preah Sihanouk	122
Vung Tau, Vietnam	138
Hai Phong, Vietnam	99
Cebu, Philippines	98
Sarawak, Philippines	123

Source: South East Asian Water Utilities Network Data Book 2005

Domestic water use per capita in Kampot is similar to that found in other coastal towns in Southeast Asia therefore appears to be reasonable.

Domestic per capita water demands used for planning in this study are indicated in Table A.2.7:

Table A.2.7 Domestic Water Demand

Year	Domestic Consumption (liter per person per day)
2020	140
2030	150

Source: JICA Study Team

These values are the same as those adopted by the water supply authority in Kampot and are consistent with unit water consumption values adopted for planning in Vietnam and other Southeast Asian countries.

Per capita consumption is assumed to increase over time to reflect an improved living standard and improved service levels.

A.2.4 Commercial and Institutional Water Consumption

There is at present no single large consumer of water and the water supply estimates that the commercial/institutional demand is quite small. The tourism industry consists of a few small guesthouses scattered throughout the urban area. The town has a strong tourism potential with a good selection of local attractions but will never be a resort destination. This study adds a moderate factor of 15% to the domestic demand as an allowance for future increases in the commercial and institutional demand.

A.2.5 Industrial demand

There is no industrial demand and this study does not foresee the development of any large industries within the urban area that would impose a unusual demand on water supply.

A.2.6 Unaccounted for Water

Unaccounted for water (UFW) represents the difference between "net production" (volume of water delivered into a network) and "consumption" (the volume of water that can be accounted for by legitimate consumption, whether metered or not). UFW falls into two categories:

i. Non physical Loss which is water consumed but not recorded by the consumer's meters or otherwise accounted for by government or other public use. It is reflected as a loss of revenue. It includes water consumed through illegal connections.

ii. Physical loss which is water lost through leakage

The current (2008) figure for UFW in Kampot is 31% which is normal relative to the average value of 28% reported in a survey of 40 utilities in Southeast Asia (SEAWUN 2005). It is assumed that most of the UFW is due to leakage in the old asbestos cement pipes. The percentage of UFW water is expected to decrease when the old pipes are replaced. This study assumes a typical planning value of 20%.

A.2.7 Peaking Factors

Water use varies with the time of year and the time of day. To account for these variations, peaking factors are commonly used in evaluating water system operating characteristics. Peaking factors are multipliers that are applied to the average day demand to approximate other peak water demands. Peaking factors are often estimated because of the lack of detailed water use data. Peak water demands and associated peaking factors that are important in evaluating water system performance are discussed below.

The average day demand (ADD) is the total volume of water used during a year divided by 365 days, usually expressed in terms of cubic meters per day (m^3/day). In order to estimate future demands based on population growth, ADD is also expressed in terms of liters per capita per day (lpcd). Peaking factors are applied to the ADD to estimate the other peak demands.

The maximum day demand (MDD) is the highest daily water use rate during the year. The MDD peaking factor is the ratio of MDD to ADD and normally occurs during the dry season. Records maintained by the Preah Sihanouk water supply authority indicate a MDD factor of 1.25.

The peak hour flow (PHF) is the highest hourly water use rate during the day. The hourly peaking factor is the ratio of PHF to ADD. This factor is usually estimated based on engineering judgment, since it is difficult to determine the actual maximum hour demand in the system. The water supply authority in Kampot and Phnom Penh have adopted a MHD peaking factor of 1.8 and this is considered appropriate for planning purposes..

A.2.8 Water Demands for Existing and future conditions

For the purposes this study, water demands for the existing and future conditions are defined as shown in Table A.2.8.

Table A.2.8 Water demands for existing and future conditions

Parameter	Units	2008	2020	2030
Population		18,382	30,970	51,644
Domestic Demand	lpcd	121	140	150
	m^3/day	2,224	4,336	7,747
	m^3/hour	93	181	323
Tourism/commercial demand	multiplier	0.15	0.15	0.15
	m^3/day	Included in domestic demand-	650	1,162
	m^3/hour		27	48
Leakage	ratio	31%	20%	20%
	m^3/day	684	997	1,782
	m^3/hour	29	42	74
Average Day Demand	m^3/day	3,213	5,983	10,690
	m^3/hour	134	249	445
Maximum Day Demand	multiplier	1.25	1.25	1.25
	m^3/day	4,404	7,479	13,363
	m^3/hour	184	312	557
Maximum Hour Demand	multiplier	1.80	1.80	1.80
	m^3/hour	330	561	1,002
	liter/sec	92	156	278
Total Annual Demand	million m^3	1.2	2.3	4.1

Source: JICA Study Team

APPENDIX B.

PROPOSED ONE COMMUNITY, ONE PRODUCT (OCOP) DEVELOPMENT STRATEGY

APPENDIX B: PROPOSED ONE COMMUNITY, ONE PRODUCT (OCOP) DEVELOPMENT STRATEGY

B.1 Proposed OCOP Development Strategy

The One Village, One Product (OVOP) movement will focus mainly on the poor in rural areas, and income and employment opportunity would be increased by creation of local products and services on a value-added basis. The OVOP concept is applied to the development strategy for the revitalization of rural and community economy, and the demonstrated OCOP project is proposed for Coastal area. Agriculture and fishery sectors will be focused linked with tourism promotion in the project. Micro-financing program is also proposed in the OCOP demonstration project for Coastal area.

Taking into consideration the existing OVOP promotion policy mentioned in 4.1.7 of Book I, the OVOP promotion project in Coastal area is proposed as OCOP project for systematic and continuous integration in terms of knowledge, skill development, business opportunity and problem solving which have been accumulated in the country. New challenge is made, and the major characters and factors in Coastal area are reflected in the OCOP demonstration project. The OCOP demonstration project is implemented based on agriculture and fishery sector in combination with tourism promotion for the period of two years under the PPP mode. Rural Development Bank of Cambodia (RDB) and Chamber of Professional and Micro-Enterprises of Cambodia (CPMEC) will play a central role under the coordination with the OVOP Secretariat in implementing the OCOP demonstration project by providing fund and training & business development services. The University of Agriculture and Fishery Department as the academic and governmental organization will play a supportive role in the OCOP research and development services.

(1) Objective

- To serve and support RGC's OVOP General Secretariat
- To promote community people in Coastal area on knowledge, skill and development capability on folk wisdom products or local properties to meet the customer's needs in Coastal area
- To select the potential products for systematic value-added development in agriculture and fishery sector in combination with tourism promotion in Coastal area
- To participate in technique/skill/technology transfer from experienced OVOP Implemented countries, CPMEC/business partners for better community production activity

(2) Operational Plan

1) Training to provide basic knowledge and continuously promote the product and folk wisdom development commercially: This category is divided into 2 parts.

- To assist creating Community Enterprise as a micro-enterprise in Coastal area with the training topics of interest such as principle of management, basic accounting, principle of marketing, business plan, packaging, basic knowledge of relevant laws and copyrights etc.

- To train in specific knowledge such as tourism management, being community guide, development of new product, quality control, food safety and science, local tourism promotion etc.

2) Organizing Fairs according to timeframe and boundary

- Coastal area fairs which include public relations of services and potential tourism areas, and seminar and training such as packaging, agriculture and fishery processed products, liquor production, herb products etc.
- Demonstration and information activities in the candidate "Road-side Station(s)" where the relevant province(s) select for all year round Fairs

3) Product advice and development services by:

- Selection of products, services or potential tourism area to be the pioneer product
- Dispatch of research team for action research by academic institute to assist product and services development
- Academic advice to communities such as product development, marketing, finance and laws etc.
- Conducting research by academic institute to examine and monitor the impacts of the OCOP demonstration project for Coastal area

(3) Implementation Schedule

The implementation schedule is shown as following Table B.1.1.

Table B.1.1 Implementation Schedule of OCOP Development Project

Operation	First Year				Second Year			
	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
1. Training								
-General knowledge	√	√	√	√	√	√	√	√
-Specific knowledge				√		√		√
2. Fairs								
-Coastal area Fairs		√		√		√		√
-Demonstration & Information					√	√	√	√
3. Product Advice & Development								
-Selection of products etc.		√		√				√
-Action research			√	√	√	√	√	√
-Advice to community enterprises					√	√	√	√
-Research					√	√	√	√

Source: JICA Study Team

(4) Implementation Scheme

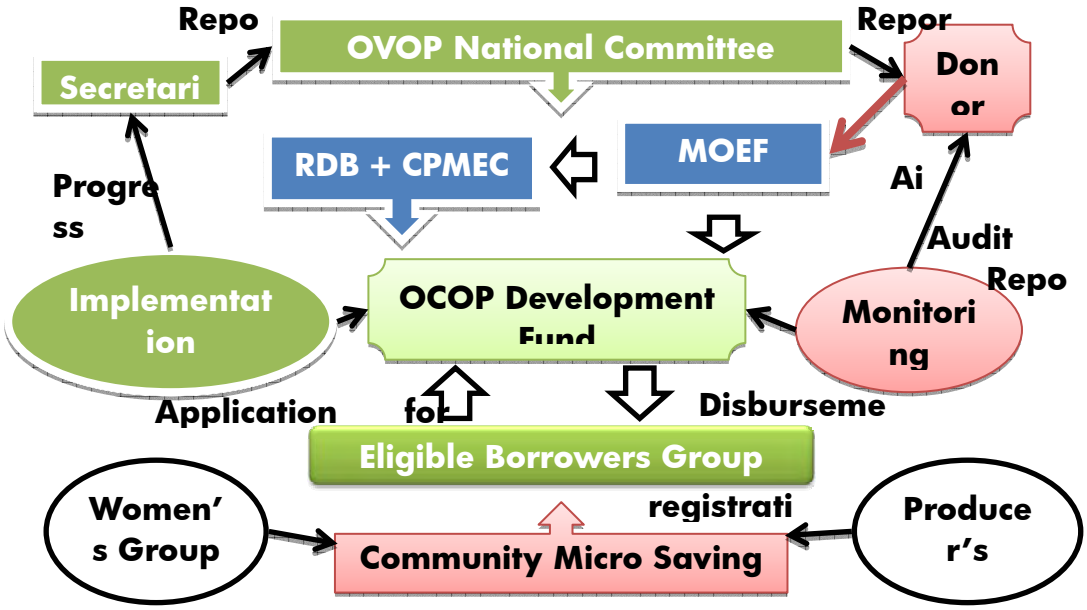
RDB and CPMEC will jointly establish the Implementation Unit for the OCOP demonstration project under the coordination with the OVOP National Committee Secretariat. For the coordinating purpose among relevant agencies, the sub-committee will be organized to monitor the implementation of (1) training plan, (2) Coastal area fairs plan, and (3) product advice and development plan. The implementation unit will make a regular progress report to the OVOP National Committee Secretariat, and outcome of the OCOP will be reported to the OVOP National Committee by the Secretariat from time to time. In case where foreign donor and/or NGO(s) participate in the OCOP demonstration project, the Monitoring Unit shall be established to regularly monitor the progress of the project for

audit purpose, and make the audit report to aid agencies. The necessary budget in implementing the OCOP demonstration project is estimated roughly to be Six hundred thousand (600,000) US dollars.

B.2 Proposed OCOP Micro-financing Development Mechanism

In combination with the proposed OCOP demonstration project for sustainable economic development in Coastal area, micro-financing scheme will play an important role, especially, in the process of formulating community enterprises as micro-enterprises for producing products, services and tourism under the OVOP development concept. The micro-finance development mechanism was discussed with the Micro-finance and SMEs Division (Industrial Promotion Department) of the Ministry of Economy & Finance (MOEF) and RDB to create the OCOP development fund in implementing the OCOP demonstration project.

At community level, the target group will be the poor with priority given to poor women and their groups. Farmers, fishermen and their family members (housewives and unemployed young people) will be the target end-borrowers and beneficiaries of the micro-finance program. At the same time, the proceeds of the loan will be used for income generating activities with a view to creating and promoting community enterprises, and the micro-finance program will focus mainly on group lending with small amount loans and thus a large number of borrowers.



Source: JICA Study Team

Figure B.2.1 Micro-Finance Development Mechanism

Income generating activities will be attained through the OCOP activities, and the detailed criteria will be decided with some flexibility. In the framework of the micro-finance program, micro-saving activities shall be encouraged through self-help groups or community-based organizations which practice compulsory and voluntary saving activities. Taking into account the factors mentioned above, the micro-finance development mechanism is described in Figure B.2.1.

Based on the discussion with the relevant agencies of MOEF, RDB and OVOP National Committee, the OCOP micro-finance development mechanism is proposed together with creation of the OCOP development fund:

(1) Objective

- To enhance financial discipline among community people in Coastal area through the micro-financing scheme
- To improve local productivity and quality of life through the OCOP promotion by creating community enterprises
- To establish local monetary framework for sustainable community economy in Coastal area through the OCOP activities

(2) Eligible End-Borrowers

- Micro-saving groups, self-help groups, or community-based organizations which practice compulsory and voluntary saving activities can be registered as eligible end-borrowers for the OCOP Development Fund in RDB.
- The eligible end-borrowers will have to apply for the CPMEC's training and business development services program which focuses on the general and specific knowledges for the OCOP production activities.
- Consideration will be made by RDB on the assessment of the business plan submitted and the performance evaluation of the CPMEC's training and business development services program in which the eligible end-borrowers participated.

(3) OCOP Development Fund

- The proposed OCOP Development Fund will be maintained and managed with RDB, and on-lending criteria based on the group lending will be decided by RDB.
- The fund will be managed by the Implementation Unit which will be jointly established by RDB, CPMEC and MOEF.
- The fund size will be one million (1,000,000) US dollars which is composed of 60 % for the training and business development services program which is specified as the "OCOP Demonstration Project", and the remaining 40 % for the investment program for micro-financing.

(4) Terms and Conditions of Loans in OCOP Development Fund

- The loan of the fund is for a specific period of repayment including a grace period which is dependent on the business plan appraised, and where both interest and principal are amortized over the loan period.
- The basic interest rate will be 7 % per annum which is adjusted based on RDB's appraisal, and service charge and penalties will be considered.
- The loan amount shall cover less than 80 % of the total cost and expenses necessary in the business plan, and non-eligible list for the loan will be prepared.

(5) Overall Implementation & Guarantee Scheme

- The collateral will be required, however the alternatives of guarantee scheme including group guarantors shall be considered.

- The appropriate fund management shall be done by the Implementation Unit on the basis of preparation of a matrix for the status, classification and corresponding policies on the accounts record of end-borrowers which include writing-off bad debts for the accounts.
- The efficient reporting systems shall be established: Progress report by Implementation Unit to the OVOP National Committee Secretariat, Feedback report for the OVOP development policy by the OVOP National Committee Secretariat, and Audit report by Monitoring Unit which is made by foreign consultant in case where the foreign donor(s) and/or NGOs participate in.

(6) Supporting Scheme

- Training and capacity building program including 3rd country training, such as Bank for Agriculture and Agriculture Cooperatives (BAAC) in Thailand, will be considered, and it should be linked with the OCOP demonstration project.
- "Local-to-Local Collaboration Scheme" will be encouraged to promote Japanese local people's participation in the OCOP demonstration project.
- The following Japanese supportive scheme will be considered.
- Introduction and utilization of Japanese SMEC (small and medium sized enterprise consultant, diagnostician) system in relation to the SMEs promotional framework in Japanese ODA
- Introduction of Japanese "Blue color tax application system" which is applicable to under the current tax framework of Self-assessment regime in Cambodia

B.3 Expected Economic and Social Impacts through the OCOP development

The OCOP development policy will generate positive results in the community economy of Coastal area, and the following positive impacts could be economically and socially estimated in the coastal economy:

- An increase of intermediate demand in the OCOP production process
- Generation of additional income including in the form of wages and salaries
- An increase of local GDP (Coastal area)
- Generation of export opportunities on some products

The impact on rural employment will be particularly significant, and the creation of community enterprises at local economy level is anticipated in the Coastal Area, and some of them will be up-graded to SMEs in the future. Economic and social impacts of the OCOP development policy are generally believed to be a lot greater, in case where due attention is drawn to the OCOP production and marketing process.

In the baseline study of Thailand's One *Tambon* (Village in Thai), One product (OTOP) development policy, where 20 *tambons* were selected randomly, shows positive results on the OTOP activities, although many fundamental problems were identified. Such positive results were summarized as follows;

- All the OTOP production groups have an accumulated history of their production experiences, ranging a few years to over 50 years.
- Some of the groups are shifting to professional full-time production groups, and 2 groups (10%) were already reached to SME level.
- 9 groups (45%) have records of export overseas in the past and currently, while most of the groups are dependent on the government's OTOP fair as their major market channel.

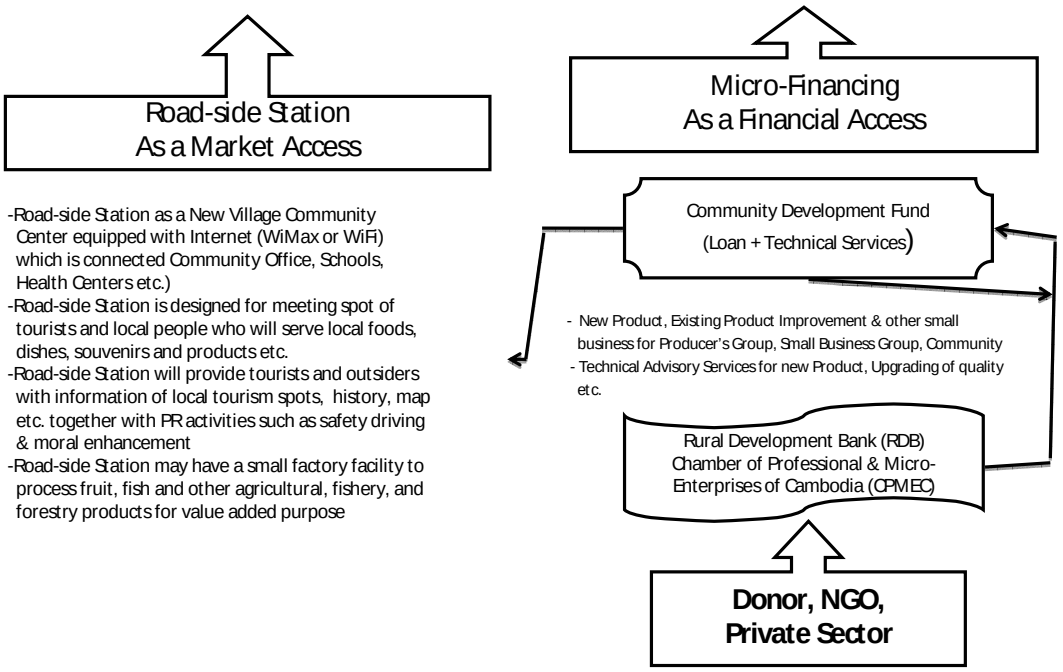
On the other hand the following factors were identified as "basic conditions" for the primary production groups to be developed towards successful community micro-enterprises and SMEs in the baseline study.

- Strongly motivated with a commercially oriented leader with leadership within the group
- Capability of the individuals / groups in jointly producing the OTOP products with the established and consistent quality
- Market-oriented production system and well prepared business plan (no production plan and quality control were not in practice generally)
- Adequate investment plan and financial accessibility to resources (inadequacy of the fund was a major problem)

Due to the long-term nature of the OVOP/OCOP development, the monitoring and evaluation activities are necessary and should focus primarily on the collection and assessment of data and information covering aspects of the OCOP demonstration project outlined by the CIPP (Context, Input, Process and Product) Model. The aim is to use the CIPP for future monitoring, assessment, evaluation and possible adjustment of the existing OVOP/OCOP development policy. As the starting point the related Key Performance Indicators (KPIs) for products, production groups, marketing and macro-impacts should be considered. The monitoring activities are proposed at provincial and community levels, and the required data should be collected comprehensively and adequately. For this purpose external specialists and/or consultants may be employed particularly for conducting monitoring and evaluation, while the OCOP Implementation Unit would play a major role in collecting and compiling the data and relevant information.

The OCOP production activities may face many fundamental problems in formulating voluntary production groups, community enterprises and SMEs at the grass roots level. In order to make the OCOP production groups strong, efficient, and self-motivated, the government policy should focus on the strategies, roles and functions which are consided to extend the helping hands to effectively meet the emerging needs and requirements. Emphasis on the government assistance will be given to the supply side rather than the demand side at the initial stage, and then the government should shift to their assistance in stimulating the demand by having a market access.

In this regard the "Road-side Station" concept in Japan may be applicable to the OCOP demonstration project in Coastal area. The road-side station is composed of rest facility including a restaurant, souvenir shop, toilets, a parking lot, an information center for tourists providing tourist maps and information, safety driving promotion and other moral enhancement activities by community peoples' initiative. Some prototype models of similar road-side stations managed by private sector's entrepreneurs already exist along with National Road No. 4 and other main roads, and more integrated approach with participation from local communities are recommendable. Such development concept toward rural economy revitalization will be summed up as shown in Figure B.3.1 below.



Source: JICA Study Team

Figure B.3.1 The OCOP Development Concept for Rural Economy Revitalization

B.4 Issues to be tackled and Actions to be Taken

The OCOP development concept for the coastal area is proposed as income generating activities at the community level through the OCOP production activities, and as a result for the creation of community enterprises under the PPP mode which public and private sectors closely work together at the same level. In this regard, a broader cooperation and collaboration framework is considered for diversified OVOP movement in the country, and local-to-local collaboration framework is also expected between public and private sectors of Japan and Cambodia. In Japan unique production activities are being observed within the village community under the different development concepts, and such unique concepts cannot be shared with other societies and communities in Japan. In the OVOP Concept the issues to be addressed are different from at the community level, and actions to be taken will be different from at the community level, too.

Recognizing the uniqueness in the OVOP/OCOP activities, the following actions are advised to be taken by RGC as a priority policy solution of several major issues:

(1) Build up Monitoring Capacity of various OVOP Movements

The OVOP/OCOP activities involve a large number of producers, products and financial arrangements, and a lot of problems and lessons in the OVOP/OCOP implementation will be identified. It will be effective to adjust the current OVOP development policy based on the feedback of the lessons in the current OVOP activities by creating monitoring and assessment mechanism at the government level. The monitoring and assessment mechanism needs professional analysis to avoid political and bureaucratic involvement.

(2) Develop Human Resources for OVOP/OCOP Activities

The most important lesson from the OVOP activities in other countries is the necessity of the OVOP human resource development at the initial stage. Almost of all production groups will face the problems relating to the management, accounting, production technique & technology, marketing, IT technology and English. The human resource development is an urgent policy issue which is to be tackled by RGC in the OVOP implementation for the process of formulating community enterprises and micro-enterprises.

(3) Create Financial Supporting Scheme for OVOP/OCOP Activities

The common lesson from other OVOP activities is the difficult financing accessibility, and financial supporting scheme is inevitable in implementing OVOP/OCOP activities.

APPENDIX C.

LIVING ENVIRONMENT AND CONSIDERATION FOR THE URBAN POOR

APPENDIX C: LIVING ENVIRONMENT AND CONSIDERATION FOR THE URBAN POOR

C1 Living Environment

For the living environment, Sihanouk City aims to materialize Vision 5: Be an internationally reputable **Marine Resort,** harmonized with most **livable environment**. As mentioned in 2.2.5 of Book II (this report), the three development issues, 1) on-site improvement of urban poor area, 2) resettlement and compensation, and 3) controlling expansion of urban poor area, should be tackled in Sihanouk City for conserving safe and comfortable living environment.

In this section, first, basic approaches to tackle the above development issues are mentioned. Second, relationship between the development issues and land use consideration is addressed. Some land use classification for tackling the development issues is introduced here. Third, land use considerations for both existing urban poor and potential urban poor are addressed.

(1) Basic Approaches to the Development Issues

Discussed hereafter are the points to be addressed to tackle the issues for urban poor areas in Preah Sihanouk Province. Approaches to be taken in City of Preah Sihanouk will basically be the same with the ones for other urban poor areas of the Coastal area.

1) On-site Improvement

The basic notion for the improvement of the urban poor issue will be the on-site improvement. Now UPDF projects in Preah Sihanouk Province are more active than other Coastal provinces. Since UPDF activities focus on on-site improvement and it has much experiences of on-site improvement in Phnom Penh, the cooperation with UPDF and utilizing UPDF's know-how is promoted.

2) Resettlement and Compensation

Where the land occupied by the urban poor is not substitutable with other areas for the implementation of the priority projects, resettlement may be needed in some cases. Basically the extent of resettlement has to be minimized and its effects to the residents have to be mitigated.

For resettlement and compensation, sub-decree on land acquisition is under processing. Plus, the provincial department of land management has considered applying social land concession for each district. It is important for stakeholders to follow the trends of the sub-decree and social land concession.

In the process of formulating resettlement plan, the community participation is critical to meet needs by the affected residents. Utilizing NGO which has more experience than the government in communicating with the residents and holding workshops is recommended for the community participation.

PAS will examine the concrete measures of resettlement of informal settlements located along the port for expansion of the port area, so the study team does not address in-depth measures for the resettlement of the informal settlements in this study.

3) Controlling Expansion of Urban Poor Area

In the first stage, influx of migrants would be accommodated in social land concession area which provincial DLMUPCC examines. It is recommendable for provincial government to monitor if the expansion of the existing urban poor areas is stopped and to identify causes and effects of the expansion after social land concession is effective.

(2) Relationship between Development Issues and Land Use Considerations

In the process of land use planning, both existing urban poor and potential urban poor are considered. The former is the residents who are now living in urban poor areas. The latter is in-migrants from other provinces or rural areas who will settle in urban poor areas in near future. Here, land use from the viewpoints of living environment for each category is proposed.

The relationship between three development issues and land use consideration is shown in the table below. The development issues are also considered for formulating land use plan. Controlling expansion of urban poor areas is the most eminent issue, because it is related with both existing urban poor and potential urban poor.

Table C.1.1 Relationship between Development Issues and Land Use Considerations for Living Environment

		Land Use Considerations		
		(1) For Existing Urban Poor		(2) For Potential Urban Poor
		1) Designation of Residential Use	2) Designation of Non-residential Use	
Development Issues	1) On-site Improvement	○		
	2) Resettlement and Compensation		○	
	3) Controlling Expansion of Urban Poor Area	○	○	○

Source: JICA Study Team

(3) Land Use Considerations

1) Land Use concerning Existing Urban Poor

How to use land in the existing urban poor areas are divided into two, a) designation of residential use, b) designation of non-residential use. The division largely depends on whether or not resettlement is avoidable.

a) Designation of Residential Use

Where resettlement of the residents is avoidable and people could live without harming natural and social environment, the existing urban poor areas can be designated as a residential area.

If the designation is realized, the concerned stakeholders including the governments, NGOs, and residents should make efforts to improve living environment in the existing urban poor areas and to secure safe and comfortable environment as seen in other residential areas of the city.

There are two urban poor areas in the water catchment area of Kbal Chhay protection forest. If the impact by people to water source is negligible in the areas as a result of environmental study, designating residential area to the urban poor areas can be considered in land use plan.

b) Designation of Non-residential Use

Where resettlement of the residents is unavoidable, the land in urban poor areas should not be used for residential use but for other purposes. The affected residents of the resettlement need to move to other areas, but the resettlement areas should be either residential area in the land use plan or in social land concession areas. Since most of the residents in urban poor areas need basic infrastructure including roads, bridges, toilets, etc., the government should help develop the infrastructure in those areas. The concerned stakeholders should consider how the affected residents can obtain similar economic and social benefits after resettlement as the benefits before resettlement. Upon resettlement, how to compensate to the affected residents is also to be considered. Generally compensation is difficult issues in the resettlement process. The land use in the urban poor areas is to be altered to other purposes little by little in the long run.

2) Land Use concerning Potential Urban Poor

To prevent built-up of new urban poor areas in the city is necessary, considering in-migrants from other provinces or rural areas. It is requisite to clarify the boundary of residential areas for urban poor or social land concession area. Plus, settlement by in-migrants at the locations outside the boundary should be prevented. The district and commune governments as well as provincial department of land management play an important role in the clarification of the boundary and monitoring for prevention of in-migrants settlements residing outside the boundary.

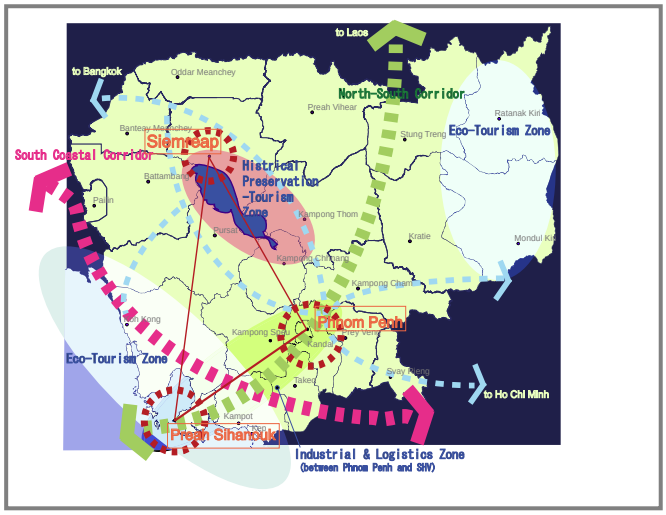
The same requisite is applied for the existing urban poor areas as mentioned in (1) Land Use concerning Existing Urban Poor. In-migrants have possibility to settle in the existing urban poor areas. In-migrants can live within the existing urban poor areas, but the government should direct those who settled outside the existing urban poor areas.

APPENDIX D.

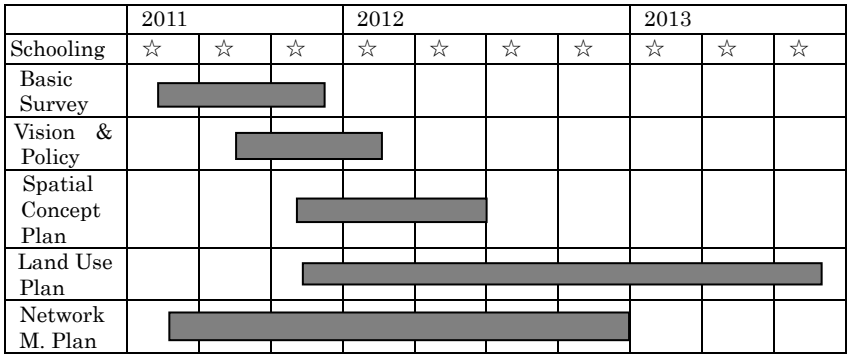
PROJECT CONCEPT NOTE FOR THE PRIORITY PROJECTS

No.	UD-01

Project	National Spatial Grand Design/ Land Use Planning Project

Project Description		
(1)	Project Scheme	Technical Assistance
(2)	Background	The National Strategy for Development Plan 2006-2010 set up by RGC placed “the good governance” as the most fundamental prerequisite for the sustainable development and pointed out the key factor for the good governance in the decentralization and deconcentration (D&D). Based on this plan RGC enacted the Regional Administration Law in 2008, which stipulates the framework of management over development planning for the capital city Phnom Penh, 23 provinces and 193 districts. Under this law the councils and officials should be responsible for and in charge of planning, enforcement and monitoring of the 5 year development plan of each province and other development planning. However, government has not set up the organizational system and capacity development plan for implementation for this new system. In 1994, the Law on Land Management, Urban Planning and Construction was enacted, and the legal framework for urban planning was thus set in place. Concurrently MLMUPC was established. Nonetheless, the administration for planning is still insufficient, typically shown in the fact that there is no officially approved National Master Plan of Land Use / Spatial Design which should be the guideline for subordinate plans for whole country. Inconsistent spatial and land use management is a highly concerning issue for future national development as well as the lack of approved plan hindering the day to day administration for construction permit and implementation of urban planning projects.
(3)	Objectives	Overall Goal: To manage the national development. Project Purpose: To formulate the National Master Plan of Land Use / Spatial Design to be the superordinate plan as the guideline for subordinate plans for a proper development.
(4)	Location	Whole country of Cambodia.
(5)	Executing Agency	MLMUPC
(6)	Proposed Work Components	• National Land Use Plan / Spatial Design - General Strategy and Policy for Development and Conservation - Land Use Plan - Network Mater Plan (concerning logistics, tourism and development plan of adjacent countries) • Reinforcement of legal framework, laws and regulations over land and spatial management • Capacity development plan of MLMUPC at the central level to enforce planning and management ability • Institutional development for MLMUPC with long term specialists • Project promotion skills for participative planning 

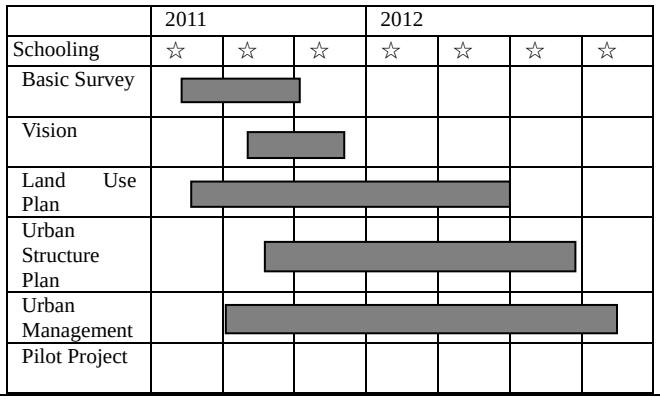
(7)	Implementation Schedule	Expected implementation period was estimated at 3 years in total from June in 2011 to December in 2014.



No.	UD-02

Project	**Urban Development Master Plan for the Coastal Area**

Project Description		
(1)	Project Scheme	Technical Assistance
(2)	Background	The National Strategy for Development Plan 2006-2010 set up by RGC placed "the good governance" as the most fundamental prerequisite for the sustainable development and pointed out the key factor for the good governance in the decentralization and deconcentration (D&D). Based on this plan RGC enacted the Regional Administration Law in 2008, which stipulates the framework of management over development planning for the capital city Phnom Penh, 23 provinces and 193 districts. Under this law the councils and officials should be responsible for and in charge of planning, enforcement and monitoring of the 5 year development plan of each province and other development planning. However, government has not set up the organizational system and capacity development plan for implementation for this new system. In 1994, the Law on Land Management, Urban Planning and Construction was enacted, and the legal framework for urban planning was thus set in place. Concurrently MLMUPC was established. Nonetheless, the administration for urban planning is still insufficient, typically shown in the fact that there is no officially approved urban master plan under the Law yet. The lack of approved plan hinders the day to day administration for construction permit and implementation of urban planning projects.
(3)	Objectives	Overall Goal: DLMUPCC of Provinces of the Coastal Area can formulate city planning for management and development. Project Purpose: ■ Formulate Master Plan of Urban Planning ■ Learn urban development project technique ■ Improve construction permission procedure with development guideline. ■ Capacity development for city planning and land management
(4)	Location	4 provinces in the Coastal Area: Sihanouk-ville, Koh Kong, Kep, Kampot
(5)	Executing Agency	DLMUPCC of 4 provinces in the Coastal Area.
(6)	Proposed Work Components	• Schooling for technical officials (1week/3months) prior to each planning stage • Draw up detail land use planning and circulation system • Draw up development project plan for the city center. • Implement pilot project to apply learned knowledge.
(7)	Implementation Schedule	Expected implementation period was estimated at 1.5yuears in total from June in 2011 to May in 2012.



No.	EV-01

Project	**Strengthening EIA Implementation Capacity Project**

Project Description		
(1)	Project Scheme	Technical Assistance
(2)	Background	Due to the lack of formal land use plan, investors could exploit any areas without ligid administrative control. Qualified investment permits are sometimes given even in the protected areas, and the protected areas may be affected by various development activities with significant impacts on the environment. Environmental Impact Assessment (EIA) must be utilized as an effective instrument for the regulation against inappropriate land use, but due to the lack of strict enforcement of EIA, most of investors have ways to skip the process. That is to say, investors could implement the project without EIA approval. Relevant environmental legislations such as the protected areas law, sub-decree on EIA, law on investment and law on concession, are not enforced properly in terms of protecting the environment. Lack of the capacity, the number of officials, budget and coordination among organizations are often sited as the reasons for this. Officials sometimes do not follow the organizational mandate intentionally, and thus it would be possible for officials to change the interpretation of legislation to cater to some interested people. As a result, some critical developments have been permitted in some areas (even in protected areas). The other issue regarding legislation is that legislation is sometimes incomplete. For example, boundary and zoning of protected areas must be determined by a sub-decree, but it has not been issued yet. Investors and MOE officials can decide the expected core zone as sustainable use zone. Detail EIA process is not explained in the sub-decree on EIA. MOE has prepared the general EIA guideline in 2009, but it is still on the policy level, and detail process and action plan have not been ready. These incomplete conditions of legislation make adequate law enforcement difficult. Proper enforcement of EIA is essential to prevent the inappropriate land development. After the low on investment was amended in 2003, one stop service was introduced, and EIA process has been changed substantially. Establishment of detail EIA guideline is a pressing need. Capacity development of the EIA department to enforce the guideline is also necessary at the central and provincial level. On the job and off the job trainings should be provided.
(3)	Objection	Overall Goal: The overall goal of this project will be to manage the development activities through EIA and monitoring. Project Purpose: The purpose of the project is to establish institutional and technical framework for implementing EIA and environmental monitoring.
(4)	Location	Phnom Penh
(5)	Executing Agency	Department of Environmental Impact Assessment, Ministry of Environment
(6)	Proposed Work Components	• Documents on the laws and regulations about EIA and environmental monitoring • Capacities of EIA department (central and provincial) to enforce the laws and regulations • Necessary sampling and data interpretation skills for environmental monitoring • Institutional development for EIA and environmental monitoring among other ministries
(7)	Implementation Schedule	September 2011 to September 2014 (Three years)

No.	EV-02

Project	**Establishment of Public-Private Partnerships and Development of Infrastructure for Solid Waste Management for Sustainable Environmental Protection and Development in Cambodian Costal Areas**

Project Description

(1) Project Scheme

2010-2011: Follow-up Survey on Public-Private Partnerships of SWM
2011-2013: TP for Implementation of 3R and Making of Master Plan with Capacity Development
2014-2017: TP for Implementation of 3R and Master Plan with Capacity Development
2013-2016: Loan or Grand Aid for Garbage collection trucks, Composting Plant, Sanitary Landfill

(2) Backgrounds

Coastal areas is expected to be developed with a rapid grown in population, tourism and industries. On the other hands, waste collection service is provided in some areas with insufficient conditions, and collected waste is dumped with no leachette system and gas control system and even without soil cover. Sometimes waste is burned at dumping sites illegally. There is a significant case where the existing SWM with an emphasis on the private initiative does not function properly due to the lack of monitoring and administration by the public sector. This is a widespread symptom of SWM in Cambodia. In this program, iwhat type of Public-Private Partnerships (PPP) is suitable for the coastal areas, will be considered first to solve the issues of SWM in these areas. At present environmental impact caused by solid waste may not be so serious, but the environmental situation will be serious due to an increase in the amount of waste and diversification in the types of wastes in accordance with the economic and social development. Now all of provinces in the coastal areas need new landfill sites. Kampot and Preah Sihanouk have to prepare new landfill sites urgently that are managed with leachette system and gas control system. Kampot and Sihanouk are proceeding with acquisition of land for new landfill sites in an area of approximately 20ha and 65ha, respectively.. In addition Kampot shows interest in the involvement of districts and communities in order to establishment a community-based SWM in parallel with the preparation of the new landfill site. Beneficial people is as follow:

Projects	Period	Target Areas (Prioritized areas are marked by "*".)	Beneficial People
Follow-up Survey	0.7 year (2010-2011)	*Kampot, *Sihanouk, Kep and Koh Kong	Approx.991,000 (estimation for 2010)
Technical cooperation	2 years (2011-2013)	*Kampot, *Sihanouk, Kep and Koh Kong	Approx.991,000 (estimation for 2010)
Technical cooperation	3.5 years (2014-2017)	*Kampot, *Sihanouk, Kep and Koh Kong	Approx.1,090,000 (estimation for 2015)
Yen Loan or Grant Aid	2.5 years (2013-2016)	*Kampot, Sihanouk (mainly urban areas)	Approx. 164,000 (estimation for 2015)

(3) Goal and Objectives

Overall Goal: To prevent environmental impacts with improving image of tourism and contributing to sound, smooth and sustainable development of Cambodian Costal Areas Objectives are as follow:
-Model of sustainable Public-Private Partnerships SWM is established with sufficient technical and financial capacity.
-3R (Reduce, Reuse, Recycle) at source is introduced, and waste reduction activities are established.
-Model system of stable and efficient collection and transportation of solid waste is established.
- Composting plant and sanitary landfill site are established (in prioritized areas only).

(4) Location (Old/ Existing Dumping Site and Proposed Sites for New Landfill Site in Kampot and Sihanouk)

In Tuek Chhou District, 3 km from National Road 3

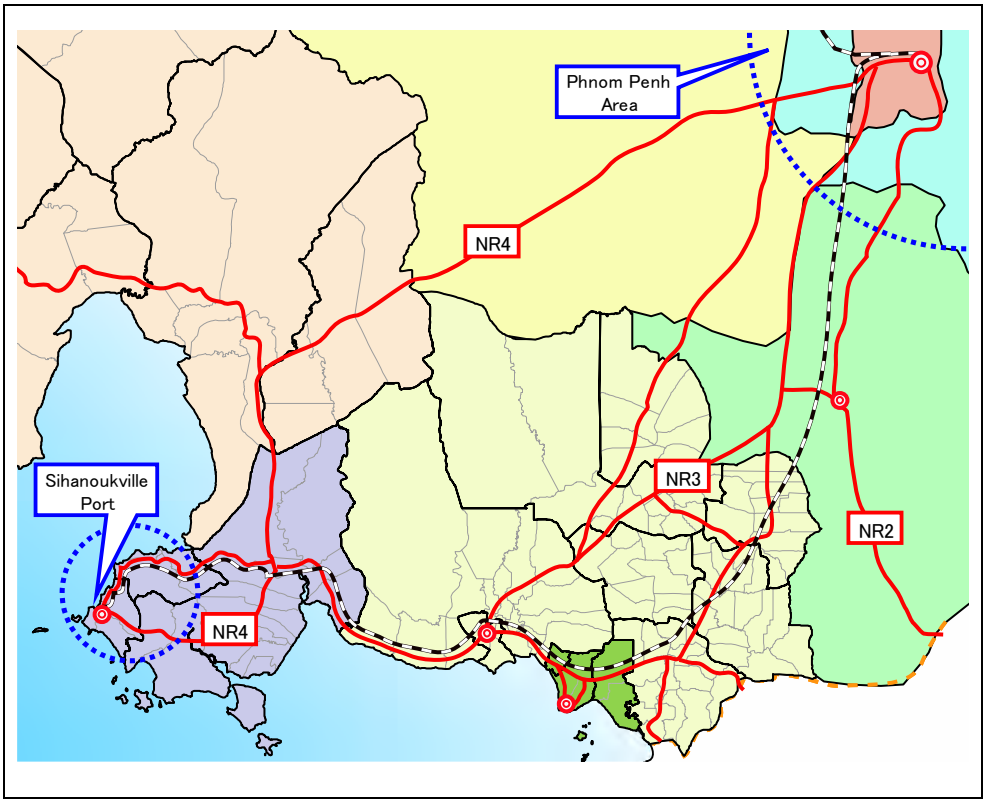
In Prey Nob District, 3km from National Road 4

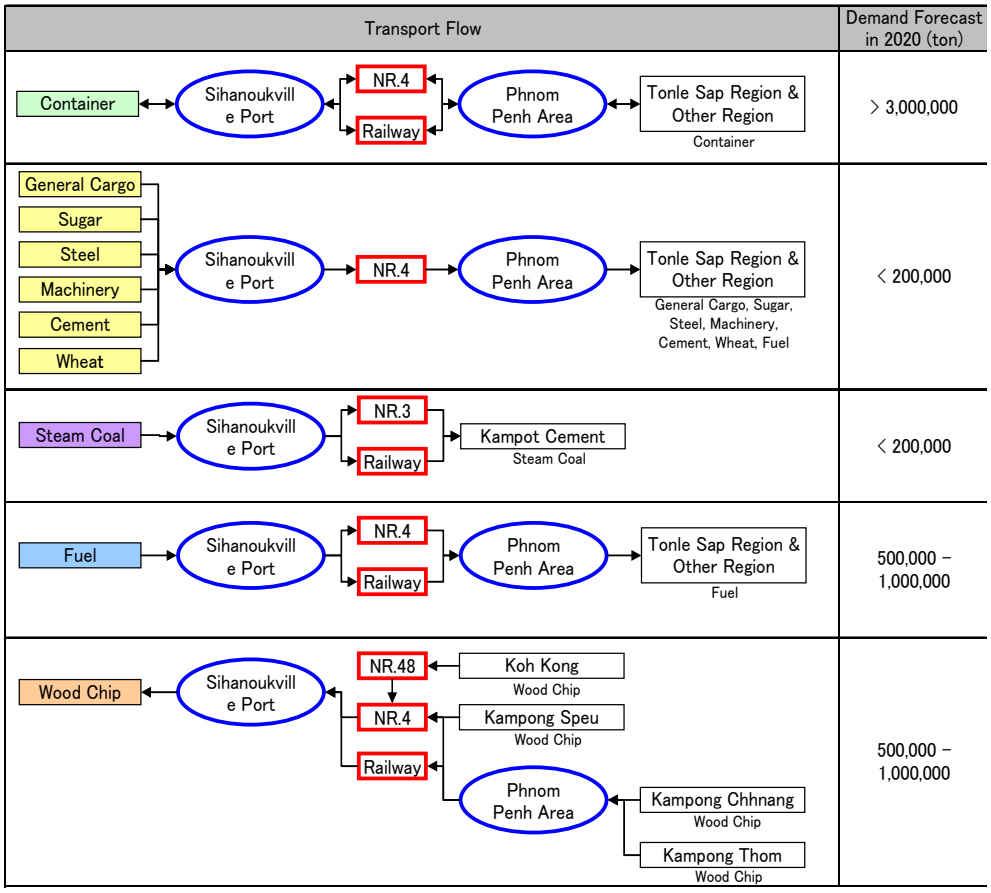
(5)	Executing Agency	Provinces (Kampot, *Preah Sihanouk, Kep and Koh Kong) and Ministry of Environment (MoE) Involvement of the MoE is necessary for hazardous waste because the MoE is responsible for hazardous waste in accordance with sub-decree on Solid Waste Management. At provincial level, Department of Environment (DoE) is the main executing agency. In addition, it is necessary to involve Department of Land Management, Urban Planning, Construction and Cadastre in the land matter. International Cooperation Office and Project Coordinator of Integrated Costal Management (ICM) in Sihanouk also should be involved because they have experience to introduce the Community-based SWM in a Village as a model project.
(6)	Proposed Work Components	■Follow-up Survey on Public-Private Partnerships of SWM (0.7 year) To study how responsibilities and risks related to SWM can be shared between public sector and private sector - Affordability Survey, including Financial Analysis -Study on type of technology and project procurement - Cost estimation: Sanitary landfill at each level ■Technical Cooperation Project for Implementation of 3R and Making of Master Plan with Capacity Development (2 years) -Basic Surveys: Waste actual condition surveys, Affordability surveys -Community-based SWM: Assistance of model project of Community-based SWM (3R at source and primary collection service), Development of operations guidelines for community-based SWM -Planning: Assistance of making of SWM master plan and action plan -Making of policy for project procurement -Particulars of EIA: Site Surveys at proposed areas for new landfill sites in Kampot and Sihanouk and at old dumping site in Kampot, Assistance of EIA process -Procurement of equipments and construction of facilities (garbage truck) -Establishment of industrial SWM (Especially for Sihanouk) ■Technical Cooperation Project for Implementation of 3R and Master Plan with Capacity Development (3.5 years) -Public Relations and Education on SWM: Public relations connected to tourism, PR and Education for Communities -Community-based SWM: Assistance of Expansion of Community-based SWM -New SWM: Assistance of Implementation of New SWM, including Maintenance and Operations of Facilities and Equipments ■Yen Loan or Grant Aid for Facilities and Equipments (3 years) -Preparation for procurement of garbage collection trucks, composting plant and sanitary landfill site (detail will be decided according to the results of the study on type of project procurement in the technical cooperation project) -Procurement of equipments and construction of facilities (garbage collection trucks, composting plant and landfill site)
(7)	Implementation Schedule	■Follow-up Survey (0.7 years): August 2010 to March 2011 ■Technical Cooperation Project (2 years): July 2011 to June 2013 ■Technical Cooperation Project (3.5 years): January 2014 to June 2017 ■ Yen Loan or Grant Aid for Facilities and Equipments (3 years): July 2013 to June 2016

No.	L-01

Project	*The Study on Comprehensive Logistics Development between Preah Sihanouk and Phnom Penh*

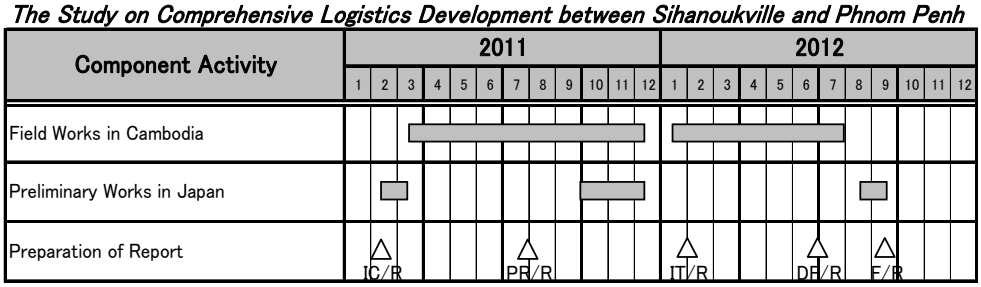
Project Description

(1)	Project Scheme	Technical Assistance
(2)	Background	Preah Sihanouk Port, which is the largest port in Cambodia, has a depth of 10m and can accommodate around 1,000 TEU container ship. In intra-Asian shipping route, Preah Sihanouk Port functions as Feeder Port. Most of the containeer cargos brought from Preah Sihanouk to West Coast of USA are currently transshipped at Singapore Port. On the other hand, Preah Sihanouk Port, which is the only international port of Cambodia, plays a role of gateway on international trade in Cambodia. In order to promote economic growth in Cambodia, it is indispensable to develop Preah Sihanouk Port and provide a logistics network between Preah Sihanouk Port and Phnom Penh which is an industrial and mega consumption area. NR3 and NR4 connect between Preah Sihanouk Port and Phnom Penh. Most of commodities which are produced in Phnom Penh area and freights which is unloaded at Preah Sihanouk Port are transported by trucks through NR4. As to railway system, the Rehabilitation Railway Project has been implemented by ADB loan and is expected to contribute to an effective freight transport. Concerning of Preah Sihanouk Port, enlargement of Preah Sihanouk Port is planned by JICA assistance. It is expected that Preah Sihanouk Port functions as more efficient gateway. Though Node which is like a Preah Sihanouk Port and Link which is like a NR4 have been developed and provided individually, a comprehensive logistics strategy has not been prepared yet. Therefore, a logistics network and an infrastructure for the network have not been developed as an integrated system.
(3)	Objectives	Overall Goal: In consideration of a feature of Preah Sihanouk Port which is Feeder Port in intra-Asia shipping route, a strategic logistics development plan should be provided in order to accelerate to increase a freight volume and to establish an efficient logistics network.
(4)	Location	Location of the proposed project is shown below.  Source: JICA Study Team

(5)	Executing Agency	
(6)	Proposed Work Components	➢ Components of the priority project are as follows. ・ Analysis of present condition and issues, ・ Proposal of an efficient international logistics and customs clearance system, ・ Study of logistics marketing, ・ Development plan of logistics terminal, ・ Proposal of logistics information system, ・ Development plan of rail transport and related facilities, ・ Development plan of Preah Sihanouk Port, ・ Proposal of land use and spatial plan related to logistics facilities, ・ Proposal of environment and social consideration, and ・ Economic and Financial Analysis Transport flow and demand of commodity, which will be transported from Preah Sihanouk Port to Phnom Penh and other area in 2020, is forecasted as follows. It is suitable to implement this study in consideration of the transport flow and the demand forecast 

(7)	Implementation Schedule	Activities and timeframes for implementing the proposed priority projects are shown below.

The Study on Comprehensive Logistics Development between Sihanoukville and Phnom Penh



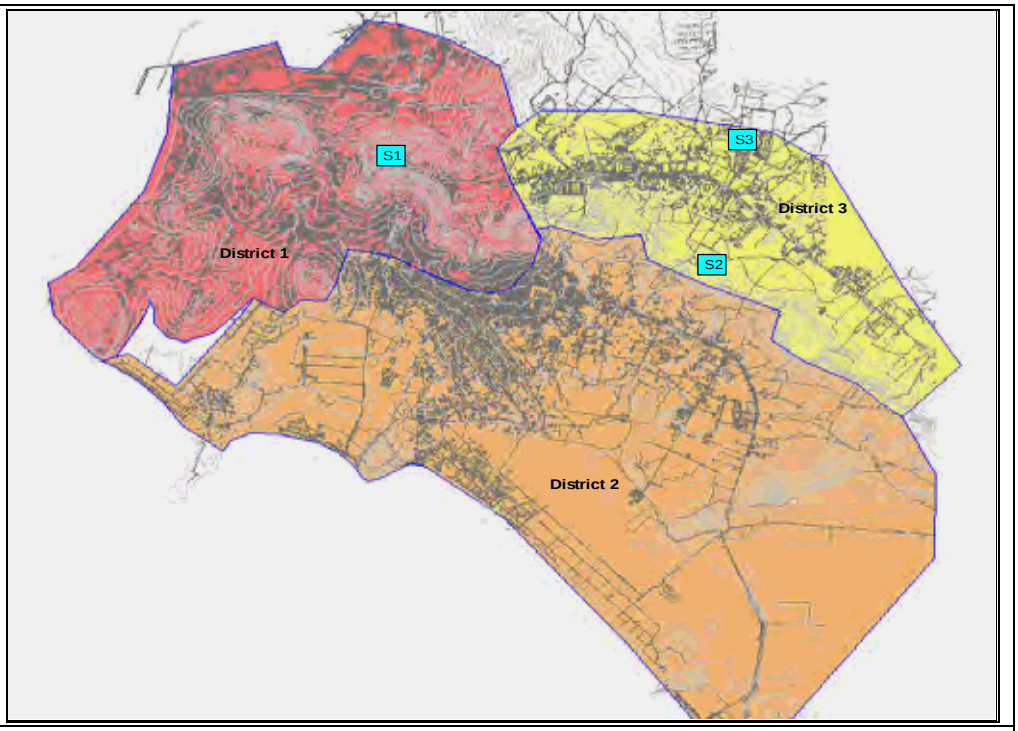
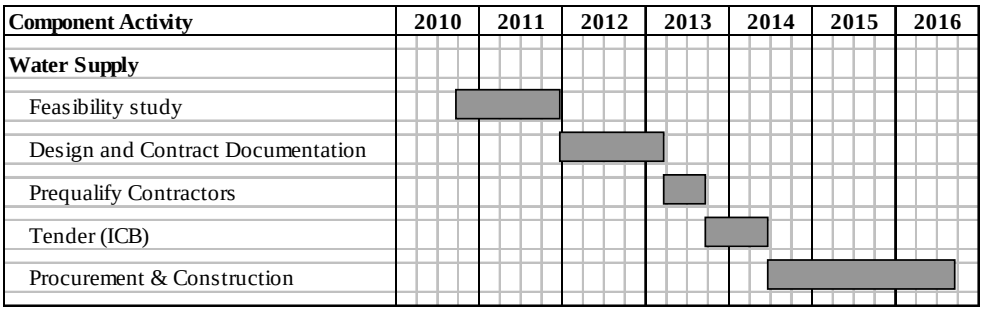
No.	WS-01

Project	**Preah Sihanouk Water Supply System Development Project**

Project Description

(1)	Project Scheme	Loan
(2)	Background	The city's main source of water is the Kbal Chay reservoir located some 8 km from the city. Water is treated by a private sector operator and sold in bulk to the Sihanoukville Water Supply Authority. The capacity to transfer treated water into the distribution system is inadequate to meet the growing demand. The distribution system covers a limited area, does not have capacity to service new growth areas and lacks sufficient storage to balance fluctuations and demand.
(3)	Objection	The priority project will improve distribution of treated water throughout the city and provide the underlying framework for future growth.
(4)	Location	The City of Preah Sihanouk.

District	District No.1	District No.2	District No.3
2020 Population	23,069	39,037	6,792
2020 Demand m3/day	7,886	11,478	2,096
Source of supply	Existing public water treatment plant supplemented with treated water from Kbal Chay	Kbal Chay scheme	Kbal Chay scheme
Storage	S-1 =1,700 m3 S-4a =5,000 m3	S-2a = 9000 m3	S-3 = 1500 m3
Transmission pump station and head works	Pumps to S-1 Variable speed drive Duty: 3 x 50-60 lps	By gravity	Pumps for S-3 Fixed speed Duty: 1 x 25 lps
Transmission pipeline	S-4 to S-1 600 mm dia. L=7000 m	S-4 to S-2 600 mm dia. L=3500 m	S-4 to S-3 Connect to existing 350mm dia. L=450 m
New feeder mains	From S-1 L = 9,775m	From S-2 L = 18,367m	Connect S-3 to existing 350 mm dia. main
Distribution system modifications to tie in new feeder mains	Including 5 pressure regulating valves	Including 2 pressure regulating valves	New distribution piping supplied from feeder main
Reconnect existing house connections	1622 connections	2602 connections	390 connections
Extend distribution system and new house connections	2992 connections	5206 connections	978 connections

		
(5)	Executing Agency	The Ministry of Industry, Mines and Energy
(6)	Proposed Work Components	The project includes storage facilities, a system of feeder mains and facilities for the transmission of treated water from Kbal Chay. The distribution system will be re-organized into three supply districts to improve operational flexibility and reduce pressures in parts of the system
(7)	Implementation Schedule	Implementation period was expected as follows. 

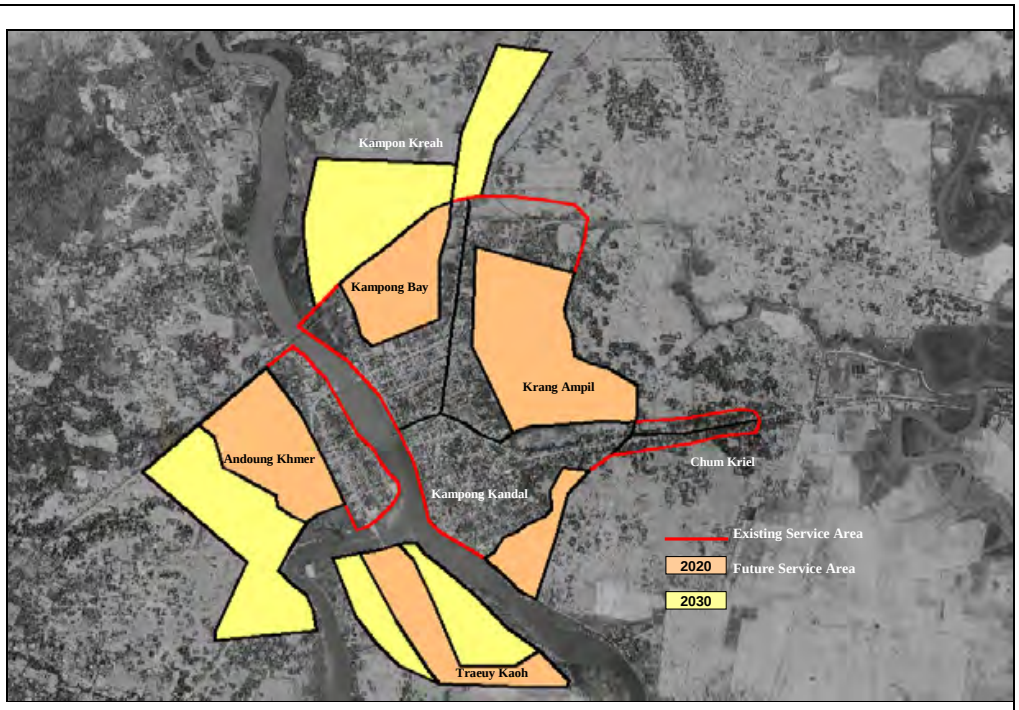
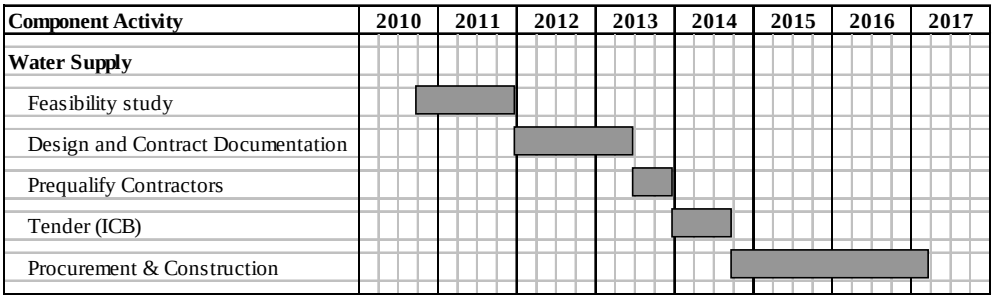
No.	WS-02

Project	**Kampot Water Supply System Development Project**

Project Description

(1)	Project Scheme	Loan
(2)	Background	The city's main source of water is the Tek Chhou rive. The raw water intake is 8 km from the treatment plant which is located in the center of the city on the West bank. A hydro dam is being constructed approximately 5 km upstream of the intake. Details of the dam are not public and it is not clear what impact it will have on the water supply system downstream. There may be an opportunity to provide a new raw water intake directly from the dam if an arrangement can be negotiated with the private developer. The treatment plant is operated by the Kampot Water Supply Authority under DIME. The treatment plant will reach its design capacity by 2015 and there is no space at the site for expansion. The distribution system is old, does not have capacity to service new growth areas and lacks sufficient storage to balance fluctuations in demand. There is also a large quantity of asbestos cement pipe that may be a health risk
(3)	Objection	The priority project will improve distribution of treated water throughout the city and provide the underlying framework for future growth.
(4)	Location	The City of Kampot.

	District No.1	District No.2
2020 population	21,370	5,463
2020 Demand m3/day	9,600	2,016
Raw water intake and pump station	5,000 m3/day	existing
Treatment plant	5,000 m3/day Land = 50,000 m2	existing
Storage	S-1a =3,000 m3 T-1 =1,600 m3 Land = 6000 m2	S-2 = 2,000 m3 Land = existing
Pump Station	Pumps to S-1 included with treatment plant Pumps to T1 Variable speed drive Duty: 3 x 25-35 lps	existing
Transmission pipeline	to S-1 400 mm dia. L=8,100 m	none
New feeder mains	From S-1 L = 26,685 m	From S-2 L = 9510 m
Distribution system modifications to tie in new feeder mains	Including district metering	Including district metering
Reconnect existing house connections	2854 connections	822 connections
Extend distribution system and new house connections	1420 connections	1098 connections

		
(5)	Executing Agency	The Ministry of Industry, Mines and Energy
(6)	Proposed Work Components	The priority project will provide a new treatment plant, a treated water pipeline, storage facilities, and a system of feeder mains. The distribution system will be re-organized into two supply districts and the asbestos cement piping will be replaced. The new treatment plant will supply the East side of the river. The existing treatment plant will supply the West side.
(7)	Implementation Schedule	Implementation period was expected as follows. 

No.	WS-03

Project	**Preah Sihanouk Sewage System Development Project**

Project Description

(1)	Project Scheme	Loan
(2)	Background	A system of separate sanitary sewers was constructed in part of the city in 2005 under ADB loan. The initial service area covers the commercial center and the densely populated urban core. The system was constructed to protect improve urban conditions and protect water quality along the Ochheuteal Beach. Treatment is provided by waste stabilization ponds. Wastewater flows by gravity and there are no pumping stations. The project was designed to accommodate a larger service area at a second stage by expanding the treatment plant with a duplicate process stream. A small area along Ochheuteal could not be serviced by gravity and was omitted from the initial project. The urban areas to the north east and west of the service area are experiencing rapid development. Population growth couples with proposed improvements to water supply will increase the amount of wastewater discharged to the coastal marine environment around Sokha and Ochheuteal beach. This will also have a negative impact on tourism
(3)	Objection	The priority project will extend wastewater collection into growth areas adjacent to the existing system within the planned service area of the original sewerage project.
(4)	Location	The City of Preah Sihanouk.

	Catchment A	Catchment A	Catchment B
Project ID.	A1	A2	B1
2020 Populations	4524	2912	11946
2020 Wastewater flow	615	433	1549
Treatment			Expand existing waste stabilization ponds in catchment A
Trunk and branch sewers	100 mm to 300 mm dia. PVC branch sewers, pre-cast concrete manholes	100 mm to 300 mm dia. PVC branch sewers, pre-cast concrete manholes	100 mm to 300 mm dia. PVC pipe, 300 to 600 mm dia. Concrete trunk sewers pre-cast concrete manholes
Service Connections	1960	896	4.097
Pump station	PS-A Capacity 24 liter/sec	Gravity collector connected to existing	PS-B Capacity 60 liter/sec
Pressure main	From PS-A to treatment plant Dia 200mm L = 500m	none	PS-B to existing gravity trunk sewer in catchment A Dia. 300 mm L= 1200m

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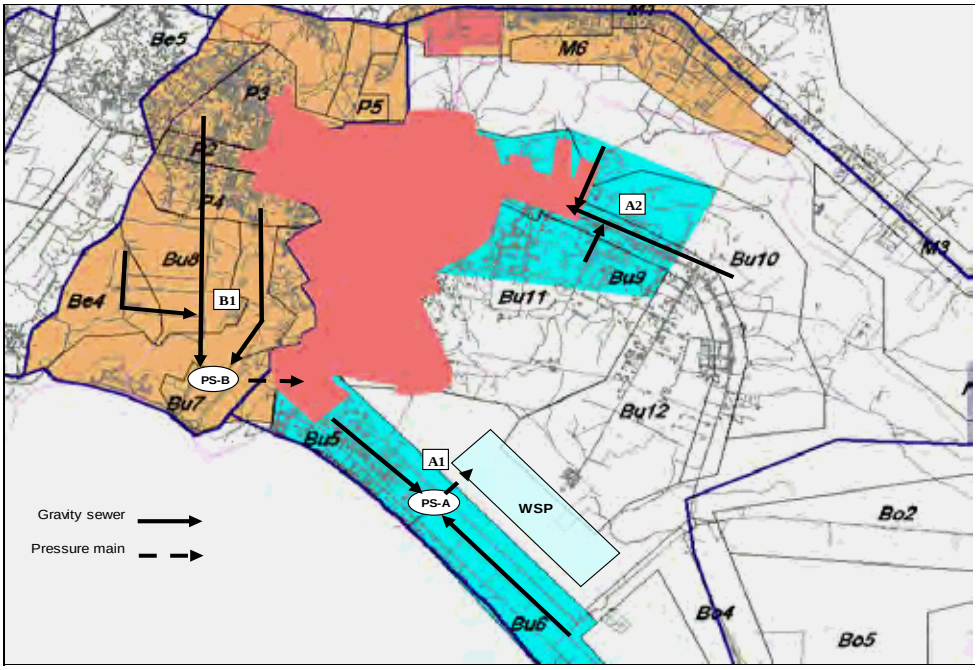
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(5)</td><td>Executing Agency</td><td>The Ministry of Public Work and Construction</td></tr>
<tr><td>(6)</td><td>Proposed Work Components</td><td>The project will include expansion of the treatment facility. Service connections will be mandatory and will be provided by the project to ensure a successful outcome. The project focuses on removing wastewater from three areas:
- The guesthouses and restaurants along Ocheuteal Beach
- The urban area to the north east which discharges wastewater to a drain that outlets at the east end of Ochheuteal beach
- The urban area to the west of the existing service area (Catchment B) which discharges wastewater to Sokha Beach.</td></tr>
<tr><td>(7)</td><td>Implementation Schedule</td><td>Implementation period was expected as follows.

<table>
<tr><th>Component Activity</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th></tr>
<tr><td>Wastewater Collection System</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Feasibility study</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Design and Contract Documentation</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Tender (ICB)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Procurement & Construction</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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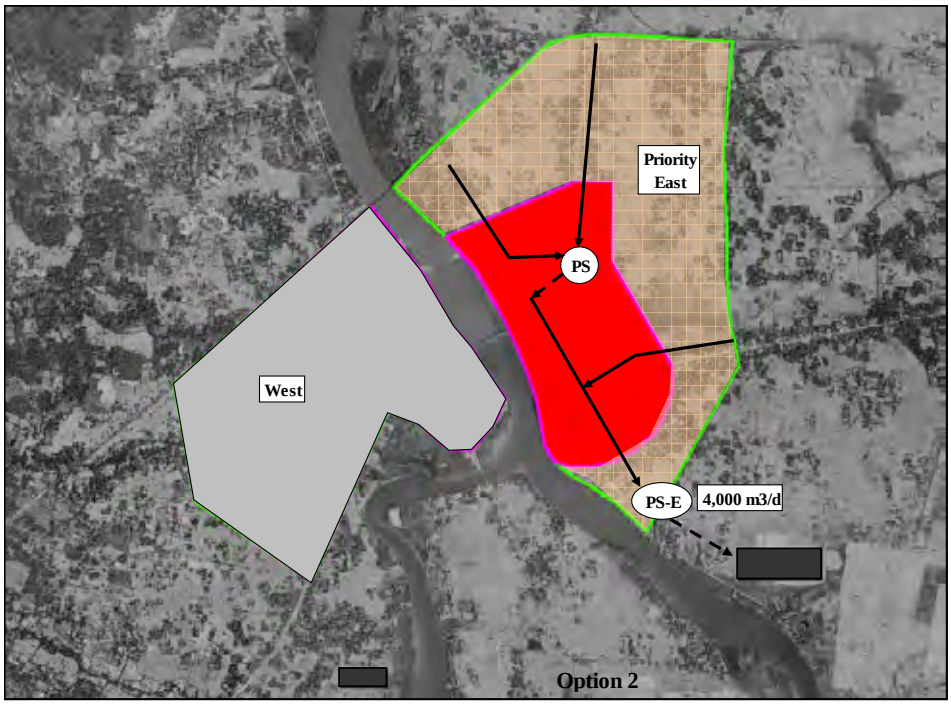
No.	WS-04

Project	**Kampot Sewage System Development Project**

Project Description

(1)	Project Scheme	Loan
(2)	Background	There is no sewerage system but city officials have indicated it as a high priority and have allocated some land for a treatment lagoon. The urban area on the East bank is growing rapidly and Kampot is seeing an increase in tourism activity. Proposed improvements in water supply will increase the amount of wastewater that is discharged to street drains and eventually to the coastal marine environment.
(3)	Objection	Sewerage will improve tourism potential and protect biodiversity in the estuary. The proposed area also includes the commercial core of the city and has the greatest potential for future growth.
(4)	Location	The City of Kampot.

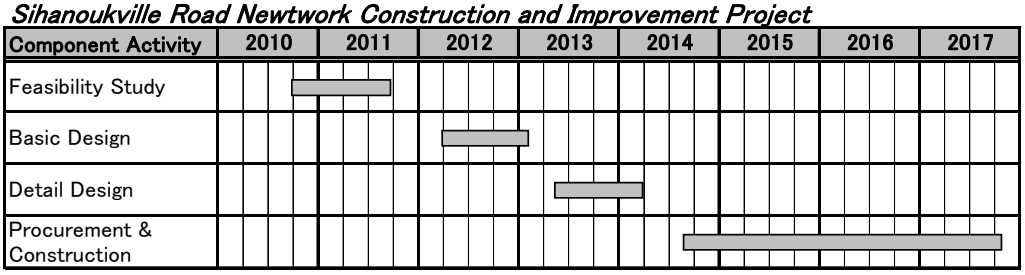
	East Catchment
Scope	Collection and treatment
Population	20720
Dry Weather wastewater flow m3/day	3260
Trunk and branch sewers	Separate sewer system 100 mm to 600 mm dia. PVC pipe, pre-cast concrete manholes
Service Connections	4560
Main Pump Station (PS-E)	Capacity 105 liter/sec
Pressure main	From MPS to treatment WSP Dia. 350 mm L=750m
Treatment Plant	Waste Stabilization Ponds: 4,000 m3/ day (2) Anaerobic (2) Facultative (2) Maturation
Capacity building	Technical assistance for operation and maintenance, bylaw enforcement and mandatory connection

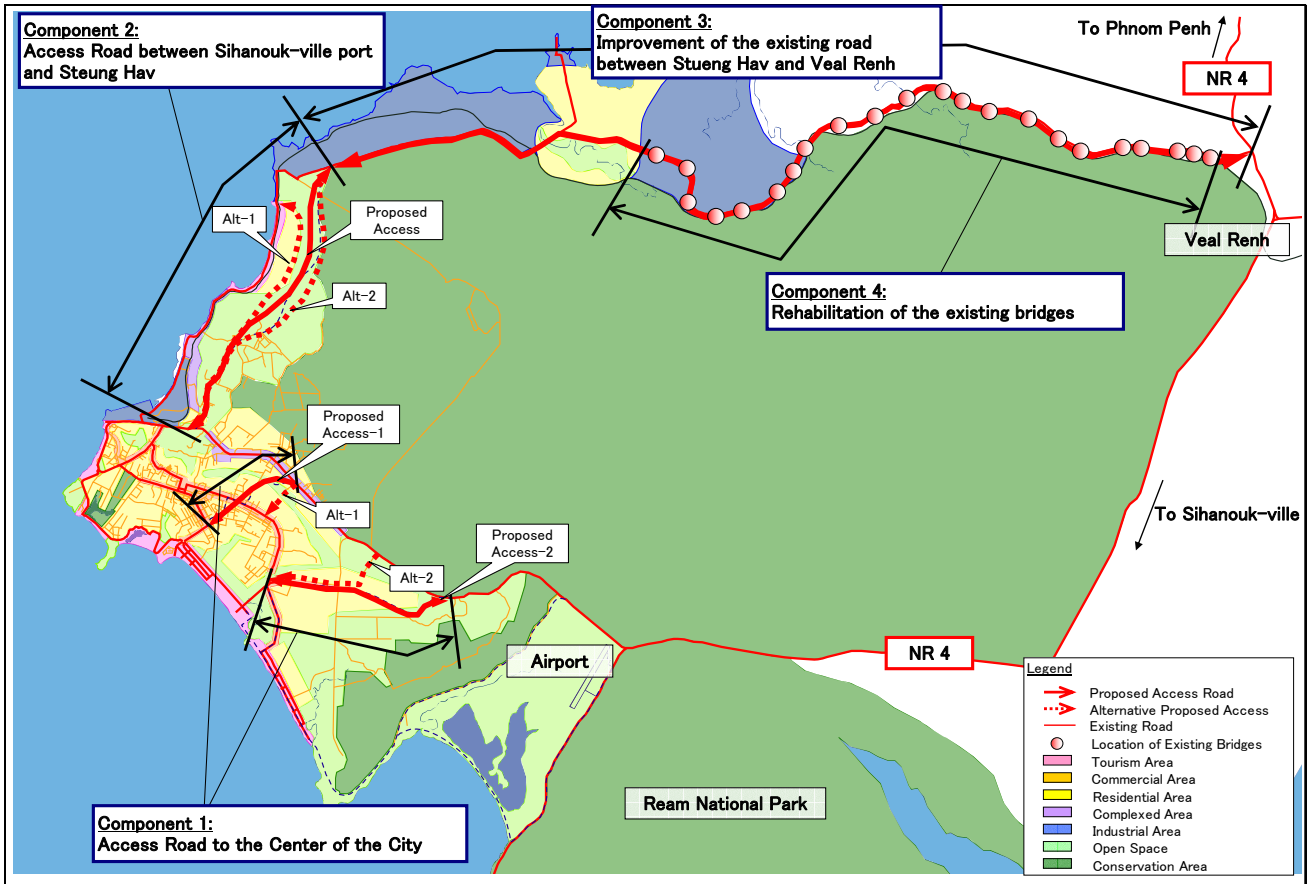
		
(5)	Executing Agency	The Ministry of Public Work and Construction
(6)	Proposed Work Components	The project will provide sewerage on the East bank to service the commercial and central urban core of the city.
(7)	Implementation Schedule	Implementation period was expected as follows.

Component Activity	2011	2012	2013	2014	2015	2016	2017	2018
Wastewater Collection System								
Feasibility study								
Design and Contract Documentation								
Prequalify Contractors								
Tender (ICB)								
Procurement & Construction								
Local Governance								
Initial study								
Establish connection by-laws								
Establish user fees								
Technical assistance for management & operation								

No.	T-01

Project	**Preah Sihanouk Road Network Construction and Improvement Project**

Project Description		
(1)	Project Scheme	Loan
(2)	Background	As the gateway of Cambodia, the population of Preah Sihanouk is estimated to increase rapidly. The residential area is expected to expand to the east of the existing urban area of Preah Sihanouk City. However, the road network of east area of Preah Sihanouk has not been provided yet. If the road network situation was not improved, all inhabitants would have to detour along with NR4 via the center of Preah Sihanouk in order to go to the direction of Phnom Penh. Tourists also have to detour along with NR4 to visit beach resorts and the center of the city due to no direct access from the direction of Sihanouk-ville airport. Along the coastal line of Sihanoukville, there are industrial area and oil jetties located in the northern part. At present, since NR4 is used as the only one main access route to the center of Preah Sihanouk, the traffic congestion mixed with motorcycles and heavy vehicles occurs. According to the road traffic condition, the number of traffic accidents has increased. Therefore, it is needed to consider northern part as industrial area and southern part as tourism area in order to provide an efficient road network for Preah Sihanouk. In consideration of the population growth, the traffic congestion, the increase of the number of traffic accidents and the growth of industry of Preah Sihanouk, an efficient road network should be provided.
(3)	Objectives	To provide an efficient road network for Preah Sihanouk
(4)	Location	Sihanoukville, Stueng Hav, Veal Rengh (refer to Location Map)
(5)	Executing Agency	MPWT (Ministry of Public Works and Transport)
(6)	Proposed Work Components	• Component1: Construction of an access road to the center of Sihanoukville from NR4, • Component 2: Construction of an access road between Sihanoukville port and Stueng Hav, • Component 3: Rehabilitation of the existing road between Stueng Hav and Veal Renh, and • Component 4: Rehabilitation of the existing bridges (21 bridges)
(7)	Implementation Schedule	Expected implementation period is estimated as follows. *Sihanoukville Road Newtwork Construction and Improvement Project* 



The Study on National Integrated Strategy of Coastal Area and Master Plan of Sihanouk-ville for Sustainable Development

JICA Study Team

Location of Proposed Project on Proposed Land Use Map

No.	T-02

Project	**Kampot Road Network Construction and Old Bridge Rehabilitation Project**

Project Description

(1)	Project Scheme	Loan
(2)	Background	Kampot city is located at the junction for three routes, NR3 (from Phnom Penh to Kampot), NR3 (from Preah Sihanouk to Kampot) and NR33 (from Kep to Kampot). Though three routes come into Kampot city, all vehicles have to pass through the center of the city. The road network in Kampot city is not suitable for heavy vehicles. Kampot city is divided by Kampong Bay River and there is only one bridge for all vehicles to be able to pass through. Though there is one more bridge, it is too old and deteriorated and there is restriction for vehicle to over the bridge. Tough the old bridge is connected to the center of the city, it has not functioned as a part of the road network in Kampot city. The existing old bridge is shown below.

Restriction for heavy vehicle to over the bridge

Deteriorated sidewalk of the existing old bridge

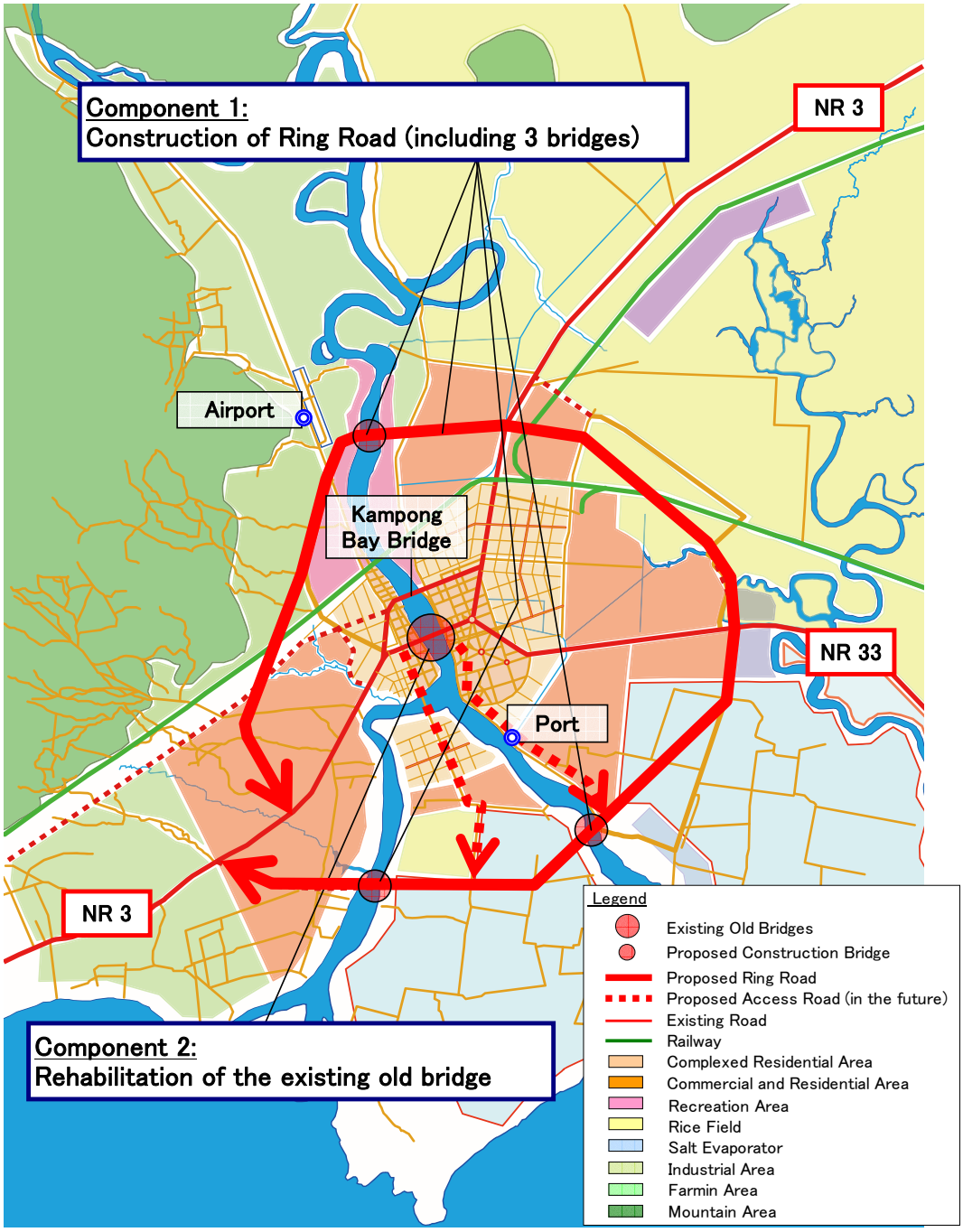
Bailay Bridge is built to connect with the existing old bridge

Moreover, an efficient road network is not only provided to connect three routes, which are NR3 (from Phnom Penh to Kampot), NR3 (from Preah Sihanouk to Kampot) and NR33 (from Kep to Kampot) and an infrastructure to transport in the city is not provided sufficiently.

(3)	Objectives	To rehabilitate the existing old bridge which is deteriorated seriously and provide an efficient road network around Kampot City
(4)	Location	Kampot (refer to Location Map)
(5)	Executing Agency	MPWT (Ministry of Public Works and Transport)
(6)	Proposed Work Components	• Component1: Construction of a ring road to establish a road network around Kampot City (including a construction of 3 bridges), and • Component2: Rehabilitation of the existing old bridge
(7)	Implementation Schedule	Expected implementation period is estimated as follows.

Kampot Old Bridge Rehabilitation Project

Component Activity	2010	2011	2012	2013	2014	2015	2016	2017
Feasibility Study								
Basic Design								
Detail Design								
Procurement & Construction								



The Study on National Integrated Strategy of Coastal Area and Master Plan of Sihanouk-ville for Sustainable Development	Location of Proposed Project on Proposed Land Use Map
JICA Study Team	

Rehabilitation of 21 Bridges according to Road Rehabilitation

Stung Hav Port
Stung Hav Port SEZ

Oil Jetties

Level Crossing & Signaling

The Study on Comprehensive Logistics Development between Preah Sihanoukville and Phnom Penh

Kbal Chhay Protection Forest

Railway Freight Terminal

Sihanoukville Port
Sihanoukville SEZ

Master Plan of Preah Sihanouk City

Urban Center

NR4

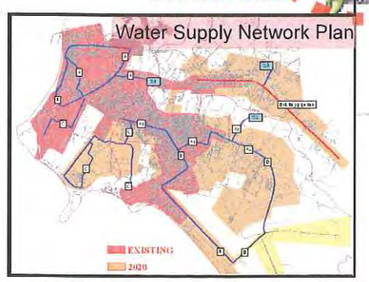
NR3

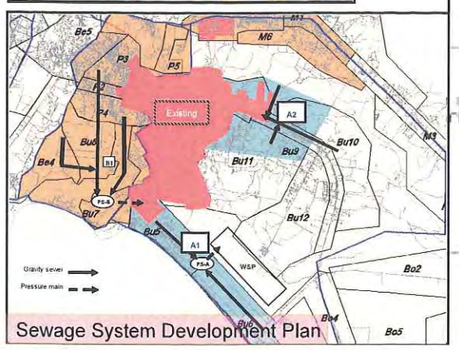
Solid Wast Dumping Site

Sihanoukville Airport

Ream National Park

Water Supply Network Plan





Sewage System Development Plan

N 0 5 10km

LAND USE	
Urbanization Promotion Area	
	Tourism
	Commercial
	Residential
	Complex
	Industrial
	Administration
	Public Facility
	Religious
	Sea port & Air port
Urbanization Control Area	
	Open Space
	National Park or Reservoir
	Preservation forest
	Scenic Green
	Agriculture Area
Infrastructure	
	Existing National Road
	Trail way
	Proposed Logistic Road
	Proposed Passenger Access Roed

<MP Programs>

- Urban Planning and Program
- Environmental Management Program
- Industrial Promotion and Logistics Development Program
- Urban Infrastructure Development Program

Master Plan of Urban Area in Preah Sihanouk

The Study on National Integrated Strategy of Coastal Area and Master Plan of Sihanouk ville for Sustainable Development

CiCaDs
Cambodia Integrated Coastal Area Development Strategies

JAPAN INTERNATIONAL COOPERATION AGENCY

Ministry of Land Management, Urban Planning and Construction