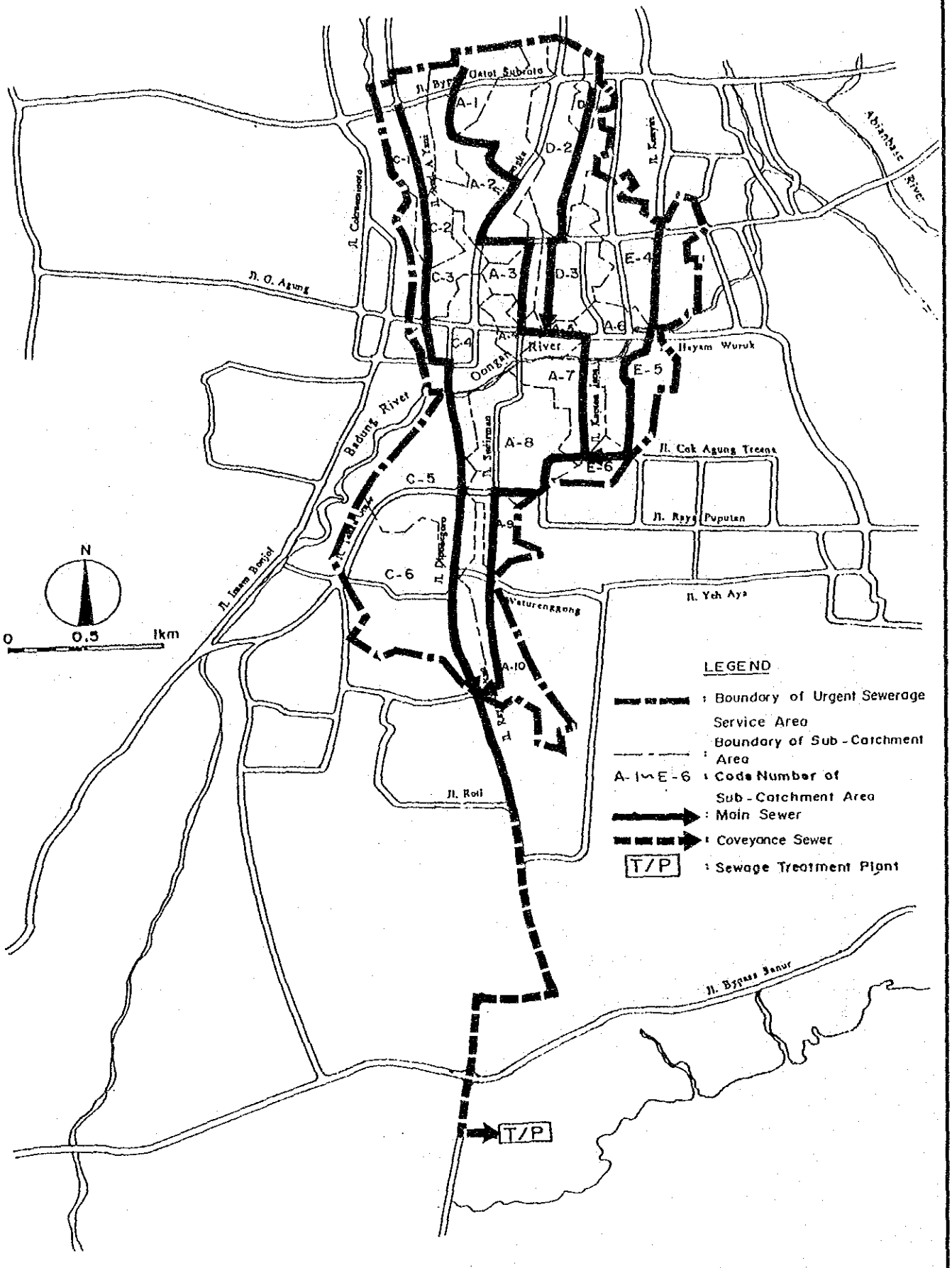

FIG. 2B PROJECT AREA - CENTRAL DENPASAR

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

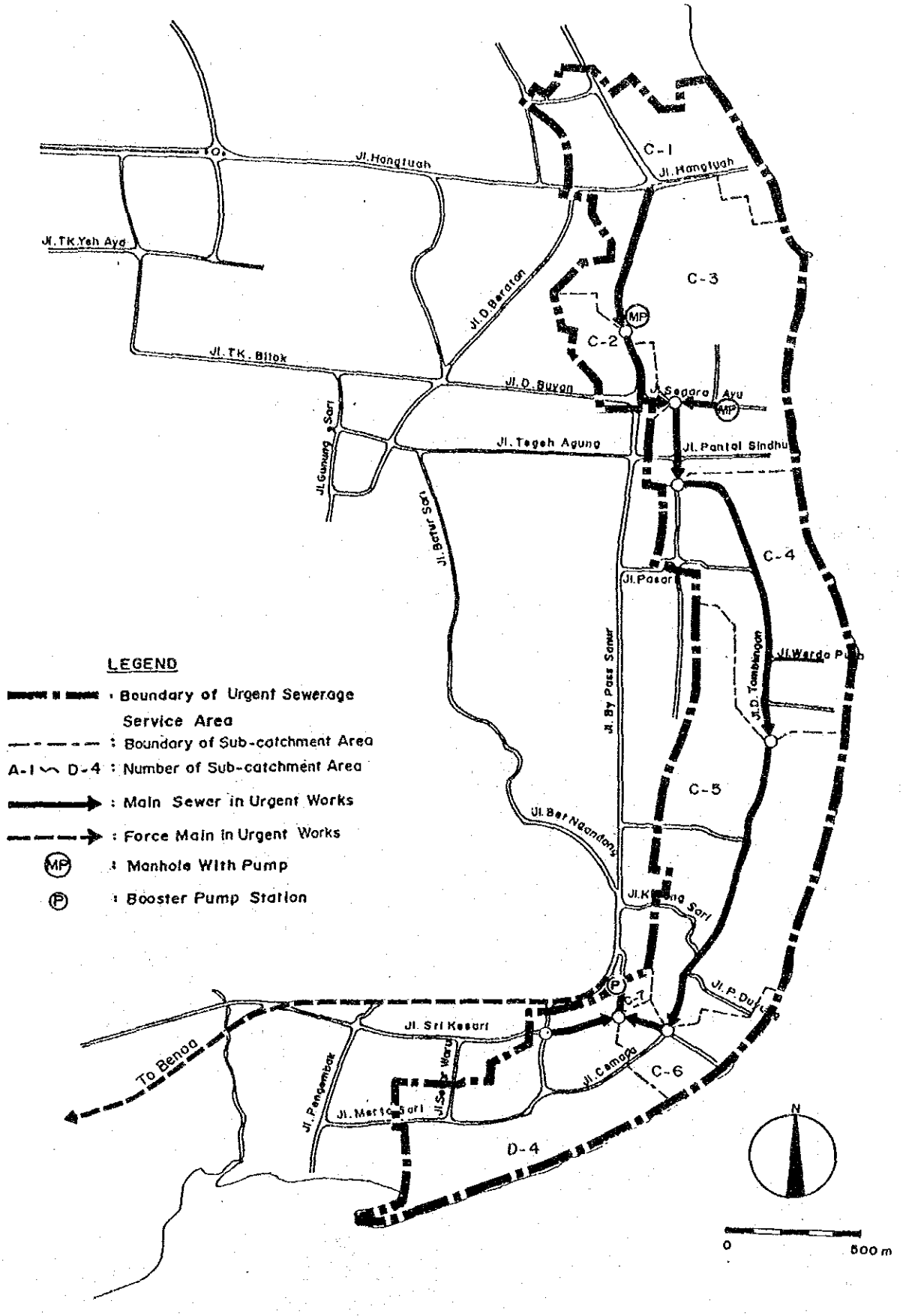

FIG. 2C PROJECT AREA - SANUR

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

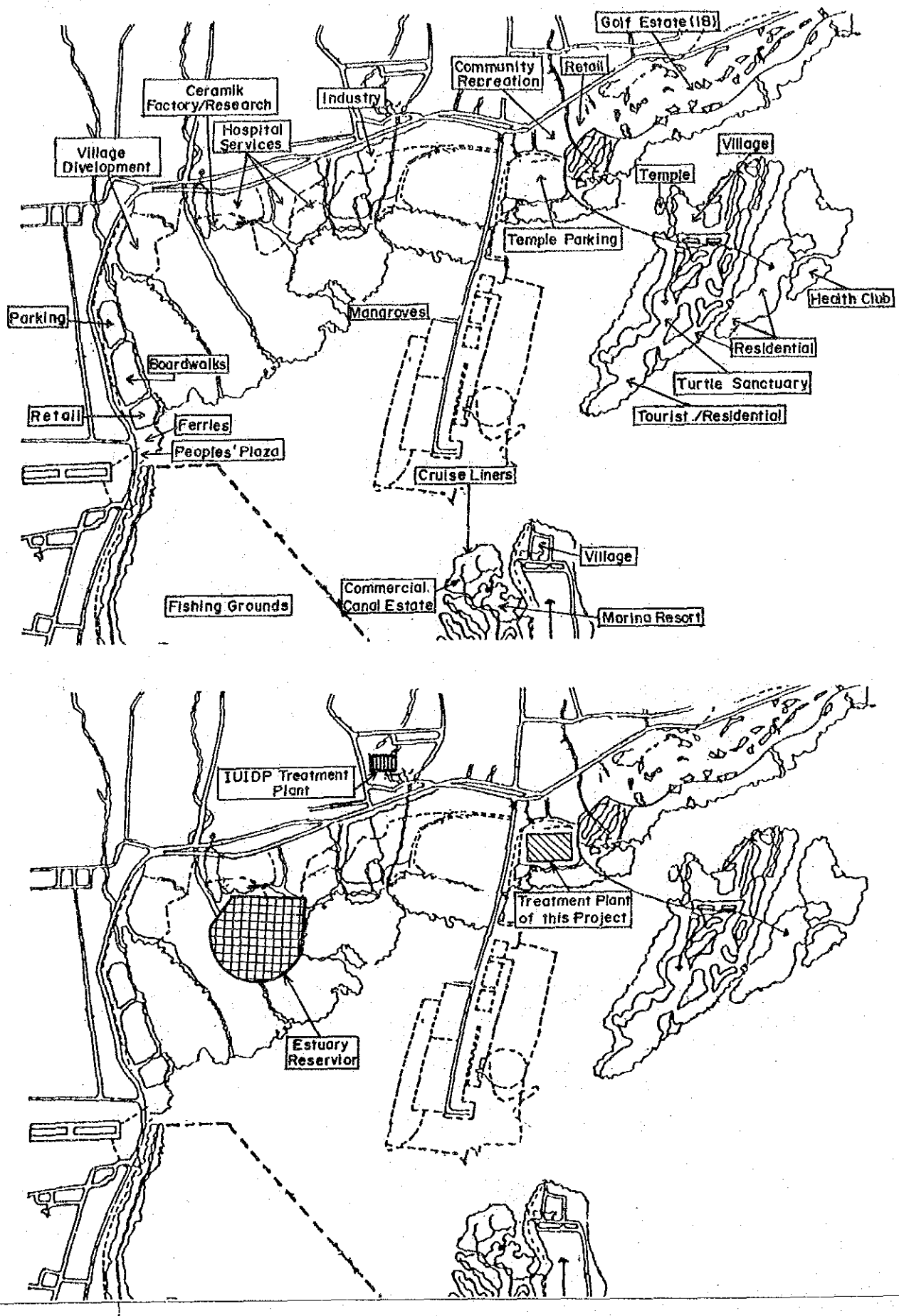

FIG. 3 AREA OF RELATED PROJECT

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

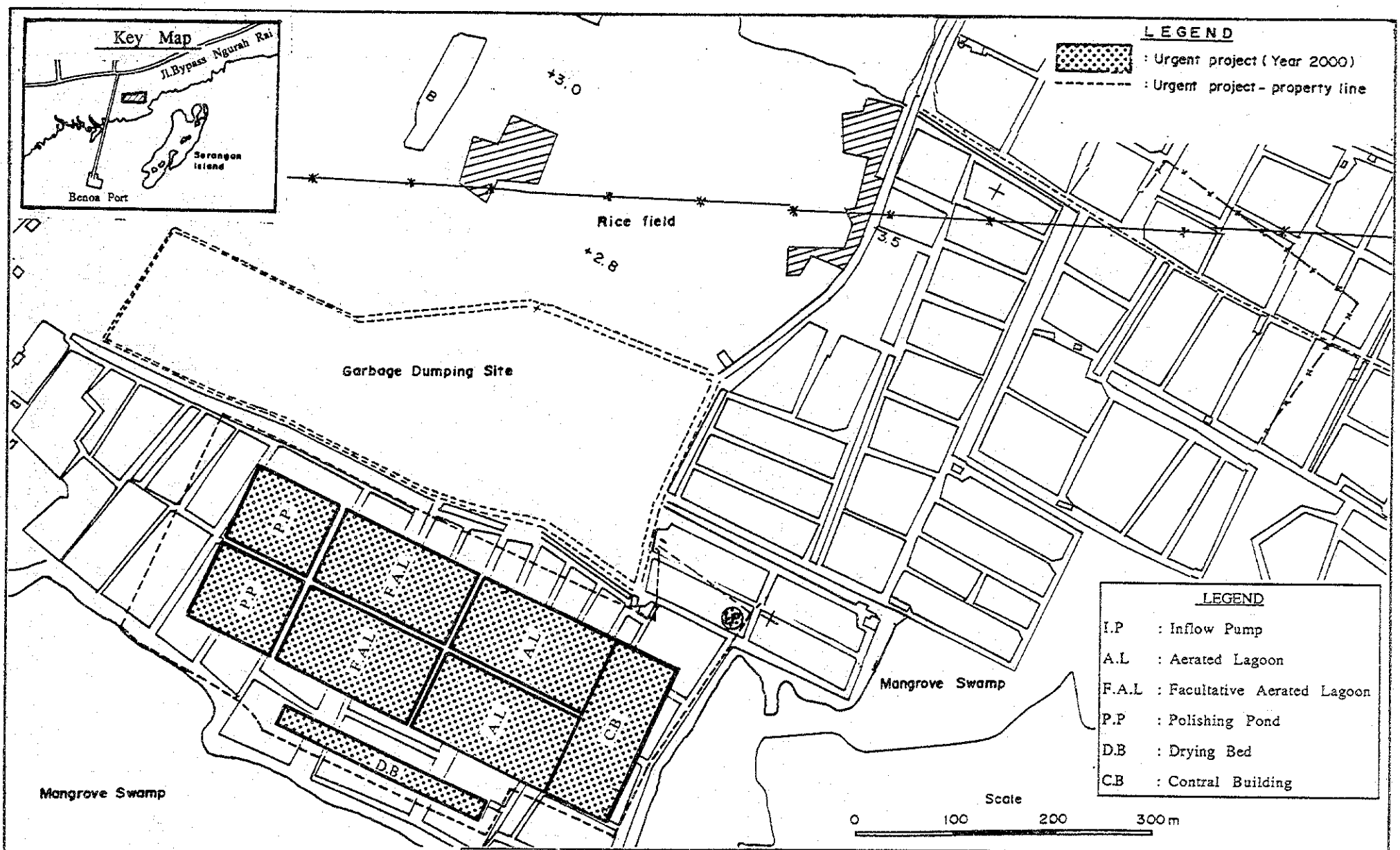

FIG. 4 LOCATION OF TREATMENT PLANT

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

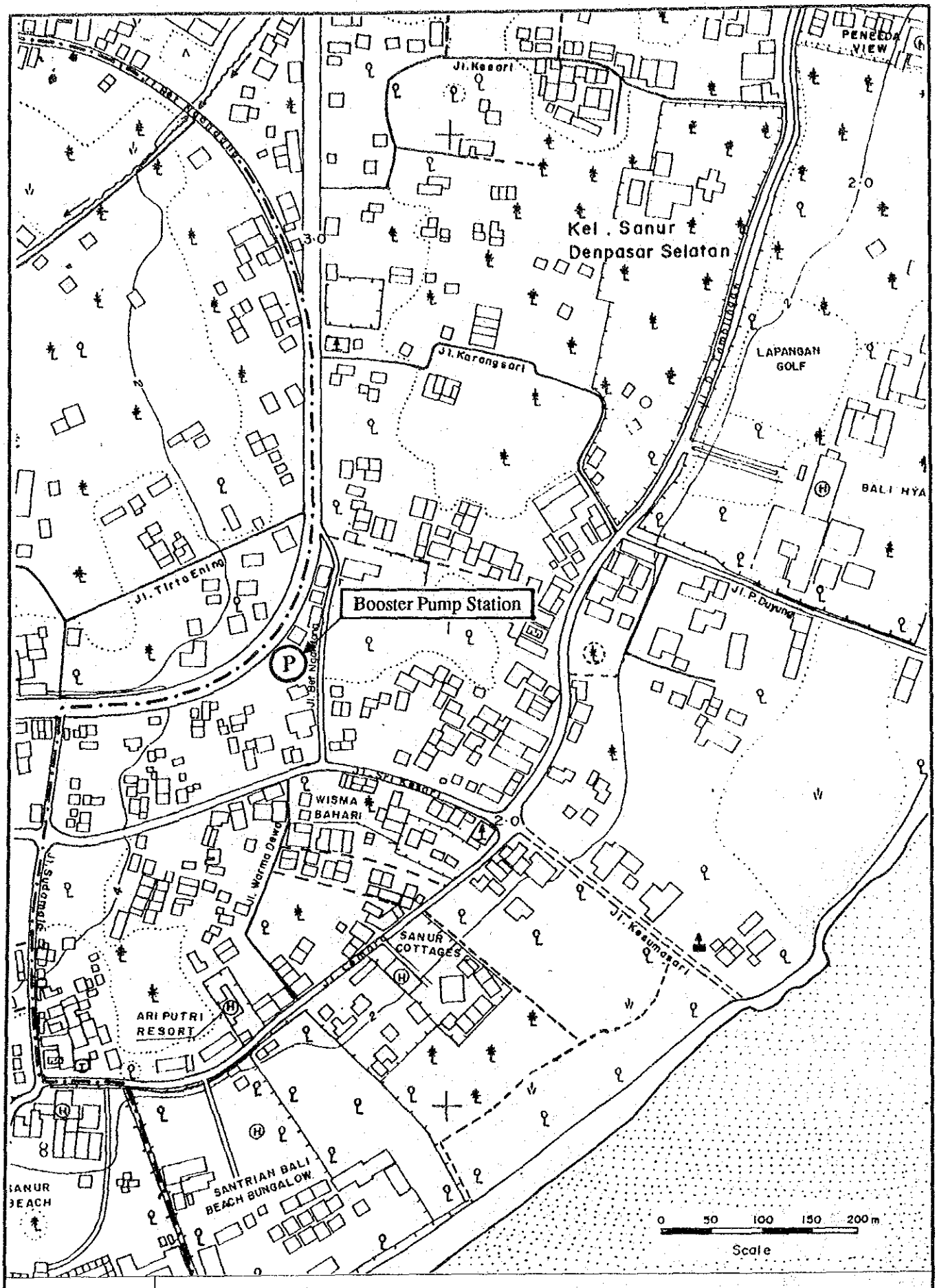

FIG. 5 LOCATION OF BOOSTER PUMP STATION

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

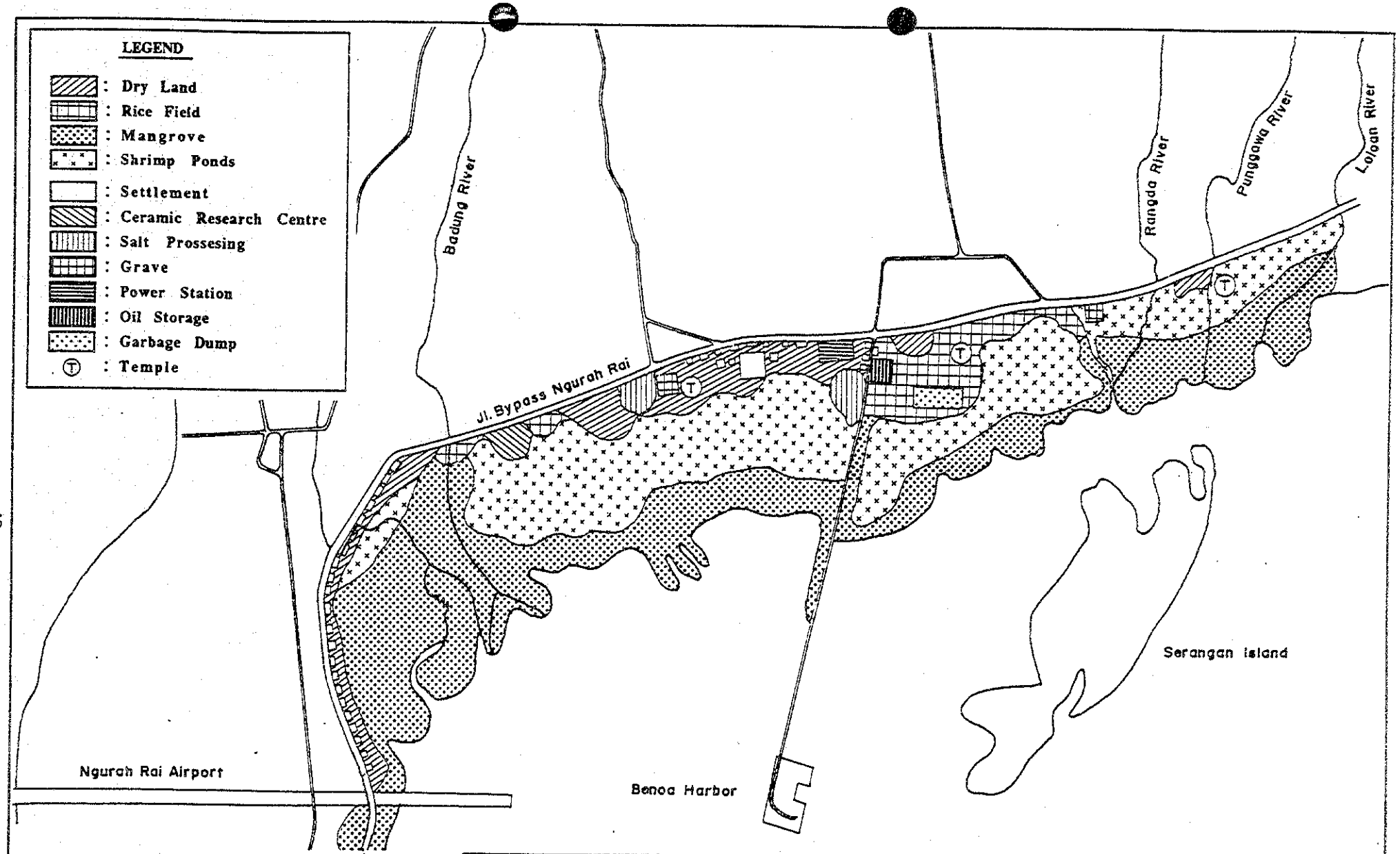

FIG. 6 EXISTING LAND USE IN BENOA COAST

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

ANNEX - 1

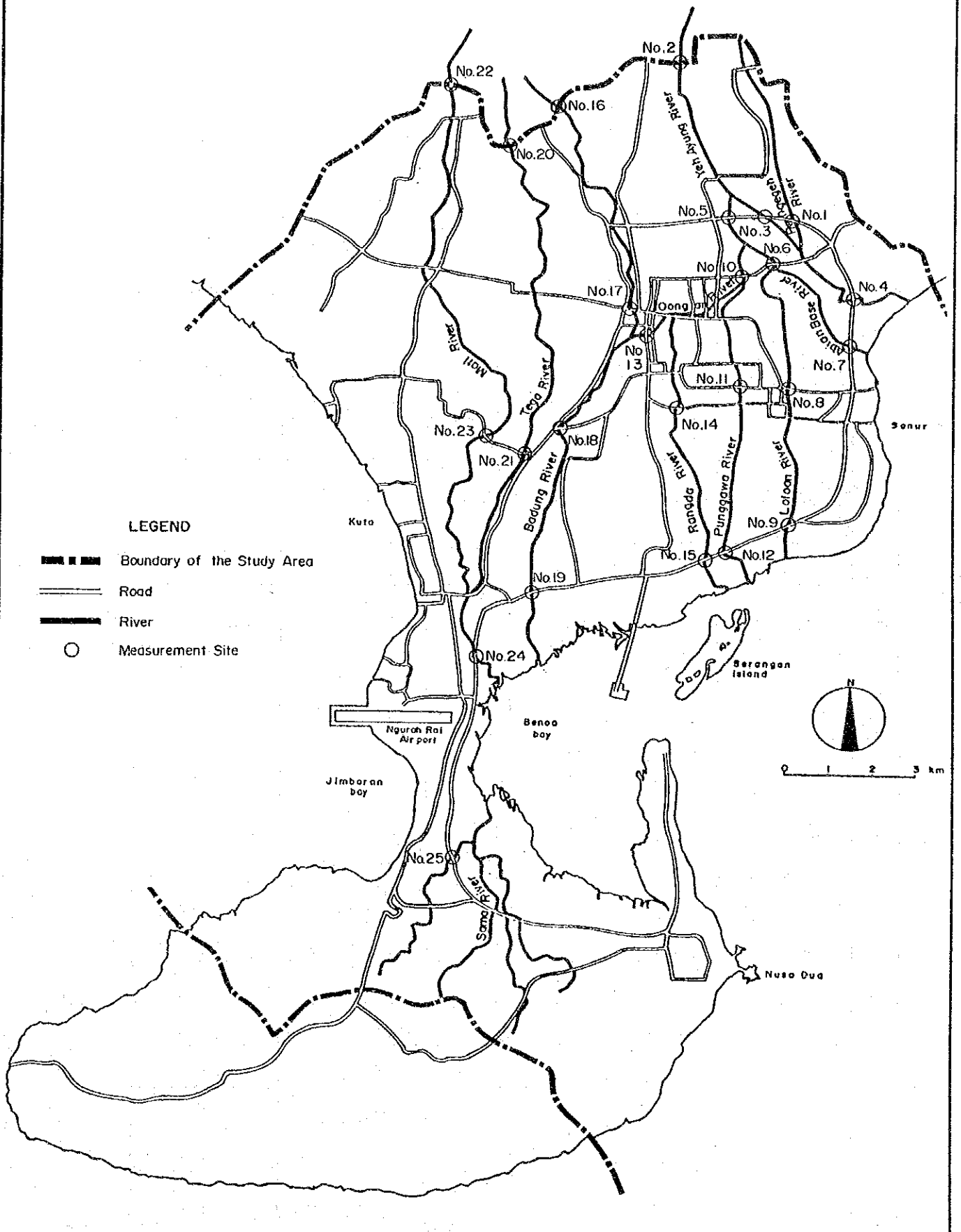

FIG. A.1 DISCHARGE MEASUREMENT SITES BY JICA

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

Table A.1 Observed River Discharge by JICA

No.	River Name	Dry Season		Rainy Season	
		Date	Q (m3/s)	Date	Q (m3/s)
1	Pengegeh	8-Nov-91	1.37	15-Jan-92	0.90
2	Ayung	6-Nov-91	4.01	15-Jan-92	4.39
3	Ayung	8-Nov-91	0.44	15-Jan-92	3.16
4	Ayung	7-Nov-91	0.76	15-Jan-92	2.46
5	Abianbase	8-Nov-91	1.56	13-Jan-92	4.74
6	Abianbase	8-Nov-91	1.02	13-Jan-92	1.50
7	Abianbase	6-Nov-91	0.05	13-Jan-92	0.07
8	Loloan	8-Nov-91	0.06	13-Jan-92	0.02
9	Loloan	7-Nov-91	0.05	13-Jan-92	1.05
10	Oongan	8-Nov-91	0.78	13-Jan-92	1.00
11	Punggawa	8-Nov-91	0.05	13-Jan-92	0.37
12	Punggawa	7-Nov-91	0.06	13-Jan-92	0.74
13	Oongan	8-Nov-91	0.06	13-Jan-92	0.31
14	Rangda	8-Nov-91	0.20	13-Jan-92	0.07
15	Rangda	6-Nov-91	0.37	13-Jan-92	0.98
16	Badung	6-Nov-91	0.89	15-Jan-92	1.07
17	Badung	8-Nov-91	1.76	15-Jan-92	2.96
18	Badung	8-Nov-91	1.72	15-Jan-92	2.61
19	Badung	6-Nov-91	2.34	13-Jan-92	2.55
20	Tega	6-Nov-91	0.38	15-Jan-92	0.18
21	Tega	6-Nov-91	0.36	15-Jan-92	0.35
22	Mati	6-Nov-91	0.74	15-Jan-92	1.61
23	Mati	6-Nov-91	2.61	15-Jan-92	0.90
24	Mati	6-Nov-91	1.11	16-Jan-92	1.29
25	Sama	6-Nov-91	2.04	16-Jan-92	0.63

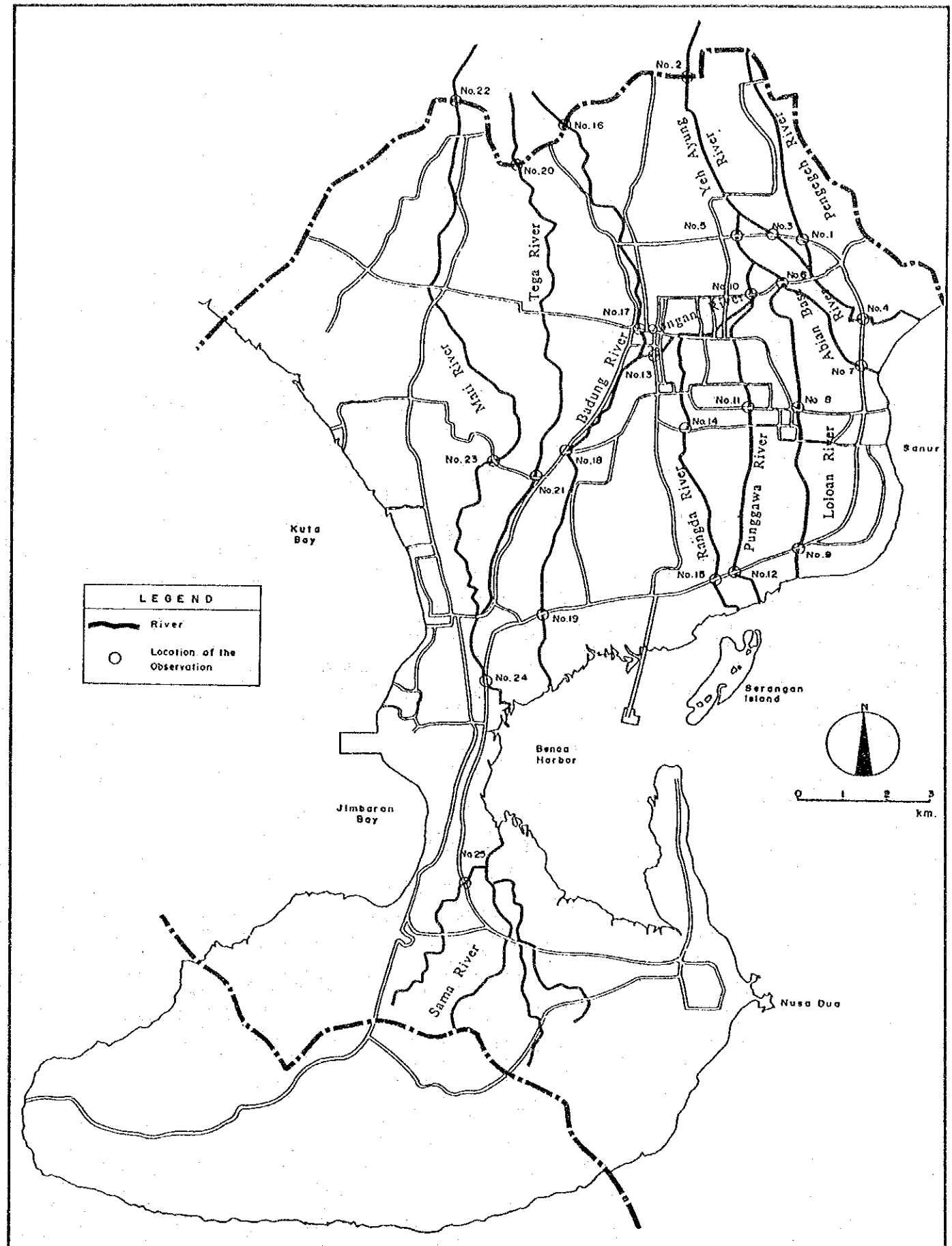

FIG. A.2 RIVER WATER QUALITY OBSERVATION POINT BY JICA (1991~1992)

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

JICA A.D 1993

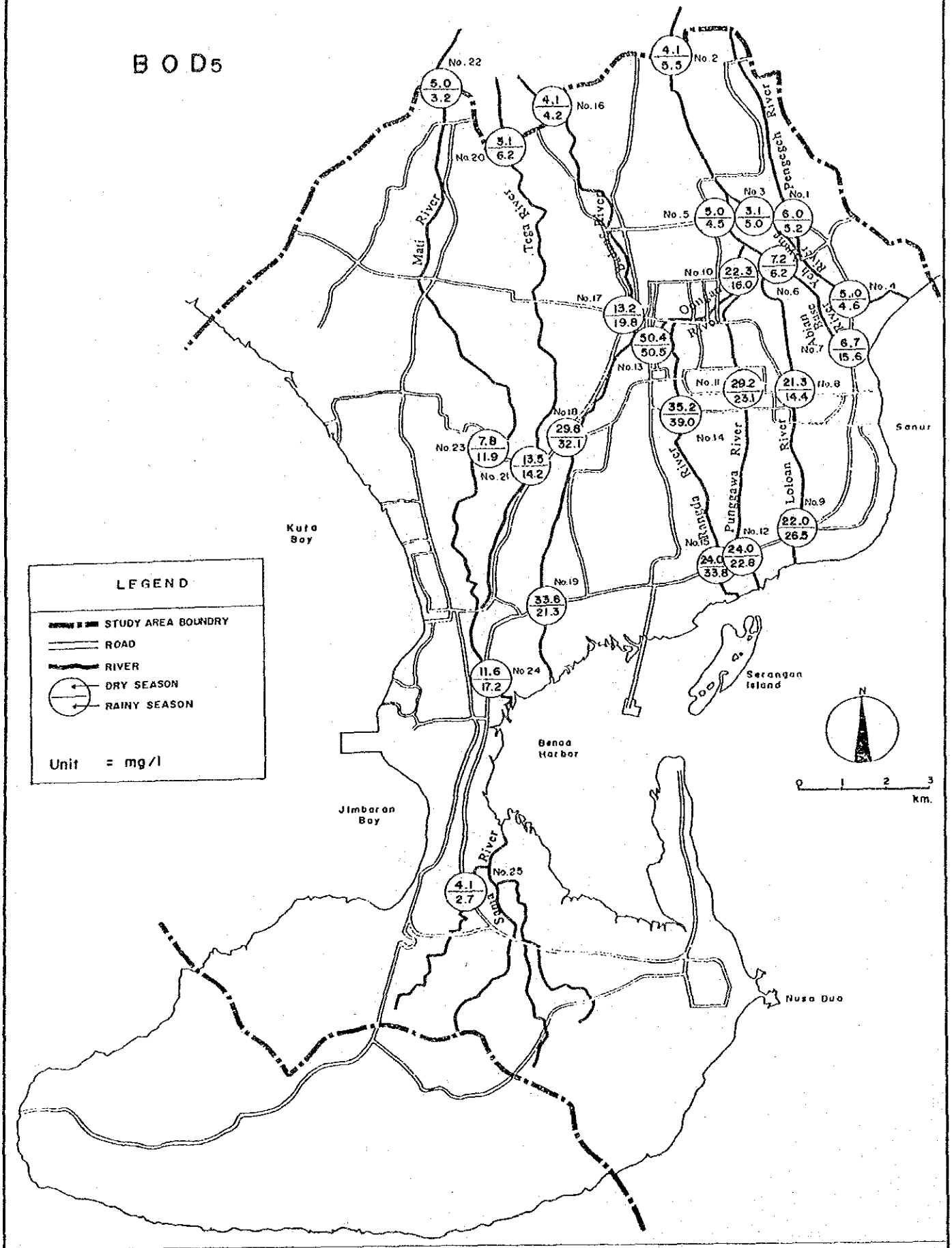

FIG. A.3 OBSERVED RIVER WATER QUALITY BY JICA

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

JICA A.D 1993

COD cr

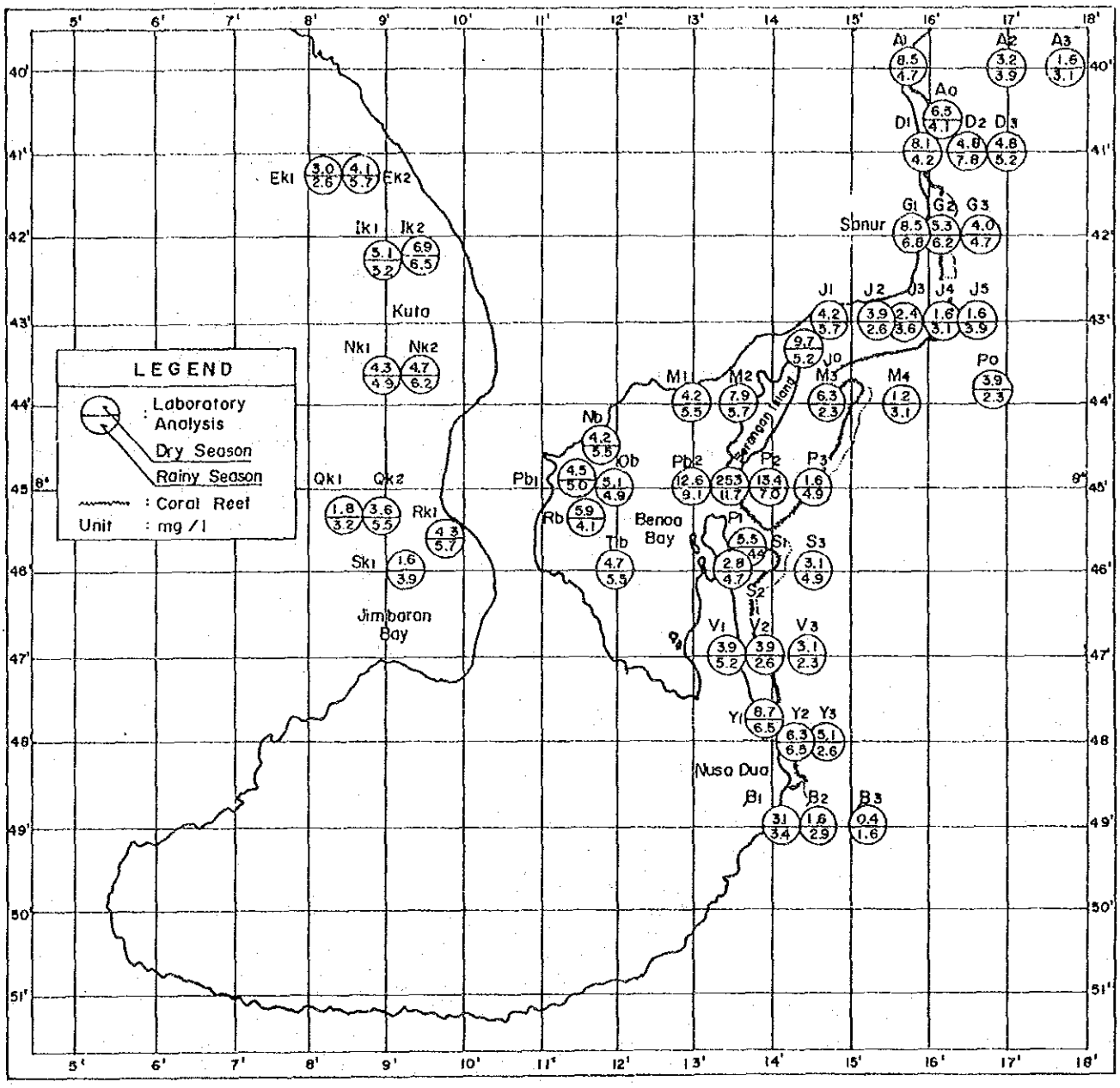

FIG. A.4 OBSERVED SEA WATER QUALITY BY JICA

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

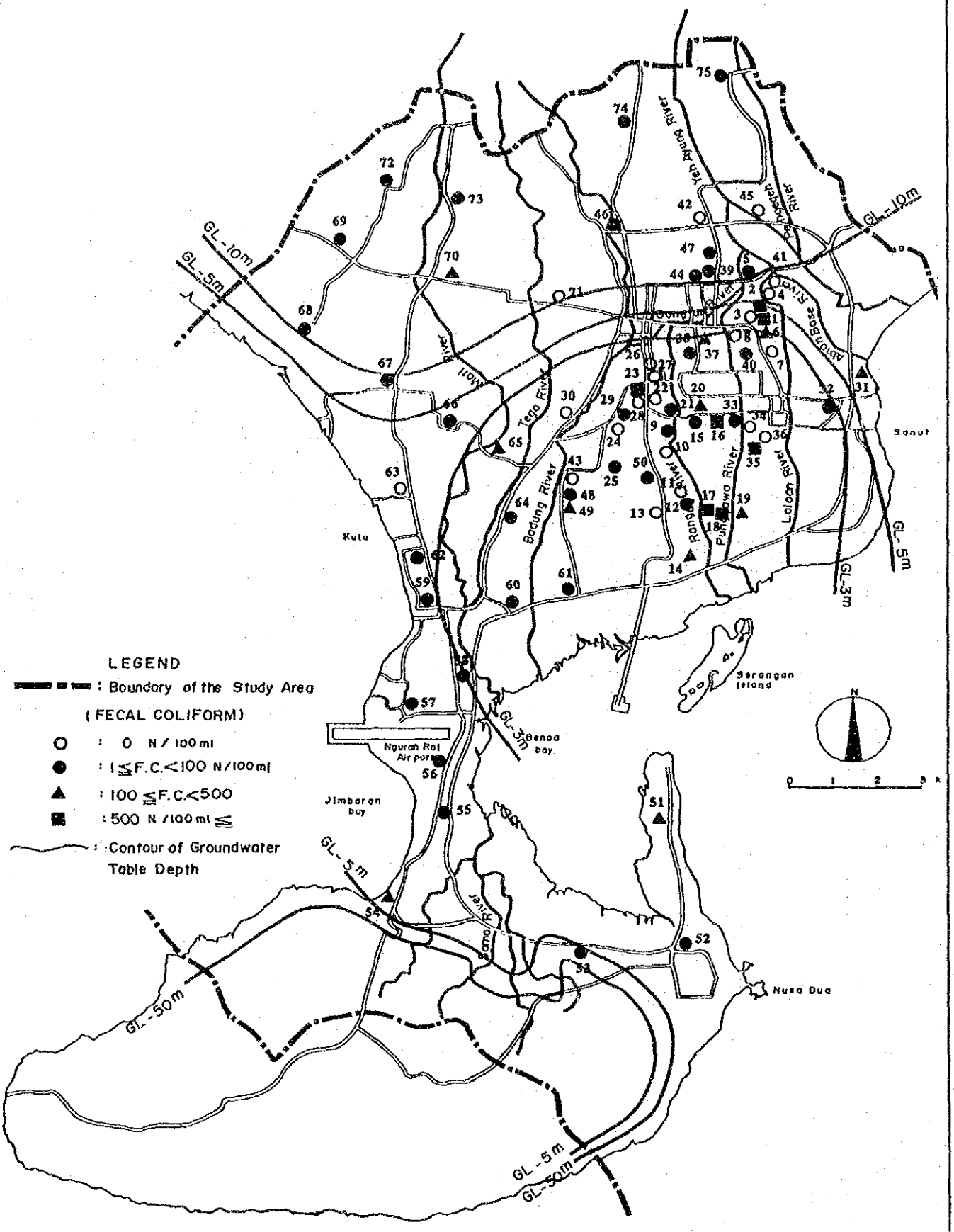

FIG. A.5 OBSERVED GROUNDWATER QUALITY BY JICA IN 1991 (FECAL COLIFORM)

THE DEVELOPMENT STUDY ON WASTEWATER DISPOSAL FOR DENPASAR

ANNEX - 2

Table A2.1 Common Fishes Living Around Mangrove Ecosystem

No.	Local Name	Scientific Name
1.	Belodo/Belodok	(*Periopthalmus dipus, Blkr*)
2.	Beloso/Boso	(*Glossogobius giceris*)
3.	Bandeng	(*Channos channos*)
4.	Pajos/payos	(*Silligo sihama*)
5.	Belanak	(*Mugil dussmieri*)
6.	Mujair	(*Oreochromis mossambicus*)
7.	Belut	(*Pluta alba*)
8.	Kerong-kerong	(*Therapos theraps*)
9.	Bulan-bulan	(*Megalops cyprinoides*)
10.	Udang Windu	(*Penaens monodon, Fab*)
11.	Udang Manis	(*Methapenaeus Sp.*)
12.	Udang Putih	(*Penaus Merguensis*)
13.	Kepiting Bakau	(*Scylla Serrata*)

Table A2.2 Common Fishes Living Around the Benoa Bay

No.	Local Name	Scientific Name
1.	Peperek	(*Leiognathus splendens*)
2.	Belanak	(*Mugil dessumeiri*)
3.	Bandeng	(*Channos channos*)
4.	Kerapu	(*Epinephelus tauvina*)
5.	Swangli	(*Priacanthus tayenus*)
6.	Lingkis	(*Siganus canaliculatus*)
7.	Ekor Kuning	(*Caesio erythrogoster*)
8.	Udang Windu	(*Penaeus monodon*)
9.	Udang Windu	(*Penaeus merguensis*)
10.	Bronang	(*Siganus*)

Table A2.3 Species of Birds over Mangrove Forest at East Suwung

No.	Local Name	Scientific Name	Family
1.	Pecuk Ular	(*Anhinga anhinga melanogaster*)	Phalacrocoracidae
2.	Cangak	(*Ardea cinerea rectirostris*)	Ardeidae
3.	Kuntul	(*Egretta garzettanigripes*)	Ardeidae
4.	Blekok	(*Ardeola speciosa*)	Ardeidae
5.	Kuntul malam	(*Nycticorax nycticorax*)(*Linn*)	Ardeidae
6.	Kokokan	(*Ixobrychus cinnanomeus cinnanomeus*)(*Gmell*)	Ardeidae
7.	Tekukur	(*Streptopelia chinensis tigrina*) (*Temm*)	Cuculidae
8.	Perkutut	(*Geopelia striata*)(*Linn*)	Cuculidae
9.	Kucica	(*Copsychus saularis javensis*)	Muscicapidae
10.	Perenjak	(*Prinia familiaris olivacea*)	Muscicapidae
11.	Walet	(*Collocalia gigas*)(*Hart&Butl*)	Apodidae
12.	Walet	(*Collocalia esculenta linchi*) (*Horsf & Moore*)	Apodidae
13.	Walet coklat	(*Collocalia inexpectata bartelsi*) (*Stress*)	Apodidae
14.	Burung rangkong	(*Aceros undulatus*)	Bucerotidae
15.	Burung leher kuning	(*Zosterops palpebrosa williamsoni*)	Zosteropidae
16.	Ulung-ulung	(*Spizaetus cirhatus limnaeetus*)	Accipitridae
17.	Elang	(*Haliastur indus intermedius*) (*Gurney*)	Accipitridae
18.	Tilil	(*Tringa glareola*)(*Linn*)	Scalopocidae
19.	Prit	(*Lonchura leucogastroides*) (*Horsf & Moore*)	Sturnidae
20.	Burung madu	(*Antreptes singalensis phoenicotis*) (*Temm*)	Nectariniidae
21.	Burung manyar	(*Pleceus manyar*)	Ploceidae
22.	Cerucuk	(*Pynonotus analis*)	Pycnonotidae
23.	Gagak	(*Corvus enca*)	Curvidae

Matrix of Important Environmental Impact Assessment (1)

Assessment Factor	Project Stage	Impact Examination	Impact Assessment
(a) Population Affected	1) Pre-construction stage	No resettlement of population with respect to land acquisition for treatment plant and booster pump station is involved.	Less important
	2) Construction stage	The daily average population affected is 180 person. While the sewered population is 129,000. Accordingly, the ratio of population affected to that of benefited becomes 0.14%.	Less important
	3) Operation stage	The impact is less important, in consideration to the remoteness of the treatment plant from residential areas and its surrounding buffer zone of mangrove forestation.	Less important
(b) Area of impact distribution	1) Pre-construction stage	The required land of 9.2 ha for construction of the treatment plant belongs to the Indonesian Government and no resettlement is involved. Though this land is used as shrimp ponds by private sector, it will be returned to the government by the end of 1992. And the land of 500 m^2 is required for booster pump station in Sanur. Though this land belongs to the private sector, it is a vacant land requiring no resettlement.	Less important
	2) Construction stage	The affected area during the construction stage is as follows: Sewer installation per day : 1.8 ha Treatment plant construction (maximum) : 9.2 ha Total area affected : 11.0 ha The area of benefit (Project Area) : 1,363 ha The ratio of affected area to benefited area is 0.8%.	Less important
	3) Operation stage	The area of any impact distribution of odor, noise would be confined to the treatment plant area of 9.2 ha, in consideration to a surrounded mangrove forestation.	Less important

Matrix of Important Environmental Impact Assessment (2)

Assessment Factor	Project Stage	Impact Examination	Impact Assessment
(c) Duration of impact	1) Pre-construction stage	No impact is anticipated.	Less important
	2) Construction stage	The duration of impact is the duration of construction period of 6 years. This is a very short period in comparison to the long-term benefit of the project beyond its implementation.	Less important
	3) Operation stage	The duration of impact is long-term, as the facilities are of permanent nature. Still, it is assessed to be less important, as the site is located in a remote area.	Less important
(d) Intensity of impact	1) Pre-construction stage	No impact is anticipated.	Less important
	2) Construction stage	Based on the assessment with respect to those items of a), b) and c) of above, it could be concluded that the intensity of impacts over the period of 6 years, which is a temporary activity of construction works.	Less important
	3) Operation stage	The intensity of impact is assessed to be less important based on the foregone assessment under a), b) and c).	Less important

Matrix of Important Environmental Impact Assessment (3)

Assessment Factor	Project Stage	Impact Examination	Impact Assessment
(e) Other environmental components affected	1) Pre-construction stage	No impact is anticipated	Less important
	2) Construction stage	(i) Vibration and noise nuisance The sewer length prone to vibration and noise nuisance, the sewer length of open trench with sheet piling, is 11.3 km. This is only a 6% of the total sewer length of about 190 km.	Less important
		(ii) Lowering of groundwater table The sewer installation works below groundwater table is about 8.3 km, which is about 4.6% of the total sewer installation.	Less important
		(iii) Dust nuisance Dust nuisance can be minimized easily by adopting accepted procedures like water spraying and covering of soil transportation vehicles.	Less important
		(iv) Traffic disturbance The effect due to the passage of additional 23 trips of surplus transportation soil trucks on overall traffic is not significant. While, other transportation can be planned to avoid heavy traffic duration. The average daily sewer installation length of 90 m represents 004% of the total road length in the Project Area of 220 km.	Less important
		(v) Road damages In consideration to the available mitigatory measures of road damages and the amenability of quick repairs of road damages, the impact is considered as less important.	Less important

Matrix of Important Environmental Impact Assessment (4)

Assessment Factor	Project Stage	Impact Examination	Impact Assessment
	3) Operation stage	(i) Odor The odor nuisance will be minimal due to aerobic nature of treatment, ample buffer zone, favorable topographic location and remoteness of treatment plant.	Less important
		(ii) Noise In consideration to the buffer zone of surrounded mangrove forestation, remoteness of the treatment plant location and the available technology for noise-proof structures, the impact of noise nuisance is assessed to be less important.	Less important
		(iii) Foam Based on the same consideration as of (ii) above, the impact is considered as less important.	Less important
(f) Cumulative-ness of impact	1) Pre-construction stage	No impact is anticipated.	Less important
	2) Construction stage	In consideration to the very temporary nature of the construction activities, the cumulativeness of impact is assessed to be nil (o).	Less important
	3) Operation stage	There is no accumulative effect concerned to the operation of treatment plant, as all end products are dispersed to the environment. Hence the cumulative impact is nil (o).	Less important

Matrix of Important Environmental Impact Assessment (5)

Assessment Factor	Project Stage	Impact Examination	Impact Assessment
(g) Reversibility of impact	1) Pre-construction stage	No impact is anticipated.	Less important
	2) Construction stage	The impact is reversible as the construction activities are only temporary ones.	Less important
	3) Operation stage	The land utilization within the 9.2 ha of treatment plant area will be irreversibly changed, with the operation of treatment system. This area of 9.2 ha is only a 0.8% of the benefited area of 1,363 ha.	Less important

ATTACHMENT

GUBERNUR KEPALA DAERAH TINGKAT I BALI

INSTRUKSI GUBERNUR KEPALA DAERAH TINGKAT I BALI

NOMOR 12 TAHUN 1990

TENTANG

PELAKSANAAN KEGIATAN REBOISASI PADA AREAL PERTAMBAKAN DI KAWASAN HUTAN PRAPAT BENOA DENPASAR

GUBERNUR KEPALA DAERAH TINGKAT I BALI,

Menimbang : a. bahwa belum adanya tindak lanjut yang nyata sebagai pelaksanaan Surat Menteri Kehutanan tanggal 13 Pebruari 1988 Nomor 095/Menhut-II/1988 perihal Pembatalan Perjanjian Pinjam Pakai Tanah Kawasan Hutan di Prapat Benoa Bali;

b. bahwa pengelolaan tanah kawasan hutan tersebut, oleh petani/pengusaha tambak tidak sesuai dengan maksud dan tujuan sebagaimana Surat Perjanjian;

c. bahwa untuk mencapai maksud dan tujuan tersebut perlu segera mereboisasi seluruh areal tambak;

d. bahwa untuk maksud tersebut huruf c perlu dikeluarkan Instruksi Gubernur Kepala Daerah Tingkat I Bali.

Mengingat : 1. Undang-undang Nomor 5 Tahun 1974 tentang Pokok - pokok Pemerintahan di Daerah (Lembaran Negara Republik Indonesia Tahun 1974 Nomor 38; Tambahan Lembaran Negara Republik Indonesia Nomor 3037);

2. Undang-undang Nomor 64 Tahun 1958 tentang Pembentukan Daerah-daerah Tingkat I Bali, Nusa Tenggara Barat dan Nusa Tenggara Timur (Lembaran Negara Republik Indonesia Tahun 1958 Nomor 115; Tambahan Lembaran Negara Republik Indonesia Nomor 1649);

3. Undang - .....

3. Undang-undang Nomor 5 Tahun 1967 tentang Ketentuan-ketentuan Pokok Kehutanan (Lembaran Negara Republik Indonesia Tahun 1967 Nomor 8;Tambahan Lembaran Negara Republik Indonesia Nomor 2813);

4. Undang-undang Nomor 4 Tahun 1982 tentang Ketentuan-ketentuan Pokok Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1982 Nomor 12; Tambahan Lembaran Negara Republik Indonesia Nomor 3215);

5. Peraturan Pemerintah Nomor 28 Tahun 1985 tentang Perlindungan Hutan (Lembaran Negara Republik Indonesia Tahun 1985 Nomor 39; Tambahan Lembaran Negara Republik Indonesia Nomor 3294).

M E N G I N S T R U K S I K A N :

Kepada : 1. Kepala Dinas Kehutanan Propinsi Daerah Tingkat I Bali.
2. Bupati Kepala Daerah Tingkat II Badung.
3. Para Petani/Pengusaha tambak dikawasan hutan Suwung Prapat Benoa Denpasar.

Untuk : 1. Kepala Dinas Kehutanan Propinsi Daerah Tingkat I Bali agar :

a. mengatur pelaksanaan pengosongan / pengeringan tambak sesuai dengan tahapan yang telah ditentukan. Dalam pelaksanaan kegiatan pengosongan/pengeringan tersebut dapat melibatkan unsur-unsur ABRI, Kepolisian dan instansi serta organisasi - lainnya;

b. melaksanakan kegiatan reboisasi secara bertahap pada areal pertambakan di kawasan hutan Suwung Prapat Benoa Denpasar, sekurang - kurangnya 1/3- (sepertiga) dari luas seluruh areal tambak atau sekurang-kurangnya 100 Ha. setiap tahun, dimulai pada Tahun 1990 sampai dengan 1992;

c. membuat petunjuk teknis lebih lanjut sebagai pelaksanaan instruksi ini.

2. Bupati .....

2. Bupati Kepala Daerah Tingkat II Badung berkewajiban membantu pelaksanaan pengosongan/pengeringan tambak yang bersangkutan serta membantu kelancaran kegiatan reboisasi dalam kawasan hutan.

3. Para Petani/Pengusaha tambak di kawasan hutan Suwung Prapat Benoa Denpasar agar :

   a. mengosongkan/mengeringkan setiap tahun sekurang - kurangnya 1/3 (sepertiga) dari luas tambak yang dikerjakannya, mulai bulan Desember 1990;

   b. waktu pelaksanaan pengosongan / pengeringan - sebagaimana dimaksud huruf a harus sudah selesai selambat-lambatnya pada tanggal 31 Desember setiap tahun;

   c. pelaksanaan pengosongan/pengeringan dimaksud dapat dilakukan secara perorangan atau berkelompok.

4. Biaya kegiatan reboisasi dimaksud dibebankan pada Anggaran Pendapatan dan Belanja Daerah (APBD) Propinsi Daerah Tingkat I Bali.

5. Instruksi ini agar dilaksanakan dengan sebaik - baiknya.

6. Dengan dikeluarkannya Instruksi ini, maka segala - kebijaksanaan daerah mengenai penanganan tambak di - kawasan hutan Suwung Prapat Benoa Denpasar sepanjang bertentangan dengan maksud Instruksi ini dinyatakan tidak berlaku.

7. Instruksi ini mulai berlaku sejak tanggal dikeluarkan.

Dikeluarkan di : Denpasar
Pada tanggal : 13 Juni 1990

GUBERNUR KEPALA DAERAH TINGKAT I BALI,

IDA BAGUS OKA
Nip. 130222536.

Salinan Instruksi ini disampaikan kepada :

1. Menteri Dalam Negeri di - Jakarta.
2. Menteri Kehutanan di - Jakarta.
3. Sekretaris .....

3. Sekretaris Jendral Departemen Kehutanan di - Jakarta.
4. Direktur Jendral Reboisasi dan Rehabilitasi Lahan di - Jakarta.
5. Direktur Jendral Perlindungan Hutan dan Pelestarian Alam di - Jakarta.
6. Kepala Kantor Wilayah Departemen Kehutanan Propinsi Bali di - Denpasar.
7. Staf Lengkap Gubernur Kepala Daerah Tingkat I Bali di - Denpasar.

APPENDIX E

FINANCIAL EVALUATION

APPENDIX E FINANCIAL EVALUATION

1. People's Willingness to Pay

1.1 Estimation Methodology

"Willingness to pay" means the amount the beneficiaries concerned are willing to pay for sewerage services.

At the master plan study stage a sampling questionnaire survey was conducted to know how much beneficiaries are willing to pay monthly for sewerage services. The selected beneficiaries were households, hotels, restaurants, shops/banks and factories. As a result the relationships between household income or corporate sales and willingness to pay were established in the form of regressional equations. They are shown in Table F.2.1 of Master Plan Study Supporting Report Appendix F.

Using those equations willingness to pay per month of the above-mentioned beneficiaries in 1991 was calculated. It is shown in Table F.2.2 of the same report.

According to the table, willingness to pay as percentage of household income ranges from 0.398% to 0.978% depending on income class. Also, willingness to pay as percentage of corporate sales ranges from 0.05% to 0.489% depending on the type and scale of an establishment.

By applying Table F.2.2 to the beneficiaries of the urgent sewerage service area, Table E.1.1 was prepared. It shows that the average willingness to pay per household is Rp.2,264.

Average monthly willingness to pay per hotel room is Rp.7,824 for the classified hotel and Rp.2,000 for the non-classified hotel or other accommodation. One classified hotel in the urgent sewerage service area is on average willing to pay Rp.1,036,415 per month, and one non-classified hotel or other accommodation is on average willing to pay Rp.32,757 per month.

Restaurants are ready to pay Rp.127 per seat per month. One restaurant is on average ready to pay Rp.7,977 per month.

One shop is on average per month willing to pay Rp.4,957, one factory Rp.8,802 and one bank Rp.29,522.

For a particular beneficiary if one combines the above willingness to pay per unit with the number of units in the urgent sewerage service area in 1990, one will get the total annual willingness to pay in the same year for that beneficiary.

As the regression equations determining the relationships between income/sales and willingness to pay dictate, willingness to pay per unit will go up in future because income/sales per unit will rise in parallel with the growth of the per capita GDP.

However, it was assumed that monthly willingness to pay per unit shown in Table E.1.1 can be applied in estimating the total annual willingness to pay in future years so that estimation may be as conservative as possible.

1.2 Willingness to Pay

1.2.1 Total Willingness to Pay

Tables D.2.11 to D.2.16 show the estimated number of households, hotels, restaurants, shops, factories and banks in the urgent conventional sewerage service area in 1990 and 2000. Also, Tables D.2.2 to D.2.7 show the estimated number of the above types of beneficiaries in the overall sewerage service area in 2010.

By combining these data with willingnesses to pay per unit in Table E.1.1, Table E.1.2 was prepared.

As the table shows, the total annual willingness to pay in the urgent sewerage service area works out at Rp.763 million in 1990. It will increase to Rp.1,314 million in 2000. In 2010 sewerage services will cover the entire master plan area. As a result, the total annual willingness to pay will reach Rp.3,582 million in the same year.

Regarding Rp.1,314 million in 2000, households are the topmost contributor with the share of 40.1%, followed by hotels and shops with 34.6% and 5.1%, respectively. Area wise, the share of the Denpasar area is greater with 52.4%, that of the Sanur area being 47.6%.

Area and type of beneficiary wise, in the Denpasar area households have a leading share of 68.4%, followed by shops and hotels with 7.3% and 4.1% respectively, while in the Sanur area hotels have a major share of 68.3%, followed by households and shops with 9.0% and 2.7% respectively.

It is to be noted that the annual O/M costs of the project are estimated at Rp.1,194 million and Rp.2,670 million in 2000 and 2010 respectively and, therefore, that the total annual willingness to pay in 2000 and 2010 is greater than the annual O/M costs in the respective years.

1.2.2 Willingness to Pay per m^2 and m^3

The JICA Study Team conducted the sampling questionnaire survey to know the average floor area and the average monthly water consumption per household, hotel/hotel room, restaurant/restaurant seat, shop, factory, office, educational institution, medical institution and religious institution in the F/S area.

The number of samples was 150 for households and 30 to 50 for each of the other types of beneficiaries. Regarding star hotels the entire number (18) was covered by the survey. The results are shown in Table E.1.3.

This table and Tables D.2.2 to D.2.28 where the number of beneficiaries are shown constitute two (2) pillars upon which sewerage charges were established.

Based on Table E.1.3 and Table E.1.1 monthly willingness to pay per m^2 of floor area and per m^3 of wastewater was worked out for each of major beneficiaries as shown in Table E.1.4.

According to Table E.1.4, monthly willingness to pay per m^2 of floor area is Rp.14 for the household, Rp.40 to 50 for the restaurant, shop and bank and around Rp.100 for the hotel and factory. Likewise, monthly willingness to

pay per m^3 of wastewater is Rp.56 for the household and Rp.150 to 250 for other beneficiaries.

It is also to be noted that a larger establishment is willing to pay more per m^2 of floor area as well as per m^3 of wastewater discharge.

2. Sewerage Charges of Other Cities in Indonesia

2.1 General

Three (3) cities in Indonesia where sewerage system is already constructed and operated/maintained in one way or another were picked up for general information. They are Jakarta, Bandung and Yogyakarta.

In Jakarta some remnants of sewerage system constructed by the Dutch have been in use in a very limited area. These few years a pilot sewerage construction project is being implemented in the Setia Budi area financed by the World Bank. From 1989 to 1991 the master plan study and the subsequent feasibility study on wastewater disposal in Jakarta were conducted by JICA. In a year or two the sewerage construction project based on those studies is scheduled to enter the detail design stage. The project area lies along main business streets running through the city.

In Bandung most of the population had been served with water supply when sewerage was introduced. It was natural, therefore, to adopt a sewerage charge that is linked with water supply charge. Thus, sewerage service charge, which is called environmental charge in Bandung is stipulated to be 30% of water supply charge for those beneficiaries having connections. A household on average pays Rp.10,000 per month as water supply charge. It means that it pays on average Rp.3,000 per month as environmental charge. Households without connections pay Rp.1,000 per month and kiosks pay Rp.2,500 per month for the same purpose.

In Yogyakarta the sewerage system constructed in the colonial period is in use and a monthly flat rate of a few hundred rupiah per household/establishment having connection has been in force for years and it is now being revised upward.

Regarding the sewerage charges in Jakarta an independent section was prepared so that they can be explained in detail.

2.2. Sewerage Charges in Jakarta

2.2.1 Sewerage Charges of BPAL

The pilot project now being implemented as mentioned above is called Jakarta Sanitation and Sewerage Project (JSSP).

An interim organization in charge of operation and maintenance of the sewerage system now being constructed under JSSP was established in 1989 and named BPAL (Badan Pengelola Air Limbah).

The underlying philosophy of BPAL regarding cost recovery is to redeem O/M cost at the least. Based on it, official tariff of sewerage discharge services to be applied for beneficiaries with direct connections to the sewers was legalized in 1989 by the decree of the Ministry of Public Works. The tariff structure is based on the floor area of the client's house/building and the quantity/quality of wastewater.

Clients are classified into five (5) categories, i.e. Residential, Small Commercial, Large Commercial, Industry and Social Institution. Each category is further broken down to specific types of customers. Unit price per square meter is different in accordance with the nature of effluents. The unit price is Rp.28 for Residential, Rp.50 for Small Commercial, Rp.182 for Large Commercial, Rp.108 for Industry and Rp.56 for Social Institution on simple average basis (refer to Table E.2.1).

Indirect charges are being contemplated for those without direct connections to the sewers. Discharge License Fees may be levied on the non-domestic beneficiaries and Environmental Charges on the PDAM customers. Also, inspection/cleaning fees will be collected on request basis.

The ultimate number of clients BPAL now envisages is 3,327 for Residential, 217 for Small Commercial, 56 for Large Commercial, 69 for Industry and 16 for Social Institution, coming to 3,681 in total. With that

number of clients it wants to raise annual revenues of around one (1) billion rupiahs.

2.2.2 Proposed Sewerage Charges for PDAL, Jakarta

BPAL is expected to become a permanent enterprise under the name of PDAL, Jakarta (Perusahaan Daerah Air Limbah Jakarta).

The sewerage construction project based on JICA studies is scheduled to start in one to two years. In the study reports the tariff of Sewerage Discharge Services now being enforced by BPAL is also recommended by JICA to be adopted by PDAL, Jakarta as a major sewerage charge.

The BPAL tariff is restructured and renamed as Sewerage Services Charge under PDAL, Jakarta as shown in Table E.2.2.

The charge is applied to all types of properties having direct connections to the sewer based on the floor area of buildings. Properties were classified into 11 types for the sake of convenience. The house will be charged Rp.28 per square meter per month. Likewise, on a simplified average basis the shop, office, school and religious institution will be charged Rp.40, the restaurant Rp.60, the factory, hotel and hospital Rp.100, and the high rise building Rp.140.

Along with Sewerage Services Charge, Capital Works Charge will be applied to the high rise buildings in lump sum payment upon the construction of property connections. Based on the floor area of the building Rp.10,000 per square meter will be levied on every high rise building having direct connections.

Regarding the application of Capital Works Charge to those high rise buildings which will have been erected before the sewer is constructed, the full rate of 100% will be applied to those with on-site sanitation facilities treating toilet waste only. Likewise, the rate of 50% will be applied to those with facilities treating both toilet waste and gray water, but not equipped with aerators. Those high rise buildings with facilities treating both toilet waste and gray water by means of aerators will be exempted from this charge.

It cannot be denied that the proposed sewerage charges are not directly related to the actual quantity/quality of wastewater discharges by beneficiaries. In the event the sewerage zone concerned is entirely served with piped water, they can be switched for sewerage charges directly based on wastewater discharges. In such a case, the house will be charged Rp.133 per cubic meter of wastewater discharges. Similarly, the establishment or institution excluding the high rise building will be charged Rp.232 on average. In case of the high rise building Rp.350 will be charged. (The average price of wastewater discharges per cubic meter across the three types of properties works out at Rp.167. Refer to Table E.2.3.)

In other words, the unit price of wastewater discharged by the establishment/institution is 1.7 times higher than the unit price for the house under the proposed sewerage charges. Also, the unit price for the high rise building is 2.6 times higher than that for the house. This is an example of the so-called cross-subsidy.

According to the questionnaire survey, the price of piped water per cubic meter for the household is calculated at Rp.523. It means that so far as households are concerned the unit price of wastewater discharges is 25.4% of that of piped water. The average piped household consumes 19.8 cubic meter of water per month, paying monthly water supply charge of Rp.10,347. The average monthly household income is estimated at Rp.261,167. That is to say, water supply charge corresponds to 4% of household income. Under the proposed sewerage charges the average household will pay monthly Rp.2,633 for wastewater discharges. It accounts for 1% of household income. Thus, the combined share of water supply and sewerage charges in household income comes to 5%.

3. Affordability and Contribution of Tourism Industry

3.1 Basic Concept

It is no exaggeration to say that the economy of the study area is directly or indirectly inseparably connected with tourism.

As mentioned in Appendix D, the wastewater disposal project holds a key for a further development of tourism in the study area.

The project is primarily economically motivated, although it has an important social role by reducing the incidence of water-borne diseases.

Therefore, the majority of project costs will be borne by beneficiaries themselves. And the balance will be borne by the government which has an important function of maintaining a sound sanitary environment.

Firstly, the entire O/M costs will be borne by the entire beneficiaries in the sewerage service area.

Secondly, a major part of initial costs will be borne by those beneficiaries which will reap the benefits of the project more directly and more abundantly. They are the so-called tourism industry represented by hotels and restaurants.

Hotels are the prime beneficiary of the "clean, clear and beautiful seas", which will be kept that way by the project. Conversely, hotels will suffer fatal damage from polluted seas in the without case of the project.

Accordingly, hotels in the sewerage service area will bear the initial costs that are to be duly expected of them.

However, the hotel-related initial costs will occupy only a minor part of initial costs.

The construction of sewerage in the F/S area will affect tourism industry more or less over the entire master plan study area by maintaining the seas clean and clear. Therefore, hotels and restaurants in the master plan study area will partake of the shouldering of initial costs.

But, how can it be put into practice?

A tourism tax imposing an additional two percent levy on the guests' bills in hotels and restaurants has taken effect starting on June 1, 1992 under the decree of the Ministry of Tourism, Post and Telecommunications. The revenue from the tax will be used to finance the activities of the Indonesian Tourism Promotion Board (ITPB). ITPB's mission includes promoting Indonesian tourism abroad as well as assisting domestic tourism

and travel-related businesses to improve the quality of their products and service.

For the sake of convenience it will be called Tourism Tax from henceforward.

It is proposed that a part of the revenue to be collected from Tourism Tax in the master plan study area be used for the recovery of initial costs in accordance with the contribution of the project in promoting tourism. It will come to a substantial amount. But, still some initial costs will be left uncovered.

Thirdly, the government will bear those remaining initial costs in the form of grant.

3.2 Affordability of Tourism Industry

In the preceding section it was recommended that hotels should bear those initial costs of the project that are to be duly expected of them.

What will be the upper limit of initial costs hotels are reasonably expected to bear ? Supposing the sea water and other related environments were to be kept as in the with case, without implementing the project, every hotel would be forced to install package treatment plant. It follows from this that installation costs of package treatment plant are the upper limit and hotels can bear up to that limit.

According to the estimation of the JICA Study Team, construction costs of package treatment plant per hotel room by class of hotels are as follows:

(Unit: Rp. million/room)

Classified Hotels	Non-Classified Hotels & Other Accommodations
1.97	1.41

This is the affordability of hotels. It is proposed that it be adopted as Capital Works Charge to be applied to the entire hotels in the sewerage service area.

The charge will be applied to the hotels which will be built after project implementation.

For those hotels which already exist or will be built before project implementation 50% of the regular rates will be applied.

The present value of the cumulative Capital Works Charge revenue for 30 years from 1994 to 2023 discounted at the FIRR of 5.5%* (refer to 5.3 Results of Financial Analysis) is calculated at Rp.7,495 million corresponding to 5.8% of that of initial costs as shown below.

Note : * = more accurately 5.51545%

Present Value of Capital Works Charge Revenue and Initial Costs

(Unit : Rp. million)

Year	Capital Works Charge Revenue	Initial Costs	Year	Capital Works Charge Revenue	Initial Costs
1994	0	1,156	2010	250	2,933
1995	0	2,695	2011	0	0
1996	0	16,924	2012	0	0
1997	0	18,563	2013	0	0
1998	1,364	13,021	2014	0	0
1999	1,494	6,742	2015	0	0
2000	1,416	6,148	2016	0	0
2001	405	6,779	2017	0	0
2002	384	6,425	2018	0	0
2003	364	7,423	2019	0	0
2004	345	11,136	2020	0	0
2005	327	10,000	2021	0	0
2006	310	7,808	2022	0	0
2007	294	4,227	2023	0	0
2008	278	3,969	Total	7,495	129,628
2009	264	3,679			

3.3 Contribution of Tourism Industry

As mentioned already, initial costs are only partially to be borne by hotels.

As the sewerage project in the F/S area will affect tourism industry more or less over the entire master plan study area including the three (3) tourism centers, it is proposed that a substantial part of the remaining initial costs be borne by the tourism industry there. It will be represented by hotels and restaurants.

As mentioned already, now hotels and restaurants in the master plan study area are subjected to Tourism Tax. Under the tax two percent levy is imposed on the guests' bills in addition to the combined 15.5% levy of the previous service charge and development tax.

It is proposed that a fixed ratio of the revenue from Tourism Tax be appropriated for the recovery of initial costs. As the contribution of the sewerage project among various infrastructure projects in further developing tourism worked out at 35.0% as a result of the questionnaire survey (refer to 4.1.2 Contribution of Sewerage to Tourism in Appendix D of this report), it is advised that the ratio be 35.0%.

That is to say, the revenue to be collected from Tourism Tax of 0.7% (2% x 35%) will be used for initial cost recovery.

As Table A.5.8 of Master Plan Study Supporting Report Appendix A shows, tourists' expenditures in the master plan study area are estimated at Rp.1,413,372 million and Rp.2,390,500 million in 2000 and 2010 respectively.

A tourist in the master plan study area on average spends 38.4% for accommodations out of the total budget and 20.5% for eating, adding up to 58.9% (refer to 1.2.2 Estimation of Tourism Benefits of Master Plan Study Supporting Report Appendix F). Therefore, tourists' expenditures on hotels and restaurants in 2000 and 2010 are estimated at Rp.832,476 million and Rp.1,408,005 million respectively.

As a result the revenue from Tourism Tax of 0.7% is calculated at Rp.4,959 million and Rp.8,388 million in 2000 and 2010 respectively (refer to Table E.4.3).

The present value of the cumulative Tourism Tax revenue for 30 years from 1994 to 2023 discounted at the FIRR of 5.5% is calculated at Rp.71,812 million corresponding to 55.4% of that of initial costs as shown below.

Present Value of Tourism Tax Revenue and Initial Costs

(Unit : Rp. million)

Year	Tourism Tax Revenue	Initial Costs	Year	Tourism Tax Revenue	Initial Costs
1994	0	1,156	2010	3,367	2,933
1995	0	2,695	2011	3,191	0
1996	0	16,924	2012	3,025	0
1997	0	18,563	2013	2,866	0
1998	1,106	13,021	2014	2,717	0
1999	2,246	6,742	2015	2,575	0
2000	3,406	6,148	2016	2,440	0
2001	3,434	6,779	2017	2,312	0
2002	3,454	6,425	2018	2,192	0
2003	3,466	7,423	2019	2,077	0
2004	3,470	11,136	2020	1,968	0
2005	3,467	10,000	2021	1,866	0
2006	3,458	7,808	2022	1,768	0
2007	3,444	4,227	2023	1,676	0
2008	3,423	3,969	Total	71,812	129,628
2009	3,398	3,679			

4. Proposed Sewerage Charges

4.1 Basic Concept

One basic difference between the sewerage project of this island and that of other areas is that the former is essentially economically motivated, while the latter is usually socially oriented.

In a social project it is often proper for the government to shoulder the cost to a greater extent. In a strongly economic project, however, majority of the cost will be borne by beneficiaries.

The JICA Study Team proposes that the capital costs be partially and O/M costs be fully recovered from beneficiaries.

Initial costs will be provided by the central/local governments to the sewerage organization as loan as well as grant. The sewerage organization will after project implementation pay back the loan by appropriating basically Capital Works Charge revenue to be collected from hotels and the subsidy deriving from Tourism Tax. O/M costs of the sewerage organization will be met by Sewerage Service Charge revenue to be collected from the entire beneficiaries in the sewerage service area.

Sewerage Service Charge will be applied based on the floor area of beneficiaries, while Capital Works Charge will be levied based on the number of rooms in hotels.

The existing situation is that well water is widely used among beneficiaries and there is no way to exactly know the amount of wastewater discharges by each beneficiary. In the event the use of well water gets negligible compared with the consumption of piped water, then they can be switched for sewerage charges based on wastewater discharges.

4.2 Sewerage Service Charge

This charge will be applied to all types of beneficiaries located within the sewerage service areas.

Beneficiaries are households, hotels, restaurants, shops, factories, offices, educational institutions, medical institutions, religious institutions and others (refer to 2. No. of Beneficiaries in Appendix D).

The charge is based on the floor area and takes the form of monthly rates per m^2. The rates are higher for hotels, factories and hospitals (private) because they usually discharge more and/or more polluted wastewater per unitary floor area. The rates for social institutions such as government offices, educational institutions, public hospitals and religious institutions are basically lower than for commercial/industrial establishments. The rates for households are cross-subsidized so that home economy may not be unduly burdened. This is the basic philosophy.

In establishing Sewerage Service Charge two (2) major factors were considered. One is the tariff of water supply charge actually employed by PDAM. Another is people's willingness to pay for sewerage services clarified through the sampling questionnaire survey. Also, the sewerage service charge actually being enforced in Jakarta was noted.

The left and second from left columns in Table E.4.1(1) show monthly water supply charge per m^3 by type of beneficiaries. The left column shows the results of the sampling questionnaire survey, while the second from left column shows the results worked out based on the water tariff. It was assumed that Sewerage Service Charge should be around 30% of water supply charge.

Based on the assumption the second from right column was prepared. From this column the right column was derived based on the relationship between monthly water consumption and floor area. It shows a monthly sewerage service charge per m^2 of floor area by type of beneficiaries. It forms a basis for proposed Sewerage Service Charge.

Turning to Table E.4.1(2), left column shows monthly willingness to pay per m^2 of floor area by type of beneficiaries. It forms another basis for proposed Sewerage Service Charge.

Out of the two bases the second from left column was created. This is the proposed Sewerage Service Charge. It is reproduced under :

Proposed Sewerage Service Charge

(Unit: Rp./m^2/month)

Beneficiaries			Sewerage Service Charge
Households			22
Hotels	Classified		125
	Others		50
Restaurants			50
Shops	Large		70
	Medium/Small		30
Factories	Large/Medium		150
	Small		50
Offices	Banks		50
	Other Offices	Private	50
		Government	30
Educational	Institutions		20
Medical Institutions	Public		50
	Private		170
Religious Institutions	Hindu Temples		0.2
	Others		15

The second from right column in Table E.4.1(2) is derived from the second from left column and shows the proposed monthly Sewerage Service Charge per m3 of wastewater. The right column shows monthly sewerage service charge per m2 of floor area in BPAL, Jakarta. They are shown as a reference.

According to the proposed charge a household will pay Rp.2,684 on average per month. It corresponds to 0.935% of average monthly income.

The present value of the cumulative revenue from Sewerage Service Charge for 30 years from 1994 to 2023 discounted at the FIRR of 5.5% is calculated at Rp.27,474 million, corresponding to 140.5% of that of the cumulative O/M costs during the same period as shown below. It means that Sewerage Service Charge can fully meet O/M costs. The surplus will be used to cater for replacement costs and 3.8% of initial costs.

Present Value of Sewerage Service Charge Revenue and O/M and Other Costs

(Unit : Rp. million)

Year	Sewerage Service Charge Revenue	O/M Costs	Replacement Costs	Initial Costs
1994	0	0	0	1,156
1995	0	0	0	2,695
1996	0	0	0	16,924
1997	0	0	0	18,563
1998	356	304	0	13,021
1999	694	577	0	6,742
2000	1,018	820	0	6,148
2001	1,092	777	0	6,779
2002	1,157	736	0	6,425
2003	1,211	698	0	7,423
2004	1,257	661	0	11,136
2005	1,294	627	0	10,000
2006	1,324	741	0	7,808
2007	1,347	841	0	4,227
2008	1,365	930	0	3,969
2009	1,377	1,006	0	3,679
2010	1,382	1,071	0	2,933
2011	1,311	1,016	310	0
2012	1,243	963	1,075	0
2013	1,178	912	266	0
2014	1,116	865	0	0
2015	1,058	820	0	0
2016	1,002	777	0	0
2017	950	736	0	0
2018	900	698	0	0
2019	853	661	683	0
2020	809	627	635	0
2021	766	594	0	0
2022	726	563	0	0
2023	688	533	0	0
Total	27,474	19,554	2,969	129,628

When Sewerage Service Charge is applied to the beneficiaries in the urgent conventional sewerage service area in 2000, the revenue from the charge is estimated to be as follows:

Estimated Amount of Sewerage Service Charge Revenue in 2000

(Unit : Rp. million)

Area	House-holds	Hotels	Restau-rants	Shops	Factories	Offices	Educational Instit'ns	Medical Instit'ns	Religious Instit'ns	Others	Total
Denpasar	460 (52.7%)	34 (3.9%)	3 (0.3%)	50 (5.7%)	6 (0.7%)	153 (17.5%)	30 (3.5%)	56 (6.4%)	2 (0.2%)	79 (9.1%)	873 (100.0%)
Sanur	66 (8.5%)	592 (76.5%)	8 (1.0%)	17 (2.2%)	5 (0.6%)	13 (1.7%)	3 (0.4%)	0 (0.0%)	0 (0.0%)	70 (9.1%)	774 (100.0%)
Total	526 (31.9%)	626 (38.0%)	11 (0.7%)	67 (4.0%)	11 (0.7%)	166 (10.1%)	33 (2.0%)	56 (3.4%)	2 (0.1%)	149 (9.1%)	1,647 (100.0%)

As the above table shows, the estimated Sewerage Service Charge revenue in 2000 comes to Rp.1,647 million. Out of it, hotels and households account for 38.0% and 31.9% respectively, combinedly reaching 69.9%. They are followed by offices with 10.1%, shops with 4.0%, medical institutions with 3.4% and so forth.

Area wise, the Denpasar area accounts for 53.0% and the Sanur area 47.0%.

Area and type of beneficiaries wise, in the Denpasar area households will bear a major part of the charge, accounting for 52.7% of the total. They are followed by offices with 17.5%, medical institutions with 6.4%, shops with 5.7%, hotels with 3.9%, etc. In the Sanur area most of the charge will be borne by hotels with the share of 76.5%. They are followed by households with 8.5%, shops with 2.2%, offices with 1.7%, etc.

4.3 Capital Works Charge

Capital Works Charge will be applied to all the existing and future hotels located within the sewerage service areas.

Already much has been mentioned including the underlying concept for the establishment of the charge in 3.2 Affordability of Tourism Industry of this appendix.

The charge will be levied to recover hotel-related initial costs of the project. It is based on hotel rooms.

The charge will be levied only once. That is to say, it will not be continuously collected as in the case of Sewerage Service Charge. It will be levied when a new hotel is constructed. Regarding the hotels that already exist or will be built before sewerage construction, it will be levied when sewerage is constructed.

As Table E.4.2 shows under Capital Works Charge classified hotels and non-classified hotels (or other accommodations) to be built after project implementation will pay Rp.1.97 million and Rp.1.41 million per room respectively. It means that the total payment per classified hotel and non-classified hotel (or other accommodation) will be on average Rp.261.0 million and Rp.23.1 million respectively.

This is the regular rates. For those hotels which already exist or will be built before project implementation 50% of regular rates will be applied.

4.4 Tourism Tax

Already much has been written about Tourism Tax in 3.3 Contribution of Tourism Industry of this appendix.

This tax will be utilized to recover initial costs of the project along with Capital Works Charge.

Tourism Tax is a broad concept: it will be used as the fund for not only the wastewater disposal project, but also for garbage disposal, drainage, road and other tourism-related projects.

However, here Tourism Tax is treated only as the resources for the recovery of initial costs of the project.

Under Tourism Tax all hotels and restaurants in the master plan study area will impose 0.7% levy on the clients' bills (refer to Table E.4.3).

In the micro-economic standpoint tourists pay Tourism Tax. It means from the macro-economic standpoint that hotels and restaurants bear the tax because a part of tourists' expenditures earmarked for accommodations and eating is used up for tax payment and as a result the total revenue of hotels and restaurants will decrease by that much.

Tourism Tax will continue to be enforced up to 2023.

Tourism Tax will be collected by the government and later will be transferred to the sewerage organization as subsidy.

5. Financial Analysis

Financial analysis of the sewerage organization in the form of the estimation of financial internal rate of return (FIRR) and financial statement projections for the period of 30 years was performed.

The sewerage organization will fulfill such functions as the payment of loans to the governments, collection of sewerage charge revenues, operation and maintenance of sewerage and related facilities, and support of its workers.

Financial analysis means to analyze the above functions from the standpoint of finance and to see if such functions can be fully exercised or performed.

In making financial analysis various preconditions must be established.

Firstly, they were established for the plan which the JICA Study Team proposes (from now on it will be called Proposed Plan). Under those preconditions financial analysis was conducted.

Then, the team prepared three other options regarding preconditions for the benefits and interest of the parties concerned. Financial analysis was also performed for these three alternatives (they will be called Alternative I, II and III).

5.1 Preconditions for Proposed Plan

Table E.5.1 shows the preconditions for the proposed plan.

As the table shows, regarding financial sources of initial costs 65% of them will be provided by the central government as loan and the balance of 35% will be provided by the central/local governments as grant.

This loan-grant ratio was arrived at after the cost recovery method in the form of proposed sewerage charges was determined.

The entire replacement costs of equipment (pumps and aerators) will be self-financed by the sewerage organization.

Loans will be provided at the annual interest rate of 10.5% with the repayment period of 25 years and the grace period of five (5) years.

The entire O/M costs and the costs of borrowed capital will be recovered by enforcing Sewerage Service Charge, Capital Works Charge and Tourism Tax.

Sewerage Service Charge will be applied to all the beneficiaries in the sewerage service area essentially to recover O/M costs. Capital Works Charge will be applied to hotels in the sewerage service area to recover hotel-related initial costs. Tourism Tax will be applied to all the hotels and restaurants in the master plan study area to recover initial costs. Tariffs of these charges/tax are shown in Tables E.4.1, E.4.2 and E.4.3.

Depreciable assets will be those ones for whose acquisition capital costs will be incurred.

Sewerage facilities will be depreciated over 50 years, while pumps and aerators will be depreciated over 15 years. Depreciation will be done in the straight-line method.

The sewerage organization's collection efficiency of Sewerage Service Charge is estimated at 90%. Annual rate of price rise is assumed to be 9%. Corporate income tax will be levied at the rate of 35%.

5.2 Establishment of Alternatives

In Proposed Plan the 0.7% rate of Tourism Tax will be levied on the guests' bills of hotels and restaurants in the master plan study area. This tax coupled with Capital Works Charge will be able to recover 65% of the initial costs to be actually incurred. The balance of 35% will borne by the government.

The JICA Study Team thinks this loan-grant ratio is optimum, considering the nature of the project.

If one adopts the thinking that the project is dominantly economic and, therefore, initial costs should be borne virtually by beneficiaries, then the rate of Tourism Tax will be 1%. In this case 90% of initial costs will be borne by the beneficiaries. That is to say, that much will be loaned to the sewerage organization by the government. The rest will be borne by the government. That is to say, they will be granted to the sewerage organization by the government. This is Alternative I. In other respects this alternative is the same with Proposed Plan (refer to Table E.5.2).

Supposing 0.7% rate of Tourism Tax is too much and one cuts it by 50% to 0.35%, then one third of initial costs will be borne by the beneficiaries, that is, loaned to the sewerage organization by the government. And two thirds will be borne, that is, granted to the sewerage organization by the government. In this case 50% of replacement costs of equipment will be self-financed by the sewerage organization and another 50% granted by the government. This is Alternative II. In other respects this alternative is the same with Proposed Plan.

In Alternative III the burden on beneficiaries will be the lightest. Conversely, budgetary stresses on government will be the hardest. Under the alternative the rate of Tourism Tax will be 0.1%. 15% of initial costs will be borne by the beneficiaries, that is, loaned by the government and 85% will be borne, that is, granted by the government. The entire replacement costs of equipment will be granted by the government. Otherwise, this alternative is the same with Proposed Plan.

5.3 Results of Financial Analysis

Upon the above-mentioned preconditions financial analysis was performed for Proposed Plan.

Based on the cost benefit streams for the period of 30 years from 1994 to 2023 as shown in Table E.5.3 financial internal rate of return (FIRR) was calculated at 5.5%. As the sewerage organization is not a private enterprise, the JICA Study Team thinks that the value is both sufficient and reasonable.

Projected financial statement comprised of income statement and funds statement for 30 years from 1994 to 2023 is shown in Table E.5.4. As it shows, the sewerage organization will be financially sound and stable in terms of earnings as well as solvency except for a few years.

Regarding Alternatives I, II and III, FIRR was calculated based on cost benefit streams in Tables E.5.5, E.5.6 and E.5.7 at 5.4%, 7.8% and 11.1% respectively.

Projected financial statements for the three alternatives are shown in Tables E.5.8, E.5.9 and E.5.10. As they show, the sewerage organization will be financially sound and stable in terms of earnings as well as solvency in each of the alternatives except for a few years.

Table E.1.1 Monthly Willingness to Pay per Unit in 1991

(Unit : Rp./household/month)

	High	Middle	Low	Average
Household	10,205	1,614	836	2,264

(Unit : Rp./room/month)

	Classified	Others	Average
Hotel	7,824	2,000	5,236

(Unit : Rp./hotel/month)

	Classified	Others	Average
Hotel	1,036,415	32,757	167,105

(Unit : Rp./seat/month)

	Large	Medium/Small	Average
Restaurant	238	64	127

(Unit : Rp./restaurant/month)

	Large	Medium/Small	Average
Restaurant	40,992	2,924	7,977

(Unit : Rp./shop/month)

	Large	Medium/Small	Average
Shop	352,059	2,439	4,957

(Unit : Rp./factory/month)

	Large/Medium	Small	Average
Factory		1,246	8,802

(Unit : Rp./bank/month)

	Average
Bank	29,522

Source: JICA

Table E.1.2 Total Annual Willingness to Pay

1. 1990 (Unit : Rp. million)

Area	Households	Hotels	Restaurants	Shops	Factories	Banks	Others	Total
Denpasar	261	24	2	41	4	16	69	417
Sanur	29	234	8	10	3	5	57	346
Total	290	258	10	51	7	21	126	763

2. 2000 (Unit : Rp. million)

Area	Households	Hotels	Restaurants	Shops	Factories	Banks	Others	Total
Denpasar	471	28	2	50	5	18	115	689
Sanur	56	427	9	17	4	8	104	625
Total	527	455	11	67	9	26	219	1,314

3. 2010 (Unit : Rp. million)

Area	Households	Hotels	Restaurants	Shops	Factories	Banks	Others	Total
Denpasar	1,848	60	5	144	34	58	430	2,579
Sanur	165	620	10	19	11	11	167	1,003
Total	2,013	680	15	163	45	69	597	3,582

Source: JICA

Table E.1.3(1) Basic Information on Beneficiaries

1. Household

Item	Income Class			Total/Average
	High	Middle	Low	
Numbers in 1990	875	12,222	4,928	18,025
Average Floor Area (m^2)	210	124	102	122
Average Monthly Water Consumption (m^3)	56.3	32.2	23.7	31.0

2. Hotel

Item	Classified	Others	Total/Average
Numbers in 1990	17	110	127
Average Number of Rooms	132.50	16.38	31.92
Average Floor Area (m^2)	11,694	735	2,202
Average Monthly Water Consumption/ Room in 1990 (m^3)	27.7	22.7	26.6

3. Restaurant

Item	Large	Medium/Small	Total/Average
Numbers in 1990	13	88	101
Average Number of Seats	172	46	62
Average Floor Area (m^2)	401	129	164
Average Monthly Water Consumption/ Seat (m^3)	0.66	0.66	0.66

4. Shop

Item	Large	Medium/Small	Total/Average
Numbers in 1990	7	965	972
Average Floor Area (m^2)	4,823	88	122
Average Monthly Water Consumption (m^3)	1,318	19	28

5. Factory

Item	Large/Medium	Small	Total/Average
Numbers in 1990	29	48	77
Average Floor Area (m^2)	172	22	78
Average Monthly Water Consumption (m^3)	82	7	35

6. Office

Item	Bank	Other Offices		Total/Average
		Private	Government	
Numbers in 1990	70	272	97	439
Average Floor Area (m^2)	747	471	1,167	669
Average Monthly Water Consumption (m^3)	198	107	251	153

Table E.1.3(2) Basic Information on Beneficiaries

7. Educational Institution

Item	Kinder-garten	Primary School	Junior High School	Senior High School	Religious School	College Univer-sity	Total/ Average
Numbers in 1990	28	63	20	17	3	10	141
Average Floor Area (m^2)	101	632	1,097	1,986	849	4,933	1,065
Average Monthly Water Consumption (m^3)	22.8	105.4	118.4	423.4	416.8	212.8	143.4

8. Medical Institution

Item	Hospital	Health Center	Clinic	Total/ Average
Numbers in 1990	6	5	6	17
Average Floor Area (m^2)	8,289	244	323	3,111
Average Monthly Water Consumption (m^3)	3,777.0	38.4	149.4	1,397.1

9. Religious Institution

Item	Hindu Temple*	Mosque	Church	Total/ Average
Numbers in 1990	45	9	15	69
Average Floor Area (m^2)	1,730	364	340	1,250
Average Monthly Water Consumption (m^3)	7.9	120.9	122.8	47.6

Note : 1) * = Village and provincial temples
2) Numbers in 1990 are for the urgent sewerage areas.

Source : JICA

Table E.1.4 Monthly Willingness to Pay per m2 and m3 in 1990

(Unit : Rp.)

Item	Per m2 of Floor Area	Per m3 of Wastewater
Household	14	56
Hotel		
Classified	89	282
Others	45	88
Average	76	197
Restaurant		
Large	102	361
Medium/Small	23	96
Average	48	191
Shop		
Large	73	267
Medium/Small	28	128
Average	41	177
Factory		
Large/Medium	124	260
Small	57	178
Average	113	252
Bank	40	149

Source : JICA

Table E.2.1 Tariff of Sewerage Discharge Services based on Floor Area in BPAL

(Unit : Rp./m2/month)

Classification of Customers	Class A	Class B	Class C	Class D
I. Residential	28	-	-	-
II. Small Commercial				
1 Shop or Retailer	40	-	-	-
2 Office	40	-	-	-
3 Building Materials	40	-	-	-
4 Hair Dresser	-	44	-	-
5 Catering	-	-	56	-
6 Restaurant	-	-	-	60
7 Motel	-	-	-	60
8 Others	-	-	-	60
III. Large Commercial				
1 High Rise Building	140	-	-	-
2 Offices including Restaurant	-	-	-	-
and Fitness Centre	-	154	-	-
3 Apartement	-	-	210	-
4 Amusement Centre	-	-	-	224
5 Private Hospital	-	-	-	224
6 Hotel	-	-	-	224
IV. Industry				
1 Home Industry	40	-	-	-
2 Craftmen	40	-	-	-
3 Pharmaceutical Industry	-	44	-	-
4 Ice Making Plant	-	-	168	-
5 Beverage Factory	-	-	-	172
6 Fabric Industry	-	-	-	172
7 Fishery Industry	-	-	-	172
V. Social Institution				
1 Mosque, Church, Kuil	40	-	-	-
2 School	40	-	-	-
3 Public Swimming Pool	40	-	-	-
4 Government Institution	40	-	-	-
5 District's Clinic	-	44	-	-
6 Other Government Institution	40	-	-	-
7 School Including Dormitory	-	-	68	-
8 Public Clinic	-	-	-	72
9 Public Hospital	-	-	-	72

Definition :

Class A = Basic Tariff

Calss B = Wastewater Quality > Domestic Waste Quality (BOD 5 = 300 mg/l)

Calss C = Wastewater Quantity > Domestic Waste Quantity (Q = 40 m3/month)

Calss D = Wastewater Quality & Quantity > Domestic Waste Quality & Quantity

Source : BPAL, Jakarta

Table E.2.2 Proposed Sewerage Tariffs for PDAL, Jakarta

1. Sewerage Service Charge

(Unit : Rp/ m^2 /month)

Type of Property	House	Shop	Factory	Hotel	Restaurant	Hospital
Rates	28	40	100	100	60	100

Type of Property	Office	School	Religions Institution	Others	High Rise Building		
					Commer-cial	Institu-tional	Averag e
Rates	40	40	40	40	200	50	140

Note : Based on the JSSP tariff now in force

2. Capital Works Charge

Type of property : High rise building

Charge : Rp 10,000/m^2

Application of capital works charge for existing high rise buildings

Degree of Treatment	Rate of Aplication	Existing Share
Toilet waste only	100%	70%
Both toilet waste & gray water, without aerator	50%	25%
Both toilet waste & gray water, with aerator	-	5%

Source : JICA

Table E.2.3 Sewerage Charges per Unitary Discharge of Wastewater for PDAL, Jakarta

Item		House	Establishment/ Institution	High Rise Building	Average
Average Montly Discharges of Wastewater per Customer		28 m3	96 m3	6,780 m3	35 m3
Average Montly Sewerage Charges per Customer	Sewerage Services Charge	Rp 3,724	Rp 22,237	Rp 1,979,320	Rp 5,588
	Capital Works Charge *	-	-	Rp 392,722	Rp 202
	Total	Rp 3,724	Rp 22,237	Rp 2,372,042	Rp 5,789
Average Sewerage Charges per m3 of Wastewater Discharges	Sewerage Services Charge	Rp 133	Rp 232	Rp 292	Rp 160
	Capital Works Charge *	-	-	Rp 58	Rp 6
	Total	Rp 133	Rp 232	Rp 350	Rp 167

Note : * Capital Works Charge is levied only once upon the construction of a building. However, it is recalculated here on montly basis.

Above figures are based on the proposed tariffs.

Source : JICA

Table E.4.1(1) Proposed Sewerage Service Charge

(Unit : Rp./month)

Beneficiaries			Water Supply Charge per m^3		Sewerage Service Charge per m^3 as 30% of A_2	Sewerage Service Charge per m^2 of Floor Area as Derivative of B
			Survey Results	Calculated Values		
			A_1	A_2	$B = A_2 \times 0.3$	$B \rightarrow C$
Households			285	285	86	22
Hotels	Classified		1,542	1,596	479	150
	Others		934	934	280	143
Restaurants			534	726	218	55
Shops	Large		769	794	238	65
	Medium/Small		220	240	72	16
Factories	Large/Medium		643	1,405	422	201
	Small		281	343	103	33
Offices	Banks		586	760	228	60
	Other Offices	Private	534	725	218	50
		Government	521	490	147	32
Educational Institutions			393	434	130	18
Medical Institutions	Public		345	317	95	43
	Private		-	1,273	382	174
Religious Institutions	Hindu Temples		161	125	38	0.2
	Others		150	125	38	13

Source: JICA

Table E.4.1(2) Proposed Sewerage Service Charge

(Unit : Rp./month)

Beneficiaries			Willingness to Pay per m^2 of Floor Area	Proposed Sewerage Service Charge per m^2 of Floor Area	(for Reference)	
					Sewerage Service Charge per m^3 as Derivative of E	Sewerage Service Charge per m^2 of Floor Area in BPAL, Jakarta
			D	C, D → E	E → F	G
Households			14	22	86	28
Hotels	Classified		89	125	399	224
	Others		45	50	311	60
Restaurants			48	50	202	60
Shops	Large		73	70	256	140
	Medium/Small		28	30	135	40
Factories	Large/Medium		124	150	315	170
	Small		57	50	156	40
Offices	Banks		40	50	190	40
	Other Offices	Private	-	50	218	40
		Government	-	30	138	40
Educational Institutions			-	20	144	40
Medical Institutions	Public		-	50	110	72
	Private		-	170	373	224
Religious Institutions	Hindu Temples		-	0.2	38	40
	Others		-	15	49	40

Source: JICA

Table E.4.2 Proposed Capital Works Charge

Item	Charge per Room (Rp. million)	Average No. of Room per Hotel (rooms)	Average Charge per Hotel (Rp. million)
	A	B	C = A x B
1. Hotels to be Built after Project Implementation			
Classified Hotels	1.97	132.50	261.0
Non-Classified Hotels and Other Accommodations	1.41	16.38	23.1
2. Hotels Existing or to be Built before Project Implementation			
Classified Hotels	0.985	132.50	130.5
Non-Classified Hotels and Other Accommodations	0.705	16.38	11.5

Source: JICA

Table E.4.3 Proposed Tourism Tax

(Unit : Rp. million)

Rate of Taxation (%)	2000		2010	
	Tourists' Expenditures on Hotels and Restaurants	Tax Revenue	Tourists' Expenditures on Hotels and Restaurants	Tax Revenue
A	B_1	$C_1 = B_1 \times A/1.175$	B_2	$C_2 = B_2 \times A/1.175$
0.7	832,476	4,959	1,408,005	8,388

Note: Tourists' Expenditures on Hotels and Restaurants = Estimated expenditures on hotels and restaurants by tourists who will stay in the master plan study area

Source: JICA

Table E.5.1 Preconditions for Financial Analysis
- Proposed Plan -

1. Financial Sources of Capital Costs
   1) Initial costs
      Loan from central government : 65%
      Grant from central/local governments : 35%

   2) Replacement costs
      To be self-financed by the sewerage organization

2. Terms of Loans from Central Government
   Annual rate of interest : 10.5%
   Repayment period : 25 years
   Grace period : 5 years

3. Cost Recovery Method (Sewerage Charges)
   (as shown in Tables E.4.1, E.4.2 and E.4.3)

4. Depreciation
   1) Depreciation periods
      Facilities : 50 years
      Pumps & aerators : 15 years

   2) Depreciable assets
      Those assets for whose acquisition capital costs will be incurred.

5. Collection Rate of Sewerage Service Charge : 90%

6. Annual Rate of Price Escalation : 9%

7. Rate of Tax on Corporate Income : 35%

Source: JICA

Table E.5.2 Comparison of Preconditions Among Alternatives

Item	Proposed Plan	Alternatives		
		I	II	III
1. Cost Recovery Method				
1) Tourism Tax (Tax Rate (%))	0.7%	1%	0.35%	0.1%
2) Sewerage Service Charge	(as shown in Table E.4.1)			
3) Capital Works Charge	(as shown in Table E.4.2)			
2. Financial Sources				
1) Initial Costs				
(1) Loan from Central Government	65%	90%	1/3	15%
(2) Grant from Central/Local Governments	35%	10%	2/3	85%
2) Replacement Costs				
(1) Self-Financing	100%	100%	50%	0%
(2) Grant from Central/Local Governments	0%	0%	50%	100%

Source: JICA

Table E.5.3 Cost Benefit Streams - Financial Analysis
(Proposed Plan)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
CF=Cash Flow (=BF - CS)

(Unit:Rp million)

NO.	YEAR	CC	OM	CS	BF	CF
1	1994	793	0	793	0	-793
2	1995	1950	0	1950	0	-1950
3	1996	12923	0	12923	0	-12923
4	1997	14957	0	14957	0	-14957
5	1998	11070	398	11468	3696	-7772
6	1999	6048	796	6844	6118	-726
7	2000	5819	1194	7013	8502	1489
8	2001	6770	1194	7964	7578	-386
9	2002	6770	1194	7964	8098	134
10	2003	8254	1194	9448	8623	-825
11	2004	13065	1194	14259	9155	-5104
12	2005	12379	1194	13573	9691	-3882
13	2006	10199	1489	11688	10234	-1454
14	2007	5826	1784	7610	10782	3172
15	2008	5772	2080	7852	11334	3482
16	2009	5645	2375	8020	11894	3874
17	2010	4750	2670	7420	12457	5037
18	2011	816	2670	3486	11834	8348
19	2012	2980	2670	5650	11834	6184
20	2013	777	2670	3447	11834	8387
21	2014	0	2670	2670	11834	9164
22	2015	0	2670	2670	11834	9164
23	2016	0	2670	2670	11834	9164
24	2017	0	2670	2670	11834	9164
25	2018	0	2670	2670	11834	9164
26	2019	2760	2670	5430	11834	6404
27	2020	2705	2670	5375	11834	6459
28	2021	0	2670	2670	11834	9164
29	2022	0	2670	2670	11834	9164
30	2023	0	2670	2670	11834	9164

Source: JICA

Table E.5.4(1) Financial Statement - Proposed Plan

(Unit: Rp million)

No.	1	2	3	4	5	6	7	8	9	10
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Income Statement										
Sewerage Service Charge	0	0	0	0	779	1,752	2,952	3,645	4,438	5,344
Capital Works Charge	0	0	0	0	2,991	3,767	4,106	1,353	1,475	1,608
Tourism Tax	0	0	0	0	2,428	5,664	9,882	11,461	13,258	15,300
Revenue	0	0	0	0	6,198	11,184	16,941	16,459	19,171	22,252
Operation and Maintenance	0	0	0	0	667	1,455	2,379	2,593	2,827	3,081
Depreciation	0	0	259	630	863	974	1,083	1,203	1,324	1,470
Payment of Interest	0	0	0	0	0	163	597	3,743	7,660	10,736
Expenditure	0	0	259	630	1,530	2,592	4,060	7,539	11,810	15,287
Profit before Tax	0	0	-259	-630	4,667	8,592	12,881	8,920	7,360	6,965
Tax	0	0	0	0	1,634	3,007	4,508	3,122	2,576	2,438
Profit after Tax	0	0	-259	-630	3,034	5,585	8,373	5,798	4,784	4,527
Funds Statement										
Profit after Tax	0	0	-259	-630	3,034	5,585	8,373	5,798	4,784	4,527
Loans	942	2,525	18,242	23,013	18,565	11,056	11,594	14,705	16,028	21,298
Grants	507	1,360	9,823	12,392	9,996	5,953	6,243	7,918	8,630	11,468
Depreciation	0	0	259	630	863	974	1,083	1,203	1,324	1,470
Sources	1,449	3,885	28,065	35,405	32,458	23,569	27,294	29,624	30,766	38,764
Capital Works	1,449	3,885	28,065	35,405	28,561	17,010	17,837	22,622	24,658	32,766
Payment of Principal	0	0	0	0	0	26	97	603	1,291	1,931
Working Capital	0	0	0	0	3,897	6,533	9,359	6,398	4,816	4,066
Applications	1,449	3,885	28,065	35,405	32,458	23,569	27,294	29,624	30,766	38,764
Loan Liabilities	1,041	3,941	24,512	52,516	78,544	98,820	121,314	145,955	170,040	198,761
Cash Balance	0	0	0	0	3,897	10,430	19,789	26,187	31,004	35,070

Source: JICA

Table E.5.4(2) Financial Statement - Proposed Plan

(Unit: Rp million)

No.	11	12	13	14	15	16	17	18	19	20
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Income Statement										
Sewerage Service Charge	6,378	7,554	8,891	10,407	12,123	14,064	16,257	17,720	19,315	21,053
Capital Works Charge	1,752	1,910	2,082	2,269	2,474	2,696	2,939	0	0	0
Tourism Tax	17,618	20,247	23,225	26,596	30,406	34,710	39,568	43,129	47,010	51,241
Revenue	25,749	29,712	34,198	39,272	45,003	51,471	58,764	60,849	66,325	72,295
Operation and Maintenance	3,358	3,661	4,977	6,500	8,257	10,277	12,595	13,728	14,964	16,311
Depreciation	1,785	2,087	2,268	2,371	2,474	2,620	2,767	2,786	2,855	2,873
Payment of Interest	12,446	14,196	16,424	18,806	22,012	27,781	33,591	38,544	41,076	43,722
Expenditure	17,589	19,943	23,668	27,677	32,743	40,678	48,952	55,058	58,895	62,906
Profit before Tax	8,159	9,768	10,530	11,595	12,260	10,793	9,811	5,791	7,430	9,389
Tax	2,856	3,419	3,685	4,058	4,291	3,778	3,434	2,027	2,601	3,286
Profit after Tax	5,304	6,349	6,844	7,537	7,969	7,016	6,377	3,764	4,830	6,103
Funds Statement										
Profit after Tax	5,304	6,349	6,844	7,537	7,969	7,016	6,377	3,764	4,830	6,103
Loans	36,747	37,952	34,081	21,221	22,917	24,431	22,404	0	0	0
Grants	19,787	20,436	18,351	11,427	12,340	13,155	12,064	0	0	0
Depreciation	1,785	2,087	2,268	2,371	2,474	2,620	2,767	2,786	2,855	2,873
Sources	63,624	66,825	61,544	42,556	45,699	47,221	43,612	6,550	7,685	8,976
Capital Works	56,535	58,388	52,432	32,648	35,256	37,586	34,468	4,196	16,701	4,747
Payment of Principal	2,435	3,005	3,720	4,547	5,603	7,189	8,976	10,844	12,559	14,501
Working Capital	4,654	5,431	5,392	5,362	4,840	2,446	169	-8,490	-21,575	-10,271
Applications	63,624	66,825	61,544	42,556	45,699	47,221	43,612	6,550	7,685	8,976
Loan Liabilities	245,357	295,856	344,436	380,698	418,379	454,335	484,230	485,686	483,048	475,546
Cash Balance	39,724	45,155	50,548	55,909	60,749	63,195	63,364	54,874	33,299	23,028

Source: JICA

Table E.5.4(3) Financial Statement - Proposed Plan

(Unit: Rp million)

No.	21	22	23	24	25	26	27	28	29	30
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Income Statement										
Sewerage Service Charge	22,948	25,013	27,265	29,718	32,393	35,308	38,486	41,950	45,726	49,841
Capital Works Charge	0	0	0	0	0	0	0	0	0	0
Tourism Tax	55,853	60,880	66,359	72,331	78,841	85,937	93,671	102,102	111,291	121,307
Revenue	78,801	85,893	93,624	102,050	111,234	121,246	132,158	144,052	157,016	171,148
Operation and Maintenance	17,778	19,379	21,123	23,024	25,096	27,354	29,816	32,500	35,425	38,613
Depreciation	2,873	2,873	2,873	2,873	2,873	2,938	3,001	3,001	3,001	3,001
Payment of Interest	46,425	48,548	46,548	44,338	41,896	39,198	36,236	33,016	29,841	26,817
Expenditure	67,077	70,800	70,545	70,236	69,866	69,490	69,053	68,517	68,267	68,431
Profit before Tax	11,724	15,093	23,079	31,814	41,369	51,755	63,105	75,535	88,750	102,717
Tax	4,103	5,283	8,078	11,135	14,479	18,114	22,087	26,437	31,062	35,951
Profit after Tax	7,621	9,810	15,002	20,679	26,890	33,641	41,018	49,098	57,687	66,766
Funds Statement										
Profit after Tax	7,621	9,810	15,002	20,679	26,890	33,641	41,018	49,098	57,687	66,766
Loans	0	0	0	0	0	0	0	0	0	0
Grants	0	0	0	0	0	0	0	0	0	0
Depreciation	2,873	2,873	2,873	2,873	2,873	2,938	3,001	3,001	3,001	3,001
Sources	10,494	12,684	17,875	23,553	29,763	36,579	44,019	52,099	60,688	69,767
Capital Works	0	0	0	0	0	28,276	30,207	0	0	0
Payment of Principal	16,687	19,048	21,048	23,258	25,700	28,210	30,667	30,235	28,804	28,112
Working Capital	-6,193	-6,364	-3,173	295	4,063	-19,908	-16,855	21,864	31,885	41,655
Applications	10,494	12,684	17,875	23,553	29,763	36,579	44,019	52,099	60,688	69,767
Loan Liabilities	462,366	443,318	422,270	399,012	373,312	345,102	314,436	284,201	255,397	227,284
Cash Balance	16,835	10,471	7,298	7,593	11,656	-8,251	-25,106	-3,242	28,642	70,297

Source: JICA

Table E.5.5 Cost Benefit Streams - Financial Analysis
(Alternative I)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
CF=Cash Flow (=BF - CS)

(Unit:Rp Million)

NO.	YEAR	CC	OM	CS	BF	CF
1	1994	1098	0	1098	0	-1098
2	1995	2700	0	2700	0	-2700
3	1996	17894	0	17894	0	-17894
4	1997	20710	0	20710	0	-20710
5	1998	15327	398	15725	4316	-11409
6	1999	8375	796	9171	7446	-1724
7	2000	8057	1194	9251	10627	1376
8	2001	9374	1194	10568	9840	-729
9	2002	9374	1194	10568	10498	-70
10	2003	11428	1194	12622	11164	-1458
11	2004	18090	1194	19284	11840	-7444
12	2005	17141	1194	18335	12521	-5813
13	2006	14121	1489	15610	13213	-2397
14	2007	8067	1784	9851	13911	4061
15	2008	7992	2080	10072	14616	4544
16	2009	7817	2375	10192	15332	5140
17	2010	6576	2670	9246	16052	6806
18	2011	816	2670	3486	15429	11943
19	2012	2980	2670	5650	15429	9779
20	2013	777	2670	3447	15429	11982
21	2014	0	2670	2670	15429	12759
22	2015	0	2670	2670	15429	12759
23	2016	0	2670	2670	15429	12759
24	2017	0	2670	2670	15429	12759
25	2018	0	2670	2670	15429	12759
26	2019	2760	2670	5430	15429	9999
27	2020	2705	2670	5375	15429	10054
28	2021	0	2670	2670	15429	12759
29	2022	0	2670	2670	15429	12759
30	2023	0	2670	2670	15429	12759

Source: JICA

Table E.5.6 Cost Benefit Streams - Financial Analysis
(Alternative II)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
CF=Cash Flow (=BF - CS)

(Unit:Rp Million)

NO.	YEAR	CC	OM	CS	BF	CF
1	1994	407	0	407	0	-407
2	1995	1000	0	1000	0	-1000
3	1996	6627	0	6627	0	-6627
4	1997	7670	0	7670	0	-7670
5	1998	5677	398	6075	2973	-3102
6	1999	3102	796	3898	4569	671
7	2000	2984	1194	4178	6023	1845
8	2001	3472	1194	4666	4940	274
9	2002	3472	1194	4666	5298	632
10	2003	4233	1194	5427	5659	232
11	2004	6700	1194	7894	6023	-1871
12	2005	6348	1194	7542	6389	-1153
13	2006	5230	1489	6719	6759	40
14	2007	2988	1784	4772	7131	2359
15	2008	2960	2080	5040	7505	2465
16	2009	2895	2375	5270	7884	2614
17	2010	2436	2670	5106	8263	3157
18	2011	408	2670	3078	7640	4562
19	2012	1490	2670	4160	7640	3480
20	2013	389	2670	3059	7640	4582
21	2014	0	2670	2670	7640	4970
22	2015	0	2670	2670	7640	4970
23	2016	0	2670	2670	7640	4970
24	2017	0	2670	2670	7640	4970
25	2018	0	2670	2670	7640	4970
26	2019	1380	2670	4050	7640	3590
27	2020	1353	2670	4023	7640	3618
28	2021	0	2670	2670	7640	4970
29	2022	0	2670	2670	7640	4970
30	2023	0	2670	2670	7640	4970

Source: JICA

Table E.5.7 Cost Benefit Streams - Financial Analysis
(Alternative III)

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits
CF=Cash Flow (=BF - CS)

(Unit:Rp Million)

NO.	YEAR	CC	OM	CS	BF	CF
1	1994	183	0	183	0	-183
2	1995	450	0	450	0	-450
3	1996	2982	0	2982	0	-2982
4	1997	3452	0	3452	0	-3452
5	1998	2555	398	2953	2456	-497
6	1999	1396	796	2192	3462	1270
7	2000	1343	1194	2537	4251	1715
8	2001	1562	1194	2756	3055	298
9	2002	1562	1194	2756	3298	542
10	2003	1905	1194	3099	3541	442
11	2004	3015	1194	4209	3786	-423
12	2005	2857	1194	4051	4030	-20
13	2006	2354	1489	3843	4277	434
14	2007	1344	1784	3128	4523	1395
15	2008	1332	2080	3412	4770	1358
16	2009	1303	2375	3678	5019	1341
17	2010	1096	2670	3766	5267	1501
18	2011	0	2670	2670	4644	1974
19	2012	0	2670	2670	4644	1974
20	2013	0	2670	2670	4644	1974
21	2014	0	2670	2670	4644	1974
22	2015	0	2670	2670	4644	1974
23	2016	0	2670	2670	4644	1974
24	2017	0	2670	2670	4644	1974
25	2018	0	2670	2670	4644	1974
26	2019	0	2670	2670	4644	1974
27	2020	0	2670	2670	4644	1974
28	2021	0	2670	2670	4644	1974
29	2022	0	2670	2670	4644	1974
30	2023	0	2670	2670	4644	1974

Source: JICA

Table E.5.8(1) Financial Statement - Alternative I

(Unit: Rp million)

No.	1	2	3	4	5	6	7	8	9	10
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Income Statement										
Sewerage Service Charge	0	0	0	0	779	1,752	2,952	3,645	4,438	5,344
Capital Works Charge	0	0	0	0	2,991	3,767	4,106	1,353	1,475	1,608
Tourism Tax	0	0	0	0	3,468	8,092	14,117	16,373	18,940	21,857
Revenue	0	0	0	0	7,238	13,611	21,176	21,371	24,852	28,809
Operation and Maintenance	0	0	0	0	667	1,455	2,379	2,593	2,827	3,081
Depreciation	0	0	359	872	1,195	1,349	1,500	1,666	1,833	2,035
Payment of Interest	0	0	0	0	0	226	827	5,182	10,606	14,865
Expenditure	0	0	359	872	1,862	3,030	4,706	9,441	15,266	19,981
Profit before Tax	0	0	-359	-872	5,376	10,582	16,470	11,929	9,587	8,828
Tax	0	0	0	0	1,882	3,704	5,765	4,175	3,355	3,090
Profit after Tax	0	0	-359	-872	3,494	6,878	10,706	7,754	6,231	5,738
Funds Statement										
Profit after Tax	0	0	-359	-872	3,494	6,878	10,706	7,754	6,231	5,738
Loans	1,305	3,497	25,259	31,865	25,705	15,309	16,054	20,360	22,193	29,490
Grants	145	389	2,807	3,541	2,856	1,701	1,784	2,262	2,466	3,277
Depreciation	0	0	359	872	1,195	1,349	1,500	1,666	1,833	2,035
Sources	1,449	3,885	28,065	35,405	33,250	25,237	30,043	32,043	32,723	40,540
Capital Works	1,449	3,885	28,065	35,405	28,561	17,010	17,837	22,622	24,658	32,766
Payment of Principal	0	0	0	0	0	35	134	835	1,788	2,674
Working Capital	0	0	0	0	4,689	8,192	12,071	8,586	6,276	5,099
Applications	1,449	3,885	28,065	35,405	33,250	25,237	30,043	32,043	32,723	40,540
Loan Liabilities	1,442	5,457	33,940	72,715	108,753	136,828	167,973	202,092	235,440	275,208
Cash Balance	0	0	0	0	4,689	12,881	24,952	33,538	39,814	44,913

Source: JICA

Table E.5.8(2) Financial Statement - Alternative I

(Unit: Rp million)

No.	11	12	13	14	15	16	17	18	19	20
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Income Statement										
Sewerage Service Charge	6,378	7,554	8,891	10,407	12,123	14,064	16,257	17,720	19,315	21,053
Capital Works Charge	1,752	1,910	2,082	2,269	2,474	2,696	2,939	0	0	0
Tourism Tax	25,169	28,925	33,179	37,994	43,437	49,586	56,525	61,613	67,158	73,202
Revenue	33,299	38,389	44,152	50,670	58,034	66,347	75,721	79,333	86,473	94,255
Operation and Maintenance	3,358	3,661	4,977	6,500	8,257	10,277	12,595	13,728	14,964	16,311
Depreciation	2,472	2,890	3,140	3,284	3,425	3,627	3,831	3,836	3,856	3,861
Payment of Interest	17,232	19,656	22,741	26,039	30,479	38,466	46,511	53,368	56,875	60,538
Expenditure	23,063	26,206	30,858	35,822	42,161	52,370	62,936	70,933	75,695	80,709
Profit before Tax	10,236	12,183	13,295	14,848	15,873	13,976	12,785	8,400	10,778	13,546
Tax	3,583	4,264	4,653	5,197	5,556	4,892	4,475	2,940	3,772	4,741
Profit after Tax	6,654	7,919	8,641	9,651	10,318	9,085	8,310	5,460	7,006	8,805
Funds Statement										
Profit after Tax	6,654	7,919	8,641	9,651	10,318	9,085	8,310	5,460	7,006	8,805
Loans	50,881	52,549	47,189	29,383	31,731	33,827	31,021	0	0	0
Grants	5,653	5,839	5,243	3,265	3,526	3,759	3,447	0	0	0
Depreciation	2,472	2,890	3,140	3,284	3,425	3,627	3,831	3,836	3,856	3,861
Sources	65,660	69,197	64,214	45,582	48,999	50,297	46,609	9,296	10,862	12,666
Capital Works	56,535	58,388	52,432	32,648	35,256	37,586	34,468	4,196	16,701	4,747
Payment of Principal	3,371	4,161	5,151	6,295	7,757	9,955	12,428	15,015	17,390	20,078
Working Capital	5,755	6,648	6,631	6,640	5,985	2,757	-286	-9,914	-23,229	-12,158
Applications	65,660	69,197	64,214	45,582	48,999	50,297	46,609	9,296	10,862	12,666
Loan Liabilities	339,725	409,646	476,911	527,121	579,294	629,079	670,472	672,489	668,836	658,448
Cash Balance	50,668	57,315	63,946	70,586	76,571	79,328	79,042	69,128	45,899	33,741

Source: JICA

Table E.5.8(3) Financial Statement - Alternative I

(Unit: Rp million)

No.	21	22	23	24	25	26	27	28	29	30
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Income Statement										
Sewerage Service Charge	22,948	25,013	27,265	29,718	32,393	35,308	38,486	41,950	45,726	49,841
Capital Works Charge	0	0	0	0	0	0	0	0	0	0
Tourism Tax	79,790	86,971	94,799	103,331	112,630	122,767	133,816	145,860	158,987	173,296
Revenue	102,738	111,985	122,063	133,049	145,024	158,076	172,302	187,810	204,713	223,137
Operation and Maintenance	17,778	19,379	21,123	23,024	25,096	27,354	29,816	32,500	35,425	38,613
Depreciation	3,861	3,861	3,861	3,861	3,861	3,880	3,898	3,898	3,898	3,898
Payment of Interest	64,281	67,221	64,452	61,392	58,010	54,274	50,173	45,714	41,318	37,131
Expenditure	85,921	90,461	89,436	88,277	86,967	85,508	83,887	82,112	80,641	79,642
Profit before Tax	16,818	21,524	32,628	44,772	58,056	72,568	88,416	105,698	124,072	143,495
Tax	5,886	7,533	11,420	15,670	20,320	25,399	30,946	36,994	43,425	50,223
Profit after Tax	10,931	13,991	21,208	29,102	37,736	47,169	57,470	68,704	80,647	93,272
Funds Statement										
Profit after Tax	10,931	13,991	21,208	29,102	37,736	47,169	57,470	68,704	80,647	93,272
Loans	0	0	0	0	0	0	0	0	0	0
Grants	0	0	0	0	0	0	0	0	0	0
Depreciation	3,861	3,861	3,861	3,861	3,861	3,880	3,898	3,898	3,898	3,898
Sources	14,793	17,852	25,069	32,963	41,598	51,049	61,368	72,602	84,544	97,170
Capital Works	0	0	0	0	0	28,276	30,207	0	0	0
Payment of Principal	23,105	26,374	29,143	32,203	35,585	39,060	42,461	41,864	39,882	38,925
Working Capital	-8,312	-8,522	-4,074	760	6,013	-16,288	-11,300	30,737	44,662	58,245
Applications	14,793	17,852	25,069	32,963	41,598	51,049	61,368	72,602	84,544	97,170
Loan Liabilities	640,199	613,825	584,682	552,479	516,894	477,834	435,373	393,509	353,626	314,702
Cash Balance	25,429	16,907	12,833	13,593	19,606	3,318	-7,982	22,755	67,417	125,662

Source: JICA

Table E.5.9(1) Financial Statement - Alternative II

(Unit: Rp million)

No.	1	2	3	4	5	6	7	8	9	10
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Income Statement										
Sewerage Service Charge	0	0	0	0	779	1,752	2,952	3,645	4,438	5,344
Capital Works Charge	0	0	0	0	2,991	3,767	4,106	1,353	1,475	1,608
Tourism Tax	0	0	0	0	1,214	2,832	4,941	5,730	6,629	7,650
Revenue	0	0	0	0	4,984	8,352	12,000	10,728	12,542	14,602
Operation and Maintenance	0	0	0	0	667	1,455	2,379	2,593	2,827	3,081
Depreciation	0	0	133	323	443	500	556	617	679	754
Payment of Interest	0	0	0	0	0	84	306	1,919	3,928	5,506
Expenditure	0	0	133	323	1,110	2,038	3,241	5,130	7,434	9,340
Profit before Tax	0	0	-133	-323	3,874	6,313	8,759	5,599	5,108	5,262
Tax	0	0	0	0	1,356	2,210	3,066	1,960	1,788	1,842
Profit after Tax	0	0	-133	-323	2,518	4,104	5,693	3,639	3,320	3,420
Funds Statement										
Profit after Tax	0	0	-133	-323	2,518	4,104	5,693	3,639	3,320	3,420
Loans	483	1,295	9,355	11,802	9,520	5,670	5,946	7,541	8,219	10,922
Grants	966	2,590	18,710	23,604	19,041	11,340	11,892	15,082	16,439	21,844
Depreciation	0	0	133	323	443	500	556	617	679	754
Sources	1,449	3,885	28,065	35,405	31,522	21,613	24,086	26,879	28,658	36,940
Capital Works	1,449	3,885	28,065	35,405	28,561	17,010	17,837	22,622	24,658	32,766
Payment of Principal	0	0	0	0	0	13	50	309	662	990
Working Capital	0	0	0	0	2,961	4,590	6,199	3,947	3,337	3,183
Applications	1,449	3,885	28,065	35,405	31,522	21,613	24,086	26,879	28,658	36,940
Loan Liabilities	534	2,021	12,570	26,931	40,279	50,677	62,212	74,849	87,200	101,929
Cash Balance	0	0	0	0	2,961	7,551	13,750	17,697	21,034	24,217

Source: JICA

Table E.5.9(2) Financial Statement - Alternative II

(Unit: Rp million)

No.	11	12	13	14	15	16	17	18	19	20
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Income Statement										
Sewerage Service Charge	6,378	7,554	8,891	10,407	12,123	14,064	16,257	17,720	19,315	21,053
Capital Works Charge	1,752	1,910	2,082	2,269	2,474	2,696	2,939	0	0	0
Tourism Tax	8,809	10,124	11,613	13,298	15,203	17,355	19,784	21,564	23,505	25,621
Revenue	16,940	19,588	22,586	25,974	29,800	34,116	38,980	39,285	42,820	46,674
Operation and Maintenance	3,358	3,661	4,977	6,500	8,257	10,277	12,595	13,728	14,964	16,311
Depreciation	916	1,070	1,163	1,216	1,269	1,343	1,419	1,428	1,461	1,470
Payment of Interest	6,382	7,280	8,422	9,644	11,288	14,247	17,226	19,766	21,065	22,421
Expenditure	10,656	12,011	14,562	17,360	20,814	25,867	31,240	34,922	37,490	40,202
Profit before Tax	6,283	7,577	8,023	8,614	8,986	8,249	7,740	4,362	5,331	6,472
Tax	2,199	2,652	2,808	3,015	3,145	2,887	2,709	1,527	1,866	2,265
Profit after Tax	4,084	4,925	5,215	5,599	5,841	5,362	5,031	2,835	3,465	4,207
Funds Statement										
Profit after Tax	4,084	4,925	5,215	5,599	5,841	5,362	5,031	2,835	3,465	4,207
Loans	18,845	19,463	17,477	10,883	11,752	12,529	11,489	0	0	0
Grants	37,690	38,926	34,954	21,765	23,504	25,057	22,979	2,098	8,351	2,373
Depreciation	916	1,070	1,163	1,216	1,269	1,343	1,419	1,428	1,461	1,470
Sources	61,534	64,384	58,810	39,463	42,366	44,290	40,918	6,361	13,277	8,050
Capital Works	56,535	58,388	52,432	32,648	35,256	37,586	34,468	4,196	16,701	4,747
Payment of Principal	1,249	1,541	1,908	2,332	2,873	3,687	4,603	5,561	6,441	7,436
Working Capital	3,751	4,454	4,471	4,484	4,236	3,018	1,847	-3,395	-9,865	-4,133
Applications	61,534	64,384	58,810	39,463	42,366	44,290	40,918	6,361	13,277	8,050
Loan Liabilities	125,824	151,721	176,634	195,230	214,553	232,992	248,323	249,070	247,717	243,870
Cash Balance	27,969	32,423	36,894	41,377	45,614	48,632	50,479	47,084	37,218	33,086

Source: JICA

Table E.5.9(3) Financial Statement - Alternative II

(Unit: Rp million)

No.	21	22	23	24	25	26	27	28	29	30
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Income Statement										
Sewerage Service Charge	22,948	25,013	27,265	29,718	32,393	35,308	38,486	41,950	45,726	49,841
Capital Works Charge	0	0	0	0	0	0	0	0	0	0
Tourism Tax	27,927	30,440	33,180	36,166	39,421	42,969	46,836	51,051	55,645	60,654
Revenue	50,875	55,453	60,444	65,884	71,814	78,277	85,322	93,001	101,371	110,494
Operation and Maintenance	17,778	19,379	21,123	23,024	25,096	27,354	29,816	32,500	35,425	38,613
Depreciation	1,470	1,470	1,470	1,470	1,470	1,500	1,530	1,530	1,530	1,530
Payment of Interest	23,808	24,897	23,871	22,738	21,485	20,101	18,582	16,931	15,303	13,752
Expenditure	43,056	45,745	46,463	47,231	48,051	48,956	49,929	50,961	52,258	53,896
Profit before Tax	7,819	9,709	13,981	18,653	23,763	29,321	35,393	42,040	49,113	56,599
Tax	2,737	3,398	4,893	6,529	8,317	10,262	12,387	14,714	17,189	19,810
Profit after Tax	5,082	6,311	9,088	12,125	15,446	19,059	23,005	27,326	31,923	36,789
Funds Statement										
Profit after Tax	5,082	6,311	9,088	12,125	15,446	19,059	23,005	27,326	31,923	36,789
Loans	0	0	0	0	0	0	0	0	0	0
Grants	0	0	0	0	0	14,138	15,104	0	0	0
Depreciation	1,470	1,470	1,470	1,470	1,470	1,500	1,530	1,530	1,530	1,530
Sources	6,552	7,780	10,557	13,594	16,916	34,697	39,639	28,856	33,454	38,320
Capital Works	0	0	0	0	0	28,276	30,207	0	0	0
Payment of Principal	8,557	9,768	10,794	11,927	13,180	14,467	15,726	15,505	14,771	14,417
Working Capital	-2,006	-1,988	-237	1,667	3,736	-8,046	-6,294	13,351	18,683	23,903
Applications	6,552	7,780	10,557	13,594	16,916	34,697	39,639	28,856	33,454	38,320
Loan Liabilities	237,111	227,343	216,549	204,622	191,442	176,976	161,249	145,744	130,973	116,556
Cash Balance	31,080	29,092	28,856	30,523	34,259	26,213	19,919	33,270	51,952	75,855

Source: JICA

Table E.5.10(1) Financial Statement - Alternative III

(Unit: Rp million)

No.	1	2	3	4	5	6	7	8	9	10
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Income Statement										
Sewerage Service Charge	0	0	0	0	779	1,752	2,952	3,645	4,438	5,344
Capital Works Charge	0	0	0	0	2,991	3,767	4,106	1,353	1,475	1,608
Tourism Tax	0	0	0	0	347	809	1,412	1,637	1,894	2,186
Revenue	0	0	0	0	4,117	6,329	8,471	6,635	7,807	9,138
Operation and Maintenance	0	0	0	0	667	1,455	2,379	2,593	2,827	3,081
Depreciation	0	0	60	145	199	225	250	278	305	339
Payment of Interest	0	0	0	0	0	38	138	864	1,768	2,478
Expenditure	0	0	60	145	867	1,718	2,767	3,735	4,900	5,898
Profit before Tax	0	0	-60	-145	3,250	4,611	5,704	2,901	2,907	3,240
Tax	0	0	0	0	1,138	1,614	1,996	1,015	1,017	1,134
Profit after Tax	0	0	-60	-145	2,113	2,997	3,707	1,885	1,890	2,106
Funds Statement										
Profit after Tax	0	0	-60	-145	2,113	2,997	3,707	1,885	1,890	2,106
Loans	217	583	4,210	5,311	4,284	2,551	2,676	3,393	3,699	4,915
Grants	1,232	3,302	23,855	30,094	24,277	14,458	15,162	19,229	20,960	27,851
Depreciation	0	0	60	145	199	225	250	278	305	339
Sources	1,449	3,885	28,065	35,405	30,873	20,232	21,795	24,786	26,854	35,212
Capital Works	1,449	3,885	28,065	35,405	28,561	17,010	17,837	22,622	24,658	32,766
Payment of Principal	0	0	0	0	0	6	22	139	298	446
Working Capital	0	0	0	0	2,312	3,216	3,935	2,024	1,897	2,000
Applications	1,449	3,885	28,065	35,405	30,873	20,232	21,795	24,786	26,854	35,212
Loan Liabilities	240	909	5,657	12,119	18,126	22,805	27,996	33,682	39,240	45,868
Cash Balance	0	0	0	0	2,312	5,528	9,463	11,487	13,384	15,384

Source: JICA

Table E.5.10(2) Financial Statement - Alternative III

(Unit: Rp million)

No.	11	12	13	14	15	16	17	18	19	20
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Income Statement										
Sewerage Service Charge	6,378	7,554	8,891	10,407	12,123	14,064	16,257	17,720	19,315	21,053
Capital Works Charge	1,752	1,910	2,082	2,269	2,474	2,696	2,939	0	0	0
Tourism Tax	2,517	2,892	3,318	3,799	4,344	4,959	5,653	6,161	6,716	7,320
Revenue	10,647	12,357	14,291	16,475	18,941	21,719	24,849	23,881	26,031	28,373
Operation and Maintenance	3,358	3,661	4,977	6,500	8,257	10,277	12,595	13,728	14,964	16,311
Depreciation	412	482	523	547	571	605	638	630	601	593
Payment of Interest	2,872	3,276	3,790	4,340	5,080	6,411	7,752	8,895	9,479	10,090
Expenditure	6,642	7,418	9,290	11,387	13,907	17,293	20,985	23,253	25,043	26,993
Profit before Tax	4,005	4,939	5,001	5,089	5,033	4,427	3,864	628	987	1,381
Tax	1,402	1,729	1,750	1,781	1,762	1,549	1,352	220	346	483
Profit after Tax	2,603	3,210	3,250	3,308	3,272	2,877	2,511	408	642	897
Funds Statement										
Profit after Tax	2,603	3,210	3,250	3,308	3,272	2,877	2,511	408	642	897
Loans	8,480	8,758	7,865	4,897	5,288	5,638	5,170	0	0	0
Grants	48,054	49,630	44,567	27,750	29,968	31,948	29,298	4,196	16,701	4,747
Depreciation	412	482	523	547	571	605	638	630	601	593
Sources	59,550	62,080	56,206	36,503	39,099	41,067	37,618	5,234	17,943	6,237
Capital Works	56,535	58,388	52,432	32,648	35,256	37,586	34,468	4,196	16,701	4,747
Payment of Principal	562	694	859	1,049	1,293	1,659	2,071	2,502	2,898	3,346
Working Capital	2,453	2,998	2,915	2,806	2,550	1,823	1,079	-1,464	-1,656	-1,856
Applications	59,550	62,080	56,206	36,503	39,099	41,067	37,618	5,234	17,943	6,237
Loan Liabilities	56,621	68,274	79,485	87,853	96,549	104,846	111,745	112,081	111,473	109,741
Cash Balance	17,837	20,835	23,751	26,556	29,106	30,929	32,007	30,543	28,887	27,031

Source: JICA

Table E.5.10(3) Financial Statement - Alternative III

(Unit: Rp million)

No.	21	22	23	24	25	26	27	28	29	30
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Income Statement										
Sewerage Service Charge	22,948	25,013	27,265	29,718	32,393	35,308	38,486	41,950	45,726	49,841
Capital Works Charge	0	0	0	0	0	0	0	0	0	0
Tourism Tax	7,979	8,697	9,480	10,333	11,263	12,277	13,382	14,586	15,899	17,330
Revenue	30,927	33,711	36,745	40,052	43,656	47,585	51,868	56,536	61,624	67,170
Operation and Maintenance	17,778	19,379	21,123	23,024	25,096	27,354	29,816	32,500	35,425	38,613
Depreciation	593	593	593	593	593	565	538	538	538	538
Payment of Interest	10,713	11,203	10,742	10,232	9,668	9,046	8,362	7,619	6,886	6,188
Expenditure	29,085	31,175	32,457	33,848	35,357	36,965	38,717	40,657	42,849	45,340
Profit before Tax	1,842	2,536	4,287	6,203	8,299	10,620	13,151	15,879	18,775	21,831
Tax	645	888	1,501	2,171	2,905	3,717	4,603	5,558	6,571	7,641
Profit after Tax	1,198	1,648	2,787	4,032	5,395	6,903	8,548	10,321	12,204	14,190
Funds Statement										
Profit after Tax	1,198	1,648	2,787	4,032	5,395	6,903	8,548	10,321	12,204	14,190
Loans	0	0	0	0	0	0	0	0	0	0
Grants	0	0	0	0	0	28,276	30,207	0	0	0
Depreciation	593	593	593	593	593	565	538	538	538	538
Sources	1,790	2,241	3,379	4,625	5,987	35,745	39,294	10,860	12,742	14,728
Capital Works	0	0	0	0	0	28,276	30,207	0	0	0
Payment of Principal	3,851	4,396	4,857	5,367	5,931	6,510	7,077	6,977	6,647	6,487
Working Capital	-2,061	-2,155	-1,478	-742	56	958	2,010	3,882	6,095	8,241
Applications	1,790	2,241	3,379	4,625	5,987	35,745	39,294	10,860	12,742	14,728
Loan Liabilities	106,700	102,304	97,447	92,080	86,149	79,639	72,562	65,585	58,938	52,450
Cash Balance	24,971	22,816	21,338	20,596	20,652	21,611	23,620	27,502	33,597	41,838

Source: JICA

APPENDIX F

INSTITUTIONAL ASPECT

APPENDIX F INSTITUTIONAL ASPECT

1. Required Activities for Sewerage Organization

1.1 Basic Ideas for a New Sewerage Organization

This Appendix will discuss the proposed sewerage organization aiming at year 2010, as described in the Master Plan.

A new sewerage system is proposed for Denpasar by the JICA Study Team. At present there is no organization to operate and maintain the sewerage system in Denpasar. Therefore this Appendix is aimed to suggest the basic ideas and concepts for establishment of a new sewerage organization, and the process of establishing it.

In Denpasar PDAM is serving water supply for the population. When water is supplied, wastewater is generated. One of the fundamental ideas proposed in the Appendix is to integrate a new organization for sewerage under PDAM (Integration Alternative). The other idea is to establish an independent organization apart from PDAM, such as PDAL (Independent Alternative).

The Appendix will discuss these two alternatives with their merits and demerits :

- Independent Alternative
- Integration Alternative

1.2 Basic Functions of Sewerage Operation

Here will be discussed the basic functions to operate and maintain the sewerage system.

In the JICA Study two (2) systems of wastewater management are proposed for the Study Area :

(1) Off-site system

(2) On-site system

Since the off-site system is more complicated than the on-site one, O/M of the off-site system will be discussed. O/M of the on-site one will be included in there, because a small group of staff of the sewerage organization will be able to monitor the facilities.

The most important aspect is that a new system should be established on a basis of technically feasible and financially sound options.

The sewerage organization should have the following functions :

(a) Administration

(b) Finance/Accounting

(c) Public Relations

(d) Planning

(e) Construction

(f) O/M of Treatment Plant and Pumping Stations

(g) O/M of collection systems.

(h) House connection and disconnection

(i) Environmental Monitoring

There are two (2) ideas for O/M of the sewerage system : (1) to have the staff required for O/M within the organization, and (2) to contract to outside for the purpose.

In the former case the organization will become large, while the latter case can make it to the minimum level. On the other hand the responsibility of O/M will be ensured in the former case, because they are all employees in the sewerage organization. In the latter case specialists for O/M could be contracted from outside, but their responsibilities are limited within the contracts.

In this Appendix the discussion will be based on the idea that main operations and routine maintenance will be done by in-house staff, while

specialized operations and irregular maintenance activities will be done by outside contractors.

The detailed functions for each section are summarized in Table F.1.1.

It is also important that house connections should be ensured as soon as possible, when the sewerage system is available for the area. There are many examples in developing countries, where residents are not willing nor affordable to make house connections even after completion of a new sewerage system available for them. This is because the house connections are generally very expensive for them. This means that there is no guarantee for sewerage revenue without house connections.

2. Existing Organization of PDAM

2.1 Staffing of PDAM

The organizational structure of PDAM is shown in Fig F.2.1.

The total number of staff of PDAM is now 365 including 37 security staff. They are serving 26,000 customers. The number has not been increased since 1985, though the production volume has been increasing every year.

Cipta Karya of Ministry of Public Works (PU) regulates the standard ratio of customers vs staff. The standard ratio of staffing is that 100 customers are to be served by one staff. The ratio of Denpasar PDAM is now 72.1 customers being served by one staff.

According to PDAM, they are providing 3000 new service connections every year without increasing the staff number. So the standard ratio will be reached in about three (3) years.

The qualifications of PDAM staff are shown in Table F.2.1.

For a better understanding the school system of Indonesia should be summarized as follows :

- Elementary School : 6 years starting at 6 years old
- Middle School : 3 years
- High School : 3 years
- College : 3 years
- University : 2 ~ 3 years

According to Table F.2.1 the ratios of qualifications are as follows :

- University graduate : 6.1 %
- College graduate : 3.1 %
- High School graduate : 51.4 %
- Middle/Elementary graduate : 39.4 %

The figures of staffing imply that PDAM is being run mainly by high school graduates with top management of university graduates, while some sections are staff with middle/elementary graduates.

2.2 Financial Situation of PDAM

The financial situation of PDAM is summarized as follows :

- Revenue of PDAM
  - Water Supply
  - Non-water income
- Expenditure of PDAM
  - Source costs
  - Treatment costs
  - Transmission & distribution costs
  - Administration costs

- Non-operational costs
    - Bank interest
    - Government tax
    - Other loss

The present water tariff of PDAM is given in Table F.2.2.

The consumer numbers of each category and the revenues are given in Table F.2.3.

3. Alternatives for Sewerage Organization

3.1 Independent Organization

There are many ways to estimate the staff number required for the sewerage system such as :

- Unit length of collection pipes
- Per house connections
- Unit volume of wastewater

The proposed sewerage system is shown in Table F.3.1.

In this section the Independent Alternative will be discussed in analogy with Denpasar PDAM If a new sewerage organization is integrated into PDAM, some of their functions can be shared and some savings will be possible. The Integration Alternative will be discussed in the next section.

Fig F.3.1 shows the organization of Independent Alternative.

Each functions are summarized as follows :

(1) Control Committee :

- Control, regulate, and approve all activities of the organization

(2) Director/Vice-Directors :

- Head(s) responsible for Sewerage Organization

(3) Internal Audit :

- Control all internal affairs of the organization

(4) Administration and Financial Department

- Responsible for Administration (Inventory, Purchase, Personnel and Others)
- Responsible for Financial Affairs (Treasury, Payment and Bill processing)
- Responsible for Accounting (Book-keeping, Billing and Financial Planning)
- Responsible for Customers (Customer relation and Public relation)

(5) Technical Department

- Responsible for Operation of Treatment Plant and Pumping Stations (T/P, P/S, Laboratorium)
- Responsible for Environmental Monitoring
- Responsible for Sewage Collection (Interceptors, Main, Secondary & Tertiary Pipes, Manholes)
- Responsible for House Connection & Disconnection
- Responsible for Maintenance of All Facilities
- Responsible for Planning
- Responsible for Record Keeping

The required staff number can be summarized as follows :

- Control Committee (Not Sewerage Staff) * : 5
- Director/Vice Directors : 3

- Internal Audit	:	3
- Department Chiefs	:	2
- Division Chiefs	:	8
- Section Chiefs	:	22
- Section Staff (22 x 2.1)	:	46
- Unit Chiefs	:	4
- Unit Staff (4 x 3.5)	:	12
Total		105

Because the members of Control Committee are not staff of the sewerage organization, the requirement at initial stage would be 100. However as the sewerage system expands, the staff requirement will increase.

The initial stage of Master Plan will start from 1998, including preparation, and the final stage will end in 2010.

Staff Requirement for Sewerage (Independent)

(Year)	(Staff Number)
1998	100
2010	370

3.2 Integration into PDAM

If a new organization for sewerage system is integrated into PDAM (Water Supply), some divisions can be shared for both water supply and sewerage.

Those divisions are as follows :

- Administrative division
- Financial division
- Accounting division
- Customer division

- Maintenance division
- Planning division

The Integration Alternative is shown in Fig F.3.2.

The required staff number for sewerage management can be calculated as follows :

- Control Committee	:	5
- Director/Vice Directors	:	4
- Internal Audit	:	3
- Department Chiefs	:	3
- Division Chiefs	:	10
- Section Chiefs	:	30
- Section Staff (30 x 7.7)	:	230
- Unit Chiefs	:	4
- Unit Staff (4 x 14)	:	56
Total		345

Since the members of Control Committee are excluded from sewerage staff, the total staff would be 340. The standard staff requirement for water supply in Denpasar is 260. Then the staff requirement for sewerage system would be 80.

Staff Requirement for Sewerage (Integration)

(Year)	(Staff Number)
1998	80
2010	290

3.3. Comparative Evaluation

The two Alternatives have merits and demerits, which this section will discuss. The final decision should be made through social, political and economical judgments.

Jakarta chose Independent Alternative, while Bandung chose Integration Alternative for their new sewerage organizations.

It is to be noted that merits of the one Alternative are demerits of the other.

(1) Independent Alternative

If a new independent organization is to be established for a new sewerage system, the following merits can be counted :

- Fresh organization : A fresh organization is commonly free from undesirable habits of the old system, and staff in there are highly motivated in their jobs.
- A fresh organization can ensure more freedom in setting higher salaries and recruiting new staff.
- Fresh thinking : A sewerage organization should be self-sufficient in at least O/M costs. A fresh flexible thinking will make the organization more independent such as cost recovery.

The following are demerits of Independent Organization :

- High costs : Since all activities of sewerage system must be covered by its own staff, financial burdens are larger than Integration Alternative.
- Less experienced : Because all staff are recruited and new for sewerage, they are by and large less experienced in the sewerage system operation. They need to learn it through "try and error" for some time.

(2) Integration Alternative

The merits of Integration Alternative are as follows :

- Less O/M costs : Because some functions can be shared with the water supply section of PDAM, certain savings will be possible.

Saving of Personnel Costs

Independent Alternative	(at initial stage) Integration Alternative
100 staff x 0.2 million Rp. x 12 month = Rp.240 million/year	80 staff x 0.2 million Rp. x 12 month = Rp.192 million/year

This indicate that about 20% can be saved by Integration Alternative.

- Experience : There are a few common technical areas in the jobs between water supply and sewerage, excluding administration and finance. They are planning, construction and operation. The accumulated experiences by PDAM can be used for sewerage system.

The demerits of this Alternative are as follows, when a new organization is integrated into an old organization.

- Established hierarchy : A new organization is subject to established hierarchy of an old one and will be influence by it.
- Less freedom : An integrated organization is not free in setting new salaries to attract new skilled staff, and must accept the existing ones.
- Undesirable habits : If there are some undesirable old habits in the old organization, new organization will also be influenced by them through integration.