G.4 Urgent Plans for Water Supply to Major Cities

The potential of groundwater resource is restricted by the several characteristic conditions, especially precipitation and its seasonal pattern, land use (vegetation), topography and geology, etc., in an area of each groundwater basin. On the other hand, the demand of groundwater resource is projected by the human activities for our social and economical benefit.

Presently, to keep the balance of groundwater cycle means that the groundwater storage in each groundwater basin is sustained. However, every unit of groundwater storage as a part of island water has been recharged to each other and between surface water. Therefore, water recharge and storage are important factor for the balance of groundwater cycle.

G.4.1 Selection for Major Water Supply Systems

Human activities have utilized large quantities of island water in the Philippines for many years. Consequently, groundwater has been removed artificially at rates far greater than the natural recharge cycle of the respective aquifers. A natural groundwater cycle might be balanced if there is no other cause of artificial groundwater removal. On this basis, groundwater resource availability means how we can apply and/or survive under the conditions of an unbalanced groundwater cycle..

Actually, in several areas such as Metro Manila and Cebu City, etc., the diminution of groundwater storage is already a serious condition. While it is quite difficult to evaluate groundwater shortage forecasting using several factors on a nationwide basis, areas predicted to have critical groundwater shortages in this Study were selected for urgent action plans by the following procedures.

G.4.1.1 Basic Condition

The water resources were classified into surface water (lake, pond and rivers, etc.) and groundwater. Surface water provides the majority (about 97 %) of water resources utilization, especially for irrigation purposes. Irrigation water use (surface and groundwater) occupies more than 91 % of water resources in the Philippines. In most cases, the majority of irrigation water has been diverted from rivers to arable lands to supply water by gravity. Irrigation systems are usually located in rural areas.

A portion (depending on differential pressure of surface and groundwater, soil moisture or water level and top soil's permeability) of irrigation water helps to directly recharge groundwater storage in shallower aquifers. This means that irrigation water demand is not a related factor for groundwater shortage, even when large quantities of groundwater are used for agricultural purposes in rural areas.

Water shortages were reported in Metro Manila, Cebu City and some urbanized provincial cities located mainly along the seashore. Probably, in urbanized and populated areas, groundwater imbalance originates from the problems associated with the lowering of groundwater levels, saline water intrusion, etc. In general, the following conditions were considered for the evaluation of groundwater problems:

(1) Object for Groundwater Evaluation

a. Classification of Groundwater Usage

In this study, water usage was categorized into the purposes of irrigation (agricultural), municipal (domestic and commercial), industrial and others (livestock, recreation and fisheries), that are used for water rights registration by the NWRB. Irrigation, municipal and industrial water constitute around 99 % of the water resources utilization in the Philippines.

b. Bulk Water Use in an Urbanized Areas

In urbanized and/or populated areas, the majority of water usage is for domestic and industrial purposes. Also, in the areas reported to have water shortages at present, Level-III water supply systems and large-scale of economic zones exist. Usually, such areas have developed huge groundwater water supply systems. Therefore, groundwater demand for Level-III water supply and industrial use was considered as one of the factors relating to the groundwater shortages in an urbanized areas.

(2) Handling Unit and Area

Recharge water originates from the direct/indirect effects of rainfall or from surface water. The variation of precipitation has a several annual patterns. To prevent unnecessary complications, the annual amount of any factor was adopted as the primary unit of measurement in this study. Water service area and service coverage area on the municipal level was used for this study. The provincial level was adopted for average annual rainfall records, because there are only 50 synoptic stations, and these do not cover the whole of the Philippines.

a. Available and Useful Information of Groundwater Development

i) Municipal & Industrial Water

Information on the groundwater intake amount from ex-MWSS (the Manila Water Co. and Maynilad Water Services Inc.) and from the WDs was useful for this study. However, the only available nationwide data for industrial water is the water right registration data, under the management of the NWRB. Finally, water resources extracted for water supply Level-III systems were evaluated for determining groundwater shortages.

For municipal water, data from the ex-MWSS organizations and LWUA provided information on the water supply systems. This information consisted of the type and structures of the water sources, their operation hours and intake records, and water quality analysis results as of 1995.

ii) Population Census 1995

The latest Philippine census was conducted in 1995. Municipal populations were used for indirect groundwater indexing.

iii) Groundwater Consumption

Groundwater recharge in the service areas was calculated by annual precipitation multiplied the municipality area. Groundwater potential was estimate by the calculation of groundwater recharge multiplied by the hydrogeological availability. L-III groundwater consumption was studied by the above basis.

Rainfall data were obtained from PAGASA's 50 synoptic stations. Their data included daily rainfall total as well as monthly and annual summary data. For most of the synoptic stations, annual data was available for the period 1961 to 1995. An isohyetal map was prepared based on these annual precipitation averages.

Municipal area data was provided from the NWRB and the NSO as of 1995. Hydrogeologic availability was studied using the geological characteristics and previous groundwater availability maps prepared by the NWRC in 1976. According to these maps, groundwater availability in urbanized areas were in fair to good condition in terms of specific capacity and coefficient of transmissivity.

The municipal groundwater potential was estimated using 5% of the average annual precipitation multiplied by the municipal area.

b. Water Supply Service Area
Level-III water supply systems service areas where were considered at the barangay level. Usually, these water supply systems distribute water to mainly urban barangays and their vicinities. Some water supply systems serve water to several municipalities. For this study, municipalities covered by water supply were the evaluation unit.

G.4.1.2 Evaluation Criteria

The service level of water supply was evaluated by the water distribution index. This index shall be estimated by multiplying the *SERVICE HOURS* and the *SQUARED SERVICE PRESSURE*. This figure shows how the beneficiaries received satisfactorily safe water supplied through systems and/or facilities anytime during the day. Sometimes, even when there was sufficient water sources in their service area, water supply systems had service level problems because of inadequate systems.

However, there was no information available regarding the above service level from each Level-III water supply system in the Philippines. Therefore, the low service level systems were evaluated (those with probable water sources shortages) by calculating the total points gamered from the below analysis.

Points were classified two groups, which were 1 to 4 and 0.5 to 2. Each group has 4 level points, which were approximately 90% of total systems for lower portion (point 1 or 0.5) and other 10% for higher portion (2 to 4 points or 1 to 2, or 3 levels each). Especially for the highest deviation level, a few water supply systems were selected and were given 2 or 4 points. The following criteria were used for selection of major cities.

(1) Water Source

a. Groundwater Extraction
The structures for groundwater development were classified two types; deepwell and spring. In the case of spring development, observable discharge was considered overflow from groundwater to surface water. Even if a large quantity of spring discharge is developed, the amount of groundwater storage is not changed. Therefore, only the amount of groundwater extraction using deepwells was

calculated. The major (high point total) WDs were the Metro Cebu WD, the Davao City WD, the ex-MWSS and Cagayan de Oro City WD, etc. The points (described in column P-1 of Table G-81) and their demarcated amounts are:

Point	Sphere	Percentage
4	10 MCM/year or more	2.0 %
3	5 MCM/year or more and less than 10 MCM/year	2.5 %
2	3 MCM/year or more and less than 5 MCM/year	1.7 %
1	less than 3 MCM/year	93.8 %

b. Type of Water Sources

For the cost of water production and supply, and for the safety regarding drinking purposes, groundwater has been developed in preference to surface water in the case of water supply level-III systems if it is available in great enough quantities within a service area, because of the low water purification requirements.

When the WDs did develop surface water, it usually meant that groundwater quantity and/or quality was not sufficient. The major (high point total) WDs were the Metro Leyte WD, the Roxas City WD, the Malaybalay WD, and some others. The points (described in column P-2 of Table G-81) and their demarcated amounts are:

Point	Sphere	Percentage
4	Only SW was developed	3.5 %
3	SW/GW were developed, & SW was larger than GW	3.7 %
2	SW/GW were developed, & GW was larger than SW	1.5 %
1	Only GW was developed	91.3 %

(2) Population

a. Population Index

The deviation square was adopted for the statistical index of the municipal population on a provincial basis. Actually, the present level-III service area was not projected by the boundary of municipal or barangay, because of their viability. The population of the municipalities that include water supply services were considered.

b. Statistical Analysis Unit

i) Population

Basically, water sources needs were estimated by the population, service coverage, unit water consumption, leakage factor, etc. The major (high point total) WDs were the ex-MWSS, the Zamboanga City WD, the Metro Cebu WD, among others. The points (described in column P-3 of Table G-81) and their demarcation amounts are:

Point	Sphere	Percentage
4	10 or more	0.7 %
3	5 or more & less than 10	1.0 %
2	2 or more & less than 5	8.7 %
1	less than 2	89.6 %

ii) Population Density

Population density was considered in terms of well field (unit groundwater extraction per well field area) consumption because municipalities, with high population densities, have limited well fields. The major (high point total) WDs were the ex-

MWSS, the Metro Iloilo WD, etc. The points (described in column P-4 of Table G-81) and their demarcation amounts are:

Point	Sphere	Percentage
2.0	10 or more	0.5 %
1.5	5 or more & less than 10	1.2 %
1.0	2 or more & less than 5	6.0 %
0.5	less than 2	92.3 %

(3) Municipality Groundwater Potential and Level-III Groundwater Consumption

a. By Present Demand

The groundwater consumption rate by present demand was evaluated based on municipality groundwater potential. This potential was estimated by recharge (5% of rainfall) and groundwater availability (area ratio shallow and deep well field). The major (high point total) WDs were the Jolo Mainland WD, the Angeles City WD, etc. The points (described in column P-5 of Table G-81) and their demarcation amounts are:

Point	Sphere	Percentage
2.0	10% or more	0.5 %
1.5	5% or more & less than 10%	1.5 %
1.0	1% or more & less than 5%	9.5 %
0.5	less than 1%	88.6 %

b. By Future Demand

The groundwater consumption rate by future demand was evaluated in the same manner as the present rate. The major (high point total) WDs were the Angeles City WD, the San Pedoro WD, etc. The points (described in column P-6 of Table G-81) and their demarcation amounts are:

Point	Sphere	Percentage
2.0	10% or more	2.2 %
1.5	5% or more & less than 10%	1.2 %
1.0	1% or more & less than 5%	8.5 %
0.5	less than 1%	88.1 %

G.4.1.3 Conclusion

The total points are mentioned in the T-P column of *Table G-81*. Out of 402 Level-III water supply systems, nine (9) systems (above 10.5 points) supply water to large cities, which were classified as "*HIGHLY URBANIZED CITIES*". These nine (9) systems serve water to 19 highly urbanized cities out of the 24 cities in the Philippines.

The rest of the highly urbanized cities were:

1. Olongapo City (Subic Water; no points, the first privatized WD since February 1997)
2. Lucena City (Quezon Metro WD; 7.5 points, the largest spring water fed system)
3. General Santos City (Gen. Santos WD; 5.5 points, low service coverage-2.6 %)
4. Iligan City (LGU has managed several Level-III water supply systems)
5. Butuan City (Butuan WD; 6.5 points, large GW potential and low coverage-32.7 %)

The tendency of large point Level-III water supply systems were:

- Surface water source was developed or planned to be developed.
- Groundwater source development amount was very close to the limit of its potential.
- Present population (1995 census) was more than 200,000.
  Urban barangays occupied more than 50 % of the service municipality.

The major Level-III water supply systems which were selected for detailed studies of their domestic water supply systems were those where the preferential water resources would be improved or developed. These major areas cover for water supply were as follows:

1. Metro Manila: Since Aug. 1997, ex-MWSS water supply system was operated private sector. These companies are namely Maynilad Water Services Company (MWSC) and Manila Water Company Incorporated (MWCI). Its service area covers whole NCR, 6 municipalities or cities of Cavite and 10 municipalities of Rizal. Ten highly urbanized cities are included within this service area, including the cities of Manila, Quezon, Kalookan, Pasay, Mandaluyong, Makati, Marikina, Muntinlupa, Pasig and Las Pinas.

2. Metro Cebu WD: MC-WD covers two highly urbanized cities (Cebu and Mandaue Cities) and five municipalities.

3. Angeles City WD; AWD covers one highly urbanized cities; namely Angeles City.

4. Cagayan de Oro CWD: CO-WD covers one highly urbanized cities; namely Cagayan de Oro City and one municipality.

5. Zamboanga WD: ZWD covers one highly urbanized cities; namely Zamboanga City.

6. Baguio City WD: BC-WD covers one highly urbanized cities; namely Baguio City.

7. Bacolod City WD: BACI-WD covers one highly urbanized cities; namely Bacolod City.

8. Metro Iloilo WD; MI-WD covers one highly urbanized cities; namely Iloilo City and 6 municipalities.

9. Davao City WD; DC-WD covers one highly urbanized cities; namely Davao City.

G.4.1.4 Data/Information Collected from Major Cities

The following major data/information were collected from major water supply systems and were referred to built in a detailed GRDP:

1. Metro Manila: Water Management and Allocation (Annex-4; Groundwater Assessment, April 1996; NWRB-ADB), Metro Manila Groundwater Development Project (Nov. 1991; MWSS-JICA), Master Plan Study on MWSS Services (May 1994; MWSS-JICA), Specifications of

MWSS Deepwell Stations (deepwells inventory, Sept. 1996; MWSS), Operational Report (Jan. to Dec. 1995; MWSS),

2. Metro Cebu WD: Groundwater Resources Investigation (1979; LWUA), Sanitary Survey of Cebu and Mandaue (Nov. 1985; University of San Carlos), Study of the Mactan Island Integrated Master Plan (Sept. 1995; Cebu Province), Annual Report (1995; MCWD), Map of Salinity & Groundwater Elevation (Dec. 1996; MCWD), Production Record (Jan. to Dec. 1996; MCWD), Infiltration Well Record (Construction Report, Jan. 1996; MCWD),

3. Angeles WD: Technical Report on Preliminary Design (Provincial Water Supply-II, Nov. 1993; LWUA),

4. Cagayan de Oro WD: Technical Report (Water Source Development, Oct. 1997; LWUA),

5. Zamboanga WD: Water Quality Analysis (Wells and Surface Raw Water/Oct. 1996 to June 1997; ZWD), Well Structures (Drawings; ZWD), Pumping Test Records (Completion Year; ZWD), Monthly Report for Water Production (July 1996 to June 1997; ZWD), Daily Report of Production for Water Treatment and Supply (Jan. 1994 to May 1997; ZWD),

6. Baguio City WD: Data Processing, Description of Hydrogeological Properties of Groundwater System and Evaluation of Groundwater Potential (Technical Report 3 & 4, March 1994; LWUA-UNDP), Updated Feasibility Study on the Expansion & Improvement of Baguio City WD (Final Report, June 1994; LWUA), Questionnaire (as of 1997; BWD)

7. Bacolod City WD: Options for Systems Development (May 1997; LWUA-ADB)

8. Metro Iloilo WD: Water Resources Master Plan 1995-2030 (Oct. 1997; LWUA-UNDP), Questionnaire (as of 1997; MI-WD),

9. Davao City WD: Technical Report on Water Sources Availability (Nov. 1997; LWUA-OECF), Detailed Resistivity Study (1985; NWRC)

G.4.2 Groundwater Development for Major Cities

Based on the previous selection for major domestic water supply service areas, the following groundwater resources development plans were studied, inclusive of existing BOT schemes, on-going development projects, etc.. Also, several groundwater problems (water quality, water level lower and saline water intrusion, etc.), were considered for the preparation of the GWRDPs in the said major cities.

The summary plans for Major Cities' water sources development are summarized in Table G-82. In the remarks column of this table, some key words of GWRDPs are mentioned. Reference data/information are described and each Major City GWRDP was studied as shown

below.

G.4.2.1 Metro Manila

(1) Present Condition

a. Water Sources

The ex-MWSS Level-III water supply is a large surface water fed system that has three Water Rights for intake facilities located at the Angat Dam in Bulacan, WRR-III. Also, a large number of wells were located in the ex-MWSS service area that adversely impact groundwater. According to the operation records (1995) provided by the MWSS, there were 265 existing wells owned by the MWSS, One hundred fifty six (156) wells out of which were abandoned due to saline water intrusion, lowered water levels, or deterioration of the facilities, as of December 1995. Their production amount and functioned facilities number have been reduced year by year.

b. Annual Operation

The majority of the groundwater in ex-MWSS service area was produced in the southern part of Manila where the municipalities of Taguig, Paranaque, Las Pinas and Muntinlupa are located. The capacities of those wells had a tendency to increase toward south Manila.

The records for groundwater production in year 1991 provided by MWSS are shown in Table G-83. According MWSS operation records (1995), the total amount of groundwater exploitation was 26.9 MCM/year. Since late the 1980's, MWSS had stopped developing groundwater areas where gravity service is not possible, such as Antipolo and the eastern hillsides of the NCR.

c. Other Groundwater Usage

According to the previous JICA study on Metro Manila Groundwater Development Project (1991), an amount of groundwater exploitation for other private sector (commercial & industrial, etc.) was investigated total 306.9 MCM/year in ex-MWSS service area.

d. Structures of Water Intake Facilities

The records of well depth in 1995 provided by MWSS are shown in Table G-84. The well depth in western Manila was deeper (maximum 300 meters or 1,000 ft) than the eastern (Laguna) side, because a major aquifer (Guadalupe Formation) outcrops as a sedimentary face in the eastern part of the Marikina Valley. Within southern Manila, the ratio of abandoned wells was also higher. The average depth of ex-MWSS wells located in Manila, Rizal and Cavite were 263 m, 156 m and 275 m respectively.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The reports on Water Management and Allocation (Annex-4; Groundwater Assessment, April 1996; NWRB-ADB) had estimated that groundwater recharge in the MWSS service area was 191 MCM/year. This amount was inclusive of recharge by rainfall, inflow from northern and southern areas, infiltration from

Laguna Bay and the leakage of MWSS distribution water.

On the other hand, the amount of groundwater exploitation in 1991 was reported at 339.6 MCM/year by the previous JICA Study. Also the extraction of groundwater had been concentrated in some industrial areas.

b. Requirements for Surface Water Development
The future demand of municipal water in this area should be developed by surface water, the water rights for which were registered and were held by MWSS.

(3) Environmental Aspect

a. Piezometric Condition
Since around twenty years back, groundwater storage, which is differential between exploitable value and exploitation, have been unbalanced. Presently, the water level of major aquifers has been lowered five to six meters every year and is now observed more than one hundred meters below sea level as shown in Figure G-69.

b. Water Quality
Saline water intrusion was reported along the seashore belt of Manila Bay, from where Valenzuela is located up to Cavite City, and the groundwater quantity (measured by electric conductivity) becomes 3,000 ms/cm or more. Also saline connate water contamination was reported on the northern side of Laguna Bay. This saline water is seawater blockaded by marine deposits of the Tertiary Period.

c. Subsidence
Ground subsidence has not been reported as yet in the ex-MWSS service areas. However, all the elements that may cause the ground surface to subside are present.

G.4.2.2 Metro Cebu

(1) Present Condition

a. Water Sources
The Metro Cebu Level-III water supply is a large groundwater fed system that has 81 production deepwells for its intake facilities located in a narrow alluvium plain along the seashore. The width of this alluvium deposit belt is only five to seven km, and the deepwells are located two to four km from the seashore. Out of the production deepwells, four deepwells were located in the Mactan Island service area. Other groundwater sources include the designed infiltration wells (23 wells) under Mananga Phase-I, which is still an on-going project. The well field is shown in Figure G-70. The MCWD has one surface water intake facility with a treatment plant on the Buhisan River.

b. Annual Operation
Records for groundwater production in year 1996, provided by the MCWD, are shown in Table G-85. According MCWD operation records, the amount of groundwater exploitation totaled 40.8 MCM/year. The capacity of deepwells varied from 8.8 to 194 m^3/hr while the operation hours were 11.6 to 23.7 hr/day. Hence, the average deepwell production was 1,387 m^3/day with 20.4 hr/day operation.

Since the early 1970's, the MCWD has been expanding their service area and well fields to develop groundwater. The MCWD divided their service areas into 11 blocks, they were constructed in different phases. Each service block has several production deepwells and elevated reservoir(s). All service blocks were connected by several distribution main pipelines, but these are usually closed.

c. Structures of Water Intake Facilities

The deepwell construction records for well structures inventory was not provided by MCWD within these field works. Probably, there are many reports on the deepwells' construction or rehabilitation in their library. However, the majority of the deepwells' structure was 50 to 120 m of deep with well diameters of 12 inches for pump housing, and eight inches for screens, according to the MCWD technical staff.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The reports on Salinity Survey of Cebu (LWUA, 1985) and Groundwater Assessment of Metro Cebu (ADB, 1996) had estimated that exploitable groundwater value in MCWD service area is 60.1 MCM/year. This amount was inclusive of recharge by rainfall (about 8 %) to alluvium deposits and infiltration recharge from nine rivers. On the other hand, the amount of groundwater exploitation in 1995 totaled 46.3 MCM/year. Also the extraction of groundwater had been concentrated in some industrial areas.

b. Requirements for Surface Water Development

Hence, the MCWD stopped developing groundwater in areas where infiltration wells were available to provide recharge with river water. Therefore, the MCWD now plans to develop surface water under a project named Mananga Phase-II for their future demand.

(3) Environmental Aspect

a. Piezometric Condition

The ADB report on groundwater assessment (1996) was provided through the MCWD's "Groundwater Elevation Map, Dec. 1996". Presently, well fields are located within an area three (3) meters above sea level or higher water level zones. The static water levels of 12 deepwells were measured at below sea level, mostly in Mandaue City and Central Cebu City. These groundwater conditions are shown in Figure G-71.

b. Water Quality

The ADB report on groundwater assessment (1996) was provided through the MCWD's "Salinity Map, Dec. 1996". Presently, the well fields were located within an area of 50 mg/liter or less chloride-ion zones. The highest salinity deepwell was measured at 230 mg/liter in Central Cebu City. The salinity condition of the Cebu well field is shown in Figure G-72.

c. Subsidence

Ground subsidence has not been reported as yet in the MCWD area. However, all

the elements that may cause the ground surface to subside are present in the study area. These might be the include the lowering of the piezometric water level and the presence of compact clay layers above the aquifers.

The implications are that the MCWD must obtain water rights for its long-range requirements from the NWRB and introduce a groundwater and subsidence monitoring and study program for planning purposes. These acquired rights must be protected from encroachment by other users.

G.4.2.3 Baguio City

(1) Present Condition

a. Water Sources

The Baguio City Level-III water supply is a large groundwater fed system that has 48 production deepwells for its intake facilities located in three well fields; the geological formations of these well fields are: Klonedyke (Eastern Baguio City), Zigzag (City Central) and Kennon Limestone (western Baguio City). Out of these production deepwells, 41 deepwells were operational and the others were stand-by deepwells located near-by the operational deepwells.

There were six (6) spring fields and nine (9) spring eyes were tapped, those were Amiliang SP (Zigzag), CJH and Amsing SP (Klondyke) and Buyog, Nauyac and Crystal SP (Kennon). There was one (1) surface water intake facility; namely the Sto. Tomas Rain Basin. However, the discharge from these springs and rain basins vary seasonally. At present, their capacity has been drastically decreased due to small precipitation levels.

b. Annual Operation

Records for groundwater production in year 1997, provided by the BWD, are shown in Table G-86. According to BWD operation records, the amount of groundwater exploitation totaled 12.1 MCM/year (33,228 m^3/day). The capacity of deepwells varied from 48 to 8,361 m^3/day while the operation hours were 7.3 to 23.9 hr/day. Hence, the average deepwell production was 858 m^3/day with 20.0 hr/day operation.

c. Structures of Water Intake Facilities

According to an UNDP report, the depths of the deepwells owned by the BWD were between 40 to 140 meters. Their average depth was around 100 meters. However, more than 90 % of the existing deepwells were not located.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The UNDP report estimated that the exploitable groundwater value in the BWD service area or three (3) well fields at 14.8 MCM/year. This amount was inclusive of recharge by rainfall (about 8 %) to the aquifer(s). On the other hand, the amount of groundwater exploitation in 1997 totaled 12.1 MCM/year.

b. Requirements for Surface Water Development

The BWD has a groundwater development and improvement project financed under AusAID (Australian Agency for International Development), probably based on the

UNDP groundwater potential study (1996). According to the BWD, a total of 33 deepwells will be constructed or rehabilitated (existing) up to the year 2000. The development capacity of groundwater intake might be reach its potential.

In addition, the BWD is proceeding to secure other water source (surface water development) through a BOT scheme. The BWD plan to rehabilitate a rain basin(s) in order to improve its capacity after the year 2000.

(3) Environmental Aspect

a. Piezometric Condition

Lowered static groundwater levels have not been reported as yet in the BWD area.

b. Water Quality

The water quality analysis results provided by the BWD are shown in Table G-87. They were analyzed in 1995 and are probably grouped in a Type-I Piper Trilinear Diagram (shallow groundwater).

c. Subsidence

Ground subsidence has not been reported as yet in the BWD area.

G.4.2.4 Angeles City

(1) Present Condition

a. Water Sources

The Angeles City Level-III water supply system is a groundwater fed system that has 20 production deepwells for its intake facilities located in the city proper and in the southern part of the city. Out of these production deepwells, 13 deepwells were operated and others were stand-by deepwells.

Since 1972, the Angeles WD had constructing 12 deepwells. In 1993, one (1) production well was constructed under a KfW project (German-Aid). An expansion project of its water supply system was just completed and is now operating. This project's name was the PCWSP-II (Provincial Cities Water Supply Project II, OECF).

b. Annual Operation

The records for groundwater production in year 1997, provided by ACWD, are shown in Table G-88. According operation records, the amount of groundwater exploitation totaled 12.2 MCM/year (33,334 m^3/day). The capacity of the deepwells varied from 1,380 to 4,320 m^3/day while the operation hours were 14.0 to 24.0 hr/day. Hence, the average deepwell production was 2,564 m^3/day with 21.7 hr/day operation.

c. Structures of Water Intake Facilities

The first 12 deepwells have depths of 81 meters to 183 meters. The KfW well has a depth of 200 meters. The seven (7) PCWSP-II deepwells, are composed of four (4) deepwells of 100 meters depth and three (3) deepwells of 200 meters depth.

These 20 deepwells are divided into two types. The first type (15 deepwells) have

target aquifer from alluvium fan deposits, which are mostly located at about 100 meters depth. The others are from Central Luzon Plain deposits, which are at exactly 200 meters depth.

d. Water Quality

The water quality extracted from the alluvium fan and the Central Luzon Plain aquifers are potable and meet to the PNSDW. However, the groundwater quality of the northern part of Angeles City (ex-Clark Air Base) were analyzed as not potable. Trace elements (Fe & Mn) were observed to be higher than in the city proper.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The exploitable groundwater value in the ACWD service area was estimated at 137.3 MCM/year. This amount was determined from the inflow of the aquifers (alluvium fan and Central Luzon Plain formations). On the other hand, the amount of groundwater exploitation in 1997 totaled 12.2 MCM/year.

b. Requirements for Surface Water Development

The groundwater potential is larger than the extraction amount. The future demand of municipal and industrial water was estimated at 31.3 MCM/year. Therefore, there is no requirement for surface water development until the year 2025.

(3) Future Requirements in Groundwater Supply

a. Deepwell Development

The present maximum deepwell capacity was estimated at 51,196 m^3/day (18.7 MCM/year). This capacity will be reduced 1 % per year by deterioration. Thus, the deepwells will produce enough water to meet the expected demand until the year 2009.

In Angeles City, the only available water source is groundwater. The result of the existing deepwell evaluation indicates that the shallower deepwell (100 meters deep alluvium fun aquifer) is more productive and would be more economical in terms of meeting the expected future demand.

b. Recommended Well Field

In consideration of the well field in the city proper and in the northern part of city, there are problems with regards to the availability of vacant land for deepwell construction and also regarding groundwater quality. Also, from the viewpoint of the hydrogeological conditions, the belt of spring eyes in the alluvium fan (about 80 to 90 meters above sea level) is suitable for a future well field. This location is in the area of the highway between Angeles City and the municipality of Porac as shown in Figure G-73.

The distance between Angeles City and Porac is approximately 25 km. Given a well influence of 500 meters, a maximum of 50 deepwells could be constructed in the future.

c. Deepwell Structure and Production Capacity
The target aquifer is the alluvium fan deposits, with a depth of about 100 meters. Based on the existing deepwells, the capacity will be estimated at 39 lps or 2,808 m^3/day with 20 hours pumping.

d. Construction Cost
An additional 18 deepwells should be constructed between 2010 and 2025. The cost was estimated at about 96.3 million pesos, inclusive of pump house, submersible pump, transmission pipeline and elevated reservoirs.

(4) Environmental Impact Assessment

This assessment of the groundwater resources in Angeles City is based on the geological environment and the existing well data. Further evaluation is advisable after the drilling and testing of the proposed production wells. A monitoring program should also be implemented in order to establish the trend of the regional water level condition and the quality of water, particularly from the wells and their downstream tributaries, swamps and marshes. Devising measures for protecting the groundwater against over-exploitation within a limited area and contamination will be based on the results of these testing and monitoring plans.

a. Piezometric Condition
Lowered static groundwater levels have not been reported as yet in the ACWD area. In the Angeles City area, the piezometric levels might be stabilized. The regional hydrogeological situation shows that the source of the groundwater flow is from the east of city and that the ultimate discharge of the groundwater flow is into the Central Luzon Plain.

b. Water Quality
The water quality of the southern Angeles City area is potable. Only chlorination will be required to for each deepwell.

c. Subsidence
Ground subsidence has not been reported as yet in the Angeles City area.

G.4.2.5 Cagayan de Oro City

(1) Present Condition

a. Water Sources
The Cagayan de Oro City Level-III water supply is a large groundwater fed system that has 20 production deepwells for intake its facilities located in three (3) well fields, whose geological formations are stream sediments. Out of these production deepwells, four (4) deepwells were under construction by the PCWSP-III. Also one (1) spring source was tapped, this is the Malasag SP.

b. Annual Operation
The records for groundwater production in year 1997, provided by the CDWD, are shown in Table G-89. According to BWD operation records, the amount of groundwater exploitation totaled 31.0 MCM/year (84,829 m^3/day). The capacity of deepwells varied from 90 to 9,607 m^3/day while the operation hours were 8.0 to 21.3

hr/day. Hence, the average deepwell production was 5,629 m^3/day with 15.6 hr/day operation; the spring has 395 m^3/day with 24 hours operation.

c. Structures of Water Intake Facilities
According to CDWD records, deepwell depths were distributed between 75 to 255 meters. Their average depth was around 188 meters.

d. Water Quality
Water quality analysis results were not provided (as yet) by the CDWD. However, due to the geological background and well depths, the probable water quality is potable and would meet the PNSDW.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand
The exploitable groundwater value in the CDWD service area was estimated at 34.3 MCM/year from the inflow of stream deposit aquifers. On the other hand, the amount of groundwater exploitation in 1997 totaled 31.0 MCM/year.

b. Requirements for Surface Water Development
The PCWSP-III is on-going and will expand the water source by four (4) deepwells. These deepwells have capacities varying from 50.5 to 64.0 lps (average 56.6 lps) and their total production will be 16,291 m^3/day (5.9 MCM/year) with 20 hr/day operation. Hence, the total groundwater exploitation is 36.9 MCM/year, which is over the exploitable amount.

A BOT water supply scheme was on-going with the NPC as a partnership. According to the CDWD, this scheme is to provide 100,000 m^3/day (36.5 MCM/year) surface water from the Cagayan River. The future gap between demand and water sources availability will be met by surface water because the groundwater potential is already limited after the OECF loan project.

(3) Environmental Impact Assessment

a. Piezometric Condition
Lowered static groundwater levels have not been reported as yet in the CDWD area.

b. Water Quality
Due to the geological background and the depth of the deepwells, only iron and manganese, as trace elements, might be observed. Water quality monitoring shall be required in future.

c. Subsidence
Ground subsidence has not been reported as yet in the CDWD area.

G.4.2.6 Zamboanga City

(1) Present Condition

a. Water Sources
The Zamboanga City Level-III water supply is a large, primarily surface water fed system. The groundwater source has been diluted by surface water, which is one

weir at the Tumaga River, with an elevation of 74 meters above sea level. The seven production deepwells were located in the city proper and in the municipality Ayala. The ZCWD has been utilizing mainly surface water since 1978, and is extracting groundwater to supplement their supply.

A water treatment plant was constructed in 1978, with a capacity of 35,000 m^3/day. The plant was then expanded to 70,000 m^3/day in 1989. This water treatment plant (WTP) is located on the northern side of the city (in the municipality Pasonanca) and its elevation is 66 meters above sea level. There are two ground reservoirs within the area of the WTP, and they distribute water by gravity to the central city.

b. Annual Operation

Surface water production is recorded daily, and it averages 67,500 m^3/day. Records for groundwater production in the latest year, provided by the ZCWD, are shown in Table G-90. According ZCWD operation records, the amount of groundwater exploitation totaled 0.73 MCM/year (2,000 m^3/day). When surface water in insufficient supply, then the WD operates its deepwells to meet their additional demand. The capacity of the deepwells varied from 764 to 1,360 m^3/day.

c. Structures of Water Intake Facilities

The depth of the deepwells is probably less than 100 meters (refer to Table G-91). Their target aquifer is in alluvium sediments located on the seashore side only. Detailed geological and hydrogeological faces for groundwater condition are unknown yet.

d. Water Quality

The water quality analysis results provided by the ZCWD are shown in Table G-92. They were analyzed in 1995 and indicated saline water intrusion by seawater, because of lower recharge from the mountainside. Even the mountainside deepwell (Camins DW) has 250 mg/liter chloride ion.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The exploitable groundwater value in Zamboanga City is 53.8 MCM/year. This amount was inclusive of the service area of Zamboanga City (156.1 km^2) and was estimated by five percentage recharge of rainfall. However, the hydrogeological condition for an aquifer as alluvium porous sediment is limited in seashore side only. The other groundwater exploitable formation is probably Tertiary sediments, which has less permeability than alluvium'.

On the other hand, the amount of groundwater exploitation in 1997 totaled only 0.7 MCM/year. For future groundwater development, the detailed study or investigation shall be implemented.

b. Requirements for Surface Water Development

The ZCWD is now planning to expand its WTP to a capacity of 105,000 m^3/day, but the flow of the Tumaga River is limited due to low precipitation (1,117 mm/y).

(3) Future Requirements in Groundwater Supply

a. Deepwell Development

Both water sources (groundwater and surface water) are not sufficient to meet the future demand of 148.0 MCM/year (in the year 2025). Other water sources are sea water, desalinated, for domestic purpose. However, the water tariff and plant running costs of sea water systems are expensive and this will affect their finance options.

Therefore, groundwater should be developed near the supply area and the groundwater should be diluted by surface water. Subsequently, the extracted groundwater will be desalinated at the source. Finally, when demand becomes larger (probably after 2007), demand management or sea water desalination would be a necessity.

b. Recommended Well Field

There is no detailed geological map of Zamboanga City and its surround areas. If well fields would be set up in Zamboanga City and/or the municipality of Ayala, the available deepwell area is estimated at about 17.4 km^2, as shown in Figure G-74 and G-75. The distance of deepwell influence is assumed at 500 meters. Hence, about 60 deepwells could probably be constructed in the future.

c. Deepwell Structure and Production Capacity

The depth of the deepwells to be constructed in the future might be less than 100 meters. Their production could be estimated at 1,000 m^3/day. Therefore, a total of 60,000 m^3/day could be available to develop the slightly saline fresh water. The total (surface water and groundwater) water sources are estimated at 173,000 m^3/day. This amount would meet the projected water demand until the year 2007.

d. Construction Cost

The estimated construction cost is ₱253.2 million, inclusive of reservoirs (until 2007).

(4) Environmental Impact Assessment

a. Piezometric Condition

In the Zamboanga City area, detailed groundwater investigation should be done in the near future as there is no such information available to plan water resources management at present.

b. Water Quality

Even if there was no exploitation of groundwater, sea water probably would have intruded into the seashore belt. Water quality monitoring should be implemented in order to study the possible requirement for a future desalination plant.

c. Subsidence

Ground subsidence has not been reported as yet in the ZCWD area.

G.4.2.7 Bacolod City

(1) Present Condition

a. Water Sources

The Bacolod City Level-III water supply is a large groundwater fed system that has 19 production deepwells for its intake facilities, located in a main well field and on the eastern seashore side. The main well field has elevation around 45 meters above sea level and is four (4) km from the sea. Also, the Bocal-Bocal and Boro-Boro spring groups are located about 15 km from the city proper.

b. Annual Operation

The records for groundwater production in year 1997, provided by BACIWA, are shown in Table G-93. According BACIWA operation records, the amount of groundwater exploitation totaled 16.0 MCM/year (43,813 m^3/day).

The capacity of deepwells varied from 768 to 3,624 m^3/day while the operation hours were 23.0 to 24.0 hr/day. Hence, the average deepwell production was 1,946 m^3/day with 23.7 hr/day operation.

The groundwater development project (PCWSP-IV, OECF) is now in the design stage. Three (3) test wells, to be production deepwells, will be drilled at the northern boundary line of Talisay, near the existing well field and on the southern boundary line of Murcia. The planned additional exploitation amounts to 9.9 MCM/year (27,000 m^3/day) for the design year 2002. The target aquifer has a depth of around 100 m; its geology is a pyroclastic formation.

c. Structures of Water Intake Facilities

According to the deepwells' records, they are distributed between 102 to 201 meters in depth. Their average depth is around 158 meters. The Deepwell diameters are composed of two types: 400 by 250 mm and 300 by 200 mm.

d. Water Quality

In terms of water quality, the groundwater in this area has contains a slightly higher iron and manganese, which exceed the PNSDW.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

The exploitable groundwater value in BACIWA's service area was studied by inflow measurement at 20.1 MCM/year (55,055 m^3/day). On the other hand, groundwater recharge into BACIWA's well field was estimated at 103.3 MCM/year, inclusive of an area of mountain slope and the future expansion service area. This amount might include a deeper aquifer's inflow and under-recharge from the north and south slopes.

The amount of groundwater exploitation in 1997, including the on-going water supply expansion project (PCWSP-IV), totaled 25.9 MCM/year.

b. Requirements for Surface Water Development

The only available and potable water source is groundwater in the service area. The

ADB report (Options for Systems Development; May 1997) recommended the development of two (2) rivers. However, for a domestic water supply system, there are much merits regarding the development of groundwater. They are 1) no WTP is necessary, 2) water is transmitted directly from water source, 3) gravity distribution is available.

Groundwater is therefore the preferred source to be developed to provide sustained potential for domestic water supply purposes.

(3) Future Requirements in Groundwater Supply

a. Deepwell Development

In order to meet the projected demand of BACIWA up to 2025, additional sources of water supply should be developed. The potential sources to meet the future needs are springs located at the foothills of Mt. Mandalagan, and groundwater through deepwells in the municipalities of Murcia, Talisay and Silay City. The area and population of the municipality of Talisay is 173.4 km^2 and 68,402 persons (1995 census); Murcia is 322.9 km^2 and 55,129 persons; Bacolod City is 156.1 km^2 and 402,351 persons.

For the future demand, there is no other alternative than to develop groundwater using deepwells. To do this, there are two options, to expand the well field or to tap a deeper aquifer within the same well field.

In regards to the deeper aquifer, this aquifer would be in the same geological condition and there might be no interference of the production water level between them.

In view of the two alternatives, the viable plans shall be should be discussed and surveyed, along with BACIWA's intentions, the beneficiary's wishes, etc.

b. Recommended Well Field

Technically, the plan to use a deeper aquifer is recommended for future groundwater development. Therefore, the new location of the well field is within Bacolod City.

If a service area expansion project will be approved, the well field will be located same elevation belt as shown in Figure G-76.

c. Deepwell Structure and Production Capacity

According the ADB report and data provided by BACIWA, the new production deepwells of the alternative to expand the well field would have a depth of 150 meters or 200 meters. The capacity is around 35 lps.

For the alternative to tap a deep aquifer, the deepwells would be designed for 300 meters or more. The capacity of such deepwells is estimated at 20 to 25 lps.

d. Construction Cost

Case 1; Well Field Expansion

The construction cost is estimated at ₱307.8 Million by the year 2025.

Case 2; Deeper Aquifer Development
The construction cost is estimated at ₱558.8 Million by the year 2025.

G.4.2.8 Metro Iloilo

(1) Present Condition

a. Water Sources

The Metro Iloilo L-III water supply sources include a surface water source with a cross weir and an intake at Maasin, two infiltration galleries, one at Talanghauan, Sta. Barbara and one at Ungca, Pavia, seven (7) deepwells, four (4) at San Jose, San Miguel and three (3) in Oton.

b. Annual Operation

According to the MIWD, the total production in 1997 was estimated at 41,040 m^3/day, of which about 11,200 m^3/day (27.3 % of the total production) was from groundwater (deepwells in the San Jose and Oton well fields) (see Table G-94) and the rest was from the Maasin surface water intake and infiltration galleries. In 1995, the MIWD served 131,221 people, which represents 33 % of the total urban population of 397,132.

c. Structures of Water Intake Facilities

In the Oton well field, three (3) deepwells have a depth about 100 meters, with a 350 mm pump house and well screens of 250 mm. The total production of the Oton deepwells is 75 lps.

In the San Jose well field, four (4) deepwells also have a depth of 100 meters. They can produce a total of 95 lps.

d. Water Quality

The existing data (Table G-95) indicates that the groundwater quality in the plain is influenced by structural features and by withdrawal. Increased saline content could occur in the aquifer further inland, like in Sta. Barbara and Alimodian; this is not related to saltwater intrusion but to the upflow of mineralized water from deep sediments, through faults and fissures.

In the coastal area of Iloilo City, the high conductivity values are attributed to saline water intrusion, caused by excessive withdrawal and tidal influence.

The high calcium content in the groundwater of the Iloilo basin is probably due to the long residence time of the groundwater during flow through limestone, which is assumed to be present at some depth in the plain, as evidenced by the limestone outcrop on the Guimaras Island, across the Guimaras Strait, opposite from Iloilo City.

(2) Groundwater Balance Study

a. Groundwater Potential and Demand

According to the Water Resources Master Plan 1995-2030 (Oct. 1997; LWUA-UNDP), the recoverable groundwater of an exploitable value was estimated at

218,824 m^3/day (79.9 MCM/year). This amount was inclusive of recharge by rainfall and inflow into the aquifers. On the other hand, the amount of groundwater exploitation in 1997 totaled 4.1 MCM/year.

b. Requirements for Surface Water Development

The minimum streamflow from the three (3) river basins is estimated at 150,984 m^3/day, from which the Tigum River would contribute 73,872 m^3/day. About 39,000 m^3/day of the Tigum River's minimum flow is appropriated for utilization by the improved Maasin weir. To utilize the remaining streamflow from the three (3) basins it is necessary to locate a suitable intake place and to obtain water permits.

(3) Future Requirements in Groundwater Supply

a. Deepwell Development

The total groundwater withdrawal of about 55,000 m^3/day represents about 25 % of the estimated recoverable groundwater recharge of 218,824 m^3/day, within the three (3) river basins, of which only the Tigum is located within the MIWD service area.

Consequently, it could be concluded that groundwater could provide a significant source of potable water to satisfy a great part of MIWD's future water demand. Therefore, groundwater is selected as the water source for the expansion of the MIWD water supply system in the near future.

b. Recommended Well Field

From the hydrogeological point of view, the most advantageous location for a well field is as far downstream in a river basin as possible, along the groundwater contour, to capture most of the groundwater flow generated by recharge in the upstream part of a river basin. However, the main constraint to do this in the MIWD area is the risk of saline water intrusion, which could be caused by the intensive withdrawal of water from deepwells located close to the coast.

The placement of production deepwells at a distance of about six (6) to nine (9) km from the coast in the Oton and San Jose well field emphasizes this point. Therefore, deepwell locations further inland (Figure G-77) will be sought to in order to be able to intercept the greatest part of groundwater flow without causing saline water intrusion (which occurs when hydraulic gradient toward the sea is reversed).

c. Deepwell Structure and Production Capacity

In the plain, the water table aquifer consists of unconsolidated Alluvium sediments, separated by a semi-confining layer from the main artesian aquifer, which consists of unconsolidated and consolidated sediments. In the Upland area, the semi-confining layer is not present, i.e. the water table aquifer, which consists of consolidated sediments, extends over the entire thickness of the system. The thickness of the different aquifer layers are 140 meters of deep.

The capacity of the deepwells to be constructed to meet the future demand is estimated at an average 20 lps.

d. Construction Cost

Sixty-five (65) deepwells and reservoirs with a total of 13,500 m^3 shall be constructed by the year 2025. The total cost is estimated at ₱335.0 million.

G.4.2.9 Davao City

(1) Present Condition

a. Water Sources

The Dumoy well field southwest of Davao City serves as the main groundwater source for the Davao City WD. The well field is located east of Mt. Talomo formed from a pyroclastic mud flow deposits caused by the eruption of a volcano. West of the well field, the flanks of Mt. Talomo serves as the watershed area for the aquifers in the said well field. From the east, the well field is recharged by waters flowing along the Talomo River.

b. Annual Operation

At present there are 33 deepwells belonging to the Davao City WD. The production rates from each deepwell range from 27 to 79 lps. The total daily production was rated at 131,000 m^3/day (47.8 MCM/year). An additional six (6) deepwells to meet the additional demand were now under construction in the Dumoy well field; these additional wells will produce about 22,000 m^3/day (8.0 MCM/year).

c. Structures of Water Intake Facilities

The depths of the deepwells owned by the DCWD are distributed between 90 to 152 meters with well diameters are telescope type 300 x 250, 400 x 250 and 450 x 250.

d. Water Quality

The water quality analysis results, provided by the DCWD, are potable and meet the PNSDW.

(2) Groundwater Balance Study

a. *Groundwater Potential and Demand*

The groundwater recharge value in the Dumoy and other well field area was estimated 84.4 MCM/year. This amount was determined based on rainfall recharge. On the other hand, the inflow of Dumoy main aquifer was estimated at 55.8 MCM/year studied by LWUA.

The amount of groundwater exploitation, inclusive the six (6) new production deepwells under the PCWSP-III, totaled 55.8 MCM/year from Davao City well field. However, the other groundwater usage and production was not investigated yet. The Davao City WD has tried to develop surface water by BOT scheme in near future.

b. Requirements for Surface Water Development

In consideration of the industrial water exploitation and water supply BOT schemes in Davao City, the WD had planned their demand and water sources availability until the year 2015. This BOT scheme will supply surface water at a maximum 230,000 m^3/day (84.0 MCM/year). Subsequently, the future existing deepwells will be utilized until the year 2020.

(3) Future Requirements in Groundwater Supply

a. Deepwell Development

Six (6) deepwells are now under construction by the PCWSP-III, financed by OECF.

Part – G

Tables

Table G-01 WATER RIGHTS & FACILITIES (NWRB)

WRR	Amount of Water Rights (MCM/year)				Numbers of Water Rights (Numeric)				Average Grants Amount (MCM/year /)		
	DW	SP	SW	Total	DW	SP	SW	Total	DW	SP	SW
I	33.9	179.2	3,406.6	3,619.7	148	335	1,086	1,565	0.24	0.53	3.14
II	24.8	13.7	8,148.4	8,187.0	122	97	1,276	1,495	0.20	0.14	6.39
III	326.5	19.8	13,439.9	13,786.2	912	30	918	1,860	0.36	0.66	14.64
IV	406.9	115.9	7,261.9	7,784.6	1,937	196	1,349	3,482	0.21	0.59	5.38
V	29.9	60.2	2,785.4	2,875.5	135	93	633	861	0.22	0.65	4.40
VI	123.1	54.4	5,278.3	5,455.8	236	84	915	1,235	0.52	0.65	5.77
VII	139.2	83.3	1,829.2	2,050.6	511	178	474	1,163	0.27	0.47	3.86
VIII	14.3	23.3	2,107.2	2,144.9	37	64	431	532	0.39	0.36	4.89
IX	3.7	9.7	1,102.7	1,116.1	35	14	160	209	0.11	0.69	6.89
X	18.8	79.6	4,272.3	4,370.7	346	113	379	838	0.05	0.70	11.27
XI	69.0	70.7	3,751.9	3,891.6	104	44	392	540	0.66	1.61	9.57
XII	52.7	132.2	5,514.9	5,704.8	150	40	388	578	0.35	3.43	14.21
Nation	1,241.8	847.1	58,898.6	60,987.5	4,669	1,288	8,401	14,358	0.27	0.66	7.01

Data Source : Database for Water Rights Registration, as of 31 March 1997 (NWRB)

Table G-02 WATER RIGHTS BY USAGE WISE (NWRB)

(Unit : MCM/year)

Usage	Type	I	II	III	VI	V	VI	VII	VIII	IX	X	XI	XII	Sub-total
Municipal	DW	29.8	13.0	95.1	243.9	18.1	45.2	77.8	3.5	2.9	10.7	55.3	26.2	620.8
	SP	120.5	1.8	4.2	82.6	46.8	16.8	15.5	11.8	4.5	26.3	8.8	63.7	401.3
	SW	29.1	1.4	909.7	47.4	0.7	8.5	24.0	32.5	15.7	6.8	51.0	14.9	1,134.7
	Sub-T	178.6	16.2	1,009.0	373.9	65.7	70.4	117.3	47.8	23.1	43.8	108.2	102.8	2,156.8
Industrial	DW	2.5	0.4	41.9	98.4	0.4	17.8	42.9	8.4	0.7	6.8	8.0	2.9	231.1
	SP	1.1	-	-	0.1	0.8	9.9	2.1	3.7	-	29.6	-	0.5	47.9
	SW	67.7	15.4	125.6	321.8	18.2	523.6	77.8	11.0	4.3	167.1	199.1	85.7	1,617.3
	Sub-T	71.3	15.8	167.4	420.3	19.4	551.4	122.8	23.0	5.0	203.6	207.1	89.1	1,896.3
Irrigation	DW	2.3	11.5	187.4	52.8	11.1	46.9	5.8	2.5	-	1.8	5.8	22.7	354.8
	SP	57.6	11.8	15.6	26.6	12.0	19.3	59.3	7.7	5.1	19.8	35.6	74.2	344.6
	SW	3,309.6	8,122.0	12,396.4	6,503.4	2,603.0	4,636.4	1,588.4	2,062.0	1,037.6	4,091.5	3,460.3	5,413.5	55,313.9
	Sub-T	3,369.5	8,145.3	12,599.4	6,587.8	2,716.1	4,702.5	1,653.6	2,072.2	1,042.7	4,112.4	3,501.4	5,510.4	56,013.3
Others	DW	0.0	-	2.1	6.8	-	13.2	11.6	-	0.0	0.1	0.1	0.9	34.9
	SP	0.0	0.2	-	6.5	0.6	8.5	6.4	0.2	0.1	3.9	26.3	0.8	53.3
	SW	0.2	9.5	8.2	389.4	73.5	109.8	138.9	1.8	45.2	6.9	48.5	0.8	832.8
	Sub-T	0.2	9.7	10.3	402.7	74.1	131.4	156.9	1.9	45.4	10.9	74.9	2.5	921.0
Total	DW	33.9	24.8	326.5	406.9	29.7	123.1	138.2	14.3	3.7	18.8	69.0	52.7	1,241.6
	SP	179.2	13.7	19.8	115.9	60.2	54.4	83.3	23.3	9.7	79.6	70.7	137.2	847.1
	SW	3,406.6	8,148.4	13,439.9	7,261.9	2,785.4	5,278.3	1,829.2	2,107.2	1,102.7	4,272.3	3,751.9	5,514.9	58,898.7
	Total	3,619.7	8,187.0	13,786.2	7,784.7	2,875.3	5,455.8	2,050.6	2,144.9	1,116.1	4,370.7	3,891.6	5,704.8	60,987.4

Data Source : Database for Water Rights Registration, as of 31 March 1997 (NWRB)

Table G-03 DISTRIBUTION OF GW WATER RIGHTS (NWRB)

Range of WRs	Wells (lps)					Springs (lps)					Grand
Usage	4.99 or less	5.00 24.99	25.00 99.99	100.00 or more	Total	9.99 or less	10.00 99.99	100.00 999.99	1,000.00 or more	Total	Total
Municipal											
WRs; MCM/year	83.4	280.0	229.3	30.0	620.8	35.9	355.4	79.1	131.9	401.3	1,022.1
No. of Facilities	2,114	835	184	3	3,135	541	186	9	3	739	3,875
Industrial											
WRs; MCM/year	12.1	60.3	123.2	35.5	231.1	0.7	9.2	38.0	-	47.9	279.0
No. of Facilities	179	169	82	7	437	8	10	2	-	20	457
Irrigation											
WRs; MCM/year	43.1	91.1	200.6	20.0	354.8	26.7	141.9	172.9	-	344.6	699.3
No. of Facilities	474	334	122	6	936	295	111	20	-	462	1,398
Others											
WRs; MCM/year	3.8	19.5	11.7	-	34.9	3.1	11.5	19.8	-	34.4	69.3
No. of Facilities	95	56	9	-	160	50	13	4	-	67	227
Total											
WRs; MCM/year	140.3	450.9	564.8	85.5	1,241.6	66.5	321.0	308.8	131.9	828.2	2,069.8
No. of Facilities	2,862	1,394	397	16	4,669	893	353	35	3	1,284	5,953

Data Source : Database for Water Rights Registration, as of March 1997 (NWRB)

Table G-04 PRODUCTION RECORDS OF MWSS IN 1995

Province	Municipality	Q MCM/year	DW No.	Capa. l/s
M.Manila	Valenzuela	0.0	1	0.02
	Navotas	0.1	1	0.07
	Malabon	0.2	1	0.16
	Quezon (C)	3.0	12	0.25
	Caloocan (C)	-	-	-
	Marikina	-	-	-
	Manila (C)	-	-	-
	San Juan	-	-	-
	Mandaluyon	-	-	-
	Pasig	0.0	1	0.02
	Makati	3.0	13	0.23
	Pasay (C)	0.7	3	0.24
	Pateros	-	-	-
	Taguig	0.1	1	0.14
	Paranaque	0.5	3	0.17
	Las Pinas	0.3	1	0.29
	Muntinlupa	1.0	6	0.17
	sub total	8.9	43	0.21
Rizal	Montalban	1.2	4	0.31
	San Mateo	1.5	5	0.30
	Antipolo	4.7	17	0.28
	Cainta	0.7	3	0.24
	Taytay	2.1	7	0.30
	sub total	10.3	36	0.29
Cavite	Bacoor	1.1	6	0.18
	Imus	0.6	2	0.30
	Kawit	1.1	4	0.28
	Cavite (C)	2.1	11	0.20
	Noveleta	1.8	5	0.37
	Rosario	0.8	2	0.41
	sub total	7.7	30	0.26
	Total	26.9	109	0.25

Data Source : Operational Report of 1995 (MWSS)

Table G-05 PRODUCTION & FACILITIES OF WDs (LWUA)

unit Q: MCM/year

WRR	Facilities			Water Supply Index		
	DW	SP	SW	Q	Pop.Serv.	Coverage
I	106	32	4	26.18	440,160	35.87%
II	48	3	0	7.24	128,920	13.48%
III	337	8	3	136.89	1,865,560	29.81%
IV	383	69	11	106.26	1,153,980	24.74%
V	62	63	7	35.33	489,310	20.81%
VI	87	29	7	48.24	695,740	19.23%
VII	128	17	1	74.06	516,330	24.61%
VIII	18	11	5	17.44	328,750	23.00%
IX	28	8	2	39.32	488,270	35.56%
X	48	23	3	47.69	716,550	36.86%
XI	51	8	3	58.73	1,028,500	48.07%
XII	31	6	0	15.58	251,540	13.19%
Nation	1327	277	46	612.95	8,103,610	27.04%

Data Source : List of WDs, as of 1995 (LWUA)

Table G-06 ESTIMATION OF PRODUCTION FOR L-II WATER SUPPLY SYSTEMS

(unit of Q : MCM/year)

WRR	Category Urb-Rur	Pop.'95 (census)	Service Coverage	Population Served	Level-II Q
I	Total	2,362,180	5.2%	122,931	2.7
	Urban	470,258	1.6%	7,524	
	Rural	1,891,922	6.1%	115,407	
II	Total	3,054,225	5.2%	159,788	3.5
	Urban	589,329	1.6%	9,429	
	Rural	2,464,896	6.1%	150,359	
III	Total	9,111,124	3.5%	321,529	7.0
	Urban	5,205,546	1.6%	83,289	
	Rural	3,905,578	6.1%	238,240	
IV	Total	19,395,047	2.6%	513,829	11.3
	Urban	14,872,647	1.6%	237,962	
	Rural	4,522,400	6.1%	275,866	
V	Total	4,325,368	4.5%	195,188	4.3
	Urban	1,525,763	1.6%	24,412	
	Rural	2,799,605	6.1%	170,776	
VI	Total	5,777,016	4.2%	245,158	5.4
	Urban	2,383,120	1.6%	38,130	
	Rural	3,393,896	6.1%	207,028	
VII	Total	5,014,652	4.1%	203,507	4.5
	Urban	2,275,267	1.6%	36,404	
	Rural	2,739,385	6.1%	167,102	
VIII	Total	3,366,953	5.1%	172,602	3.8
	Urban	728,494	1.6%	11,656	
	Rural	2,638,459	6.1%	160,946	
IX	Total	3,581,617	4.8%	170,136	3.7
	Urban	1,074,282	1.6%	17,189	
	Rural	2,507,335	6.1%	152,947	
X	Total	3,954,742	4.3%	170,737	3.7
	Urban	1,566,713	1.6%	25,067	
	Rural	2,388,029	6.1%	145,670	
XI	Total	3,760,145	3.7%	139,135	3.0
	Urban	2,005,198	1.6%	32,083	
	Rural	1,754,947	6.1%	107,052	
XII	Total	4,909,195	4.2%	205,770	4.5
	Urban	2,082,018	1.6%	33,312	
	Rural	2,827,177	6.1%	172,458	
Total	Total	68,612,264	3.8%	2,620,310	57.4
	Urban	34,778,635	1.6%	556,458	
	Rural	33,833,629	6.1%	2,063,851	

Notes :
1. Population is adopted by the census 1995 provided from the NEDA.
2. Service coverages for categolized population are the average estimated by the Provincial Water Supply and Sanitation Sector Plan, as of 1995 (DILG).
3. Unit consumption for Level-II Domestic water is limitted by the National Sector Plan which mentioned as at least 60 Lpcd.

Table G-07 ACTUAL WELL CONSTRUCTION FOR LEVEL-I (DPWH)

Region	Province	Year of Wells Completion									Total wells	Operational wells	Q MCM/year	Pop. Served
		until 1987	1988	1989	1990	1991	1992	1993	1994	1995				
WRR I	Abra	0	91	192	364	233	542	19	165	662	2,259	2,259	1.65	225,932
	Benguet	0	91	192	364	233	542	19	165	652	2,259	2,259	1.65	225,932
	Ilocos Norte	6,228	99	532	376	633	6	0	0	0	8,489	6,767	2.10	289,312
	Ilocos Sur	45,328	76	109	215	523	10	0	0	0	46,315	34,971	6.41	872,511
	La Union	1,261	56	143	331	305	121	0	52	27	2,668	1,783	0.72	105,481
WRR I Total		53,367	415	1,168	1,450	1,975	1,224	39	383	1,351	61,381	48,039	12.58	1,721,168
WRR II	Batanes	114	4	2	54	4	4	3	3	6	194	166	0.07	9,960
	Cagayan	7,054	117	459	258	171	0	0	87	130	8,336	6,573	1.83	250,043
	Ifugao	0	91	192	364	233	542	19	155	662	2,259	2,259	1.65	225,932
	Isabela	8,935	73	328	675	410	0	0	109	148	10,589	8,453	2.40	328,624
	Kalinga-Apayao	0	91	192	364	233	542	19	165	662	2,259	2,259	1.65	225,932
	Mountain Province	0	91	192	364	233	542	19	165	662	2,259	2,259	1.65	225,932
	Nueva Vizcaya	2,510	52	151	295	62	0	0	0	0	3,037	2,410	0.70	96,665
	Quirino	915	25	31	283	76	0	0	17	32	1,349	1,180	0.41	59,205
WRR II Total		19,539	552	1,552	2,587	1,422	1,631	81	712	2,301	30,083	25,498	10.38	1,421,892
WRR III	Bataan	13,696	54	81	160	75	87	0	123	129	14,405	10,981	2.24	307,470
	Bulacan	44,420	35	31	192	498	650	0	314	178	46,318	35,213	6.99	953,663
	Nueva Ecija	41,464	153	715	441	365	507	0	304	398	44,347	33,981	7.33	1,004,505
	Pampanga	47,101	129	701	467	241	689	0	380	428	50,126	38,351	8.15	1,116,672
	Pangasinan	76,049	121	224	548	581	11	0	226	83	77,755	58,750	10.85	1,486,671
	Tarlac	26,135	119	347	346	38	149	0	158	249	27,551	21,603	4.33	593,026
	Zambales	17,336	61	85	137	21	62	0	0	0	18,104	13,670	2.50	342,987
WRR III Total		266,573	672	2,174	2,291	1,769	2,455	0	1,514	1,455	278,606	211,963	42.49	5,807,706
WRR IV	Aurora	959	29	65	170	97	92	0	23	93	1,468	1,258	0.53	72,374
	Batangas	9,148	111	377	815	195	309	0	388	289	11,422	9,123	2.78	381,276
	Cavite	6,230	62	158	326	336	225	0	48	26	8,067	6,385	1.82	249,947
	Laguna	8,145	48	151	742	532	595	0	175	149	10,572	8,536	2.80	383,388
	Marinduque	12,692	132	136	279	116	13	0	48	61	13,466	10,293	2.17	295,928
	Metro Manila (NCR)	0	13	26	52	33	77	3	24	95	323	323	0.24	32,376
	Occidental Mindoro	17,165	63	168	447	23	0	0	0	0	17,866	13,575	2.68	366,590
	Oriental Mindoro	34,867	83	139	295	76	0	0	0	0	35,417	26,715	4.83	662,219
	Palawan	30,481	210	399	381	29	0	0	139	145	31,784	24,164	4.79	656,790
	Quezon	9,029	129	748	1,053	1,111	568	321	343	295	13,628	11,321	4.50	615,857
	Rizal	4,823	28	79	572	66	25	0	0	0	5,663	4,453	1.22	167,367
	Romblon	13,671	139	149	265	415	93	321	115	70	15,239	11,821	2.87	392,938
WRR IV Total		147,660	1,035	2,685	5,249	3,035	2,142	645	1,304	1,075	164,935	128,020	31.23	4,222,956
WRR V	Albay	2,215	99	568	525	412	444	0	193	329	4,577	4,023	2.00	274,660
	Camarines Norte	508	43	207	240	323	79	0	142	306	3,564	1,377	0.76	104,375
	Camarines Sur	738	177	926	832	581	140	0	451	671	4,516	4,332	2.95	393,547
	Catanduanes	1,340	76	127	639	366	31	230	127	60	2,956	2,021	1.37	184,755
	Masbate	250	89	280	363	868	299	309	247	45	3,180	2,993	1.87	255,955
	Sorsogon	708	113	472	653	254	133	0	299	365	2,918	2,337	1.70	232,829
WRR V Total		6,219	598	2,580	3,285	2,654	1,036	539	1,369	1,367	19,547	18,092	10.58	1,480,221
WRR VI	Aklan	1,824	31	154	225	438	164	210	45	35	2,371	2,090	1.05	14,415
	Antique	1,205	30	102	285	315	107	27	19	28	2,119	1,838	0.82	112,214
	Capiz	1,739	61	251	306	661	125	339	34	19	3,435	3,010	1.46	290,638
	Guimaras	0	37	46	152	250	46	29	61	0	621	621	0.45	62,100
	Iloilo	4,928	147	178	455	1,326	121	44	18	152	7,329	6,097	2.37	325,221
	Negros Occidental	6,798	329	594	843	2,894	956	769	1,073	0	14,166	12,467	6.24	854,221
WRR VI Total		15,294	655	1,285	2,352	5,750	1,519	1,218	1,250	234	30,051	26,093	12.40	1,658,809
WRR VII	Bohol	10,166	142	342	245	397	178	177	145	116	11,973	9,831	2.60	356,131
	Cebu	13,250	153	418	481	461	524	417	273	146	16,123	12,811	3.77	515,166
	Negros Oriental	21,552	219	324	595	609	105	174	98	0	23,476	17,913	4.21	576,030
	Siquijor	1,281	25	48	69	46	22	7	23	0	1,560	1,230	0.34	45,800
WRR VII Total		45,760	539	1,132	1,430	1,513	829	775	542	262	52,832	41,785	10.91	1,493,127
WRR VIII	Biliran	55	15	89	309	26	61	30	23	10	588	530	0.39	53,223
	Eastern Samar	565	34	193	177	149	24	17	12	22	1,213	1,067	0.53	72,965
	Leyte	2,371	95	1,152	463	298	51	51	29	130	4,641	4,048	1.95	267,954
	Northern Samar	412	29	178	230	95	94	48	23	31	1,062	959	0.53	72,115
	Southern Leyte	642	43	344	202	107	28	17	5	35	1,480	1,310	0.69	91,580
	Western Samar	421	45	377	456	95	137	67	36	57	1,691	1,588	0.98	134,476
WRR VIII Total		4,538	255	2,240	1,834	771	395	230	128	265	10,676	9,542	5.05	692,194
WRR IX	Basilan	63	157	247	196	130	37	27	53	0	910	894	0.63	85,758
	Sulu	0	0	0	0	0	0	0	0	0	0	0	-	0
	Tawi-Tawi	0	0	0	0	0	0	0	0	0	0	0	-	0
	Zamboanga del Norte	124	109	433	658	482	305	49	67	74	2,351	2,304	1.61	220,765
	Zamboanga del Sur	1,306	201	539	1,206	560	752	308	326	97	5,295	4,969	3.08	421,458
WRR IX Total		1,543	467	1,219	2,060	1,172	1,094	384	446	171	8,556	8,170	5.31	727,951
WRR X	Agusan del Norte	1,427	45	86	83	87	96	69	73	59	2,012	1,655	0.61	83,138
	Agusan del Sur	1,063	90	82	25	61	350	57	63	56	1,850	1,584	0.71	97,061
	Bukidnon	4,754	166	76	142	66	73	65	56	90	5,492	4,303	1.14	155,585
	Camiguin	244	33	52	51	15	20	12	14	0	440	379	0.37	23,835
	Misamis Occidental	551	92	113	129	133	110	62	36	15	1,221	1,098	0.57	74,132
	Misamis Oriental	2,567	105	166	179	55	90	16	24	9	3,361	2,683	0.83	113,812
	Surigao del Norte	1,424	41	85	83	87	96	69	73	0	1,963	1,606	0.57	78,166
WRR X Total		12,138	566	691	692	507	835	349	339	229	16,339	13,308	4.60	629,739
WRR XI	Davao del Norte	5,371	246	240	853	478	157	124	138	94	8,901	5,648	1.85	254,773
	Davao del Sur	8,240	143	268	144	391	0	309	77	84	10,156	7,971	2.19	292,565
	Davao Oriental	2,557	47	103	146	162	0	62	38	38	3,153	2,514	0.76	103,767
	Surigao del Sur	2,884	197	241	116	256	68	41	30	36	3,769	3,048	1.01	138,315
WRR XI Total		19,552	633	852	559	1,287	235	536	283	252	24,009	19,181	5.75	789,420
WRR XII	Lanao del Norte	192	245	272	243	187	84	109	69	48	1,418	1,366	0.92	125,515
	Lanao del Sur	0	91	192	364	233	542	19	165	662	2,259	2,259	1.65	225,932
	Maguindanao	0	91	192	364	233	542	19	155	662	2,259	2,259	1.65	225,932
	North Cotabato	589	136	335	500	198	145	51	43	27	2,021	1,373	1.12	153,374
	Sarangani	0	0	0	0	0	0	0	0	0	0	0	-	0
	South Cotabato	5,827	126	145	242	233	66	70	32	48	6,839	5,262	1.47	201,849
	Sultan Kudarat	6,472	29	871	245	59	81	29	9	30	7,825	5,567	1.29	177,090
WRR XII Total		13,080	689	1,267	2,008	1,143	1,461	298	476	1,477	21,918	18,548	8.10	1,109,693
Grand Total		655,763	7,067	19,811	25,806	23,007	11,561	5,073	8,725	10,549	719,592	567,944	159.31	21,923,716

Data Source : Well Construction Report, as of January 1997 (DPWH DILG)

Table G-08 IRRIGATION SYSTEMS & WRs (NIA & NWRB)

unit Amount: MCM/year

WRR	Potential Arable-area	Irrigation System			Types of Source				Registered Water Rights					
		Total		Coverage	SW		GW		SW		DW		SP	
	(ha.)	Facilities	Area (ha.)	%	Facilities	Area (ha.)	Facilities	Area (ha.)	Facilities	Amount	Facilities	Amount	Facilities	Amount
I	121,760	2,301	94,206	77%	2,218	93,896	83	310	980	3,310	30	2	135	58
II	547,210	2,082	235,246	43%	1,987	234,899	95	347	862	12,396	452	187	17	16
III	662,730	1,374	359,262	54%	1,122	358,680	252	582	1,207	6,503	100	58	41	27
IV	263,590	971	122,040	46%	917	121,945	54	95	602	2,693	69	11	16	12
V	239,660	1,257	112,584	47%	1,197	112,394	60	190	724	4,636	55	47	18	19
VI	197,250	513	79,362	40%	406	79,044	107	318	396	1,588	20	6	105	59
VII	50,740	437	22,541	44%	421	22,504	16	37	394	2,062	10	2	21	8
VIII	84,390	467	50,824	60%	460	50,810	7	14	124	1,038	-	-	3	5
IX	76,500	263	34,551	45%	224	34,400	39	151	336	4,091	4	1	21	20
X	230,150	615	67,759	29%	540	67,473	75	286	329	3,460	10	6	13	36
XI	189,900	218	63,019	33%	208	62,982	10	37	365	5,413	83	23	16	74
XII	462,470	591	120,312	26%	405	119,798	186	514	7,573	55,314	936	355	462	365
Nation	3,126,340	11,089	1,361,703	44%	10,105	1,358,825	984	2,878	13,892	102,506	1,809	698	868	677

Remarks : Based on the 3% slope criteria, estimated by NIA Inventory
: Based on Inventory of completed and Operational Projects of BSWM, DPWH and NIA (1996 Repon)
: Based on Database of Water Rights Registration, as of 31March 1997 (NWRB)

Table G-09 PRODUCTION FOR IRRIGATION (NWRB)

WRR	Types of Sources									Total	
	SW			DW			SP				
	Facilities	Capacity	Amount	Facilities	Capacity	Amount	Facilities	Capacity	Amount	Facilities	Amount
	No.	MCM/year.f	MCM/year	No.	MCM/year.f	MCM/year	No.	MCM/year.f	MCM/year	No.	MCM/year
I	2,218	3.38	7,490.5	83	0.08	6.4	135	0.43	57.6	2,436	7,554.5
II	1,987	6.48	12,869.5	95	0.16	17.4	56	0.21	11.8	2,138	12,898.7
III	1,122	14.38	16,135.4	252	0.41	104.5	17	0.92	15.6	1,391	16,255.5
IV	917	5.39	4,940.8	54	0.36	19.5	41	0.65	26.6	1,012	4,987.0
V	1,197	4.47	5,354.6	60	0.23	13.6	16	0.75	12.0	1,273	5,380.2
VI	406	6.40	2,599.9	107	0.85	91.3	18	1.07	19.3	531	2,710.5
VII	421	4.01	1,688.7	16	0.29	4.7	105	0.56	59.3	542	1,752.7
VIII	460	5.23	2,407.4	7	0.25	1.7	21	0.37	7.7	488	2,416.8
IX	224	8.37	1,874.3	39	0.38	14.8	3	1.71	5.1	266	1,894.2
X	540	12.18	6,575.6	75	0.28	20.8	21	0.94	19.8	636	6,616.2
XI	208	10.52	2,187.7	10	0.55	5.5	13	2.74	35.6	231	2,228.8
XII	405	14.83	6,006.7	186	0.27	50.9	16	4.64	74.2	607	6,131.9
T/A	10,105	6.94	70,131.3	984	0.36	351.1	462	0.75	344.6	11,551	70,827.0

Data Source: NWRB Water Rights Database, as of March 1997

Table G-10 FOREIGN ASSISTED MAJOR PROJECTS (LWUA)

WRR		Province	Large PS	as vet.	OECF	ADB	AusAID	DANIDA	FreAID	GerAID
I	1	Abra	None	-	-	-	-	-	-	-
	2	Benguet	Baguio City				1			
	3	Ilocos Norte	Metro Ilocos Norte	1						
	4	Ilocos Sur	Metro Vigan	1						
	5	La Union	Metro La Union	1						
II	6	Batanes	None							
	7	Cagayan	Tuguegarao		1					
	8	Ifugao	None	-	-	-	-	-	-	-
	9	Isabela	Santiago		1					
	10	Kalinga-Apayao	None	-	-	-	-	-	-	-
	11	Mountain Pro.	None	-	-	-	-	-	-	-
	12	Nueva Viscaya	None	-	-	-	-	-	-	-
	13	Quirino	None	-	-	-	-	-	-	-
III	14	Bataan	Balanga		1					
			Mariveles		1					
	15	Bulacan	Angat		1					
			Baliuag		1					
			Bocaue		1					
			Bulacan		1					
			Bustos		1					
			Calumpit		1					
			Hagonoy		1					
			Meycauayan		1					
			San Jose del Monte			1				
	16	Nueva Ecija	Cabanatuan City			1				
			Gapan		1					
			San Jose City		1					
	17	Pampanga	Angeles City			1				
			Guagua		1					
			Mabalacat							1
			San Fernando			1				
	18	Pangasinan	Alaminos		1					
			Binamaley		1					
			Dagupan City		1					
			Lingayen							1
			Mangaldan		1					
			San Carlos City							1
	19	Tarlac	Tarlac			1				
	20	Zambales	Olongapo City		1					
			Subic		1					
IV	21	Aurora	None	-	-	-	-	-	-	-
	22	Batangas	Batangas City			1				
			Lipa City			1				
			Tanauan		1					
	23	Cavite	Dasmarinas		1					
			Gen. M. Alvarez		1					
	24	Laguna	Calamba				1			
			Laguna							1
			San Pablo City			1				
			San Pedro		1					
	25	Marinduque	None	-	-	-	-	-	-	-
	26	Metro Manila (NCR)	MWSS				1			
	27	Occidental Mindoro	None	-	-	-	-	-	-	-
	28	Oriental Mindoro	None	-	-	-	-	-	-	-
	29	Palawan	Puerto Princesa City	1						
	30	Quezon	Quezon Metro			1				
	31	Rizal	None	-	-	-	-	-	-	-
	32	Romblon	None	-	-	-	-	-	-	-
V	33	Albay	Daraga		1					
			Legaspi City		1					
			Ligao-Oas		1					
			Tabaco		1					
	34	Camarines Norte	Camarines Norte		1					
	35	Camarines Sur	Iriga City		1					
			Metro Naga				1			
	36	Catanduanes	Virac		1					
	37	Masbate	None	-	-	-	-	-	-	-
	38	Sorsogon	Sorsogon		1					
VI	39	Aklan	Kalibo			1				
	40	Antique	None	-	-	-	-	-	-	-
	41	Capiz	Roxas City			1				
	42	Guimaras	None	-	-	-	-	-	-	-
	43	Iloilo	Metro Iloilo				1			
	44	Negros Occidental	Bacolod City			1				
			Cadiz City						1	
			La Carlota City		1					
VII	45	Bohol	None	-	-	-	-	-	-	-
	46	Cebu	Carcar		1					
			Metro Cebu				1			
	47	Negros Oriental	Bayawan						1	
			Dumaguete City				1			
	48	Siquijor	None	-	-	-	-	-	-	-
VIII	49	Biliran	Naval		1					
	50	Eastern Samar	None	-	-	-	-	-	-	-
	51	Leyte	Metro Leyte		1					
	52	Northern Samar	None	-	-	-	-	-	-	-
	53	Southern Leyte	None	-	-	-	-	-	-	-
	54	Western Samar	None	-	-	-	-	-	-	-
IX	55	Basilan	Isabela		1					
			Lamitan		1					
	56	Sulu	Jolo Mainland		1					
	57	Tawi-Tawi	None	-	-	-	-	-	-	-
	58	Zamboanga del Norte	None	-	-	-	-	-	-	-
	59	Zamboanga del Sur	Pagadian City		1					
			Zamboanga City		1					
X	60	Agusan del Norte	Butuan City			1				
			Nasipit		1					
	61	Agusan del Sur	None	-	-	-	-	-	-	-
	62	Bukidnon	Malaybalay		1					
			Valencia			1				
	63	Camiguin	None	-	-	-	-	-	-	-
	64	Misamis Occidental	Misamis Occidental		1					
	65	Misamis Oriental	Cagayan dO. City			1				
			Gingoog City		1					
	66	Surigao del Norte	Metro Surigao			1				
XI	67	Davao del Norte	Tagum		1					
	68	Davao del Sur	Davao City			1				
	69	Davao Oriental	None	-	-	-	-	-	-	-
	70	Surigao del Sur	Bislig		1					
XII	71	Lanao del Norte	None	-	-	-	-	-	-	-
	72	Lanao del Sur	None	-	-	-	-	-	-	-
	73	Maguindanao	Cotabato City				1			
	74	North Cotabato	Metro Kidapawan		1					
	75	Sarangani	None	-	-	-	-	-	-	-
	76	South Cotabato	Polomolok				1			
	77	Sultan Kudarat	None	-	-	-	-	-	-	-
Nation		sub-total		(34) 24	8	6	-	2	-	-
		others		(43) -	5	2	-	3	2	31
		Total		(77) 24	13	8	-	5	2	31

Data Source : Status of Foreign Assistance (as of April 1997), List of WDs (as of Jan. 1997), WD's Annual Reports (as of 1995 & 1996) and Master Plan of MWSS (Feb. 1996)

Table G-11 PLANNED & STUDIED ECONOMIC-ZONE (PEZA)

(1) Planned Economic-Zone

Location		Name of Zone	Area	Types of Preferred Industries													
WRR	Province	(RZ; Regular, SZ; Special)	(ha)	N-M	L-M	Hea.	Ref.	H-T	Auto	Ele.	Che.	Mar.	Fo.	Gar.	Fur.	T-P	N-P
PI-01 III	Bataan	Hermosa RZ	600.0		1												1
PI-02 III	Bataan	PNOC Petrochemical Comp. EZ	150.0								1						
PI-03 IV	Batangas	First Batangas Ind'l Park RZ	54.0							1							
PI-04 IV	Batangas	First Philippine Ind'l Park RZ	75.0		1			1									
PI-05 IV	Batangas	Lima Tech. Center SZ	485.0		1			1									
PI-06 IV	Batangas	RLC SZ	95.0		1												
PI-07 IV	Batangas	Sto. Tomas Batangas RZ	133.0		1												
PI-08 IV	Batangas	Cambridge Ind'l Park RZ	88.0		1												
PI-09 IV	Batangas	DAIICHI Ind'l Park SZ	60.0		1												
PI-10 IV	Batangas	FIE-Estate SZ	266.9		1			1									
PI-11 IV	Batangas	Filinvest Ind'l Park Cavite SZ	85.0		1												
PI-12 IV	Batangas	Filoil SZ	37.5	1													
PI-13 IV	Batangas	Taipan Gold Ind'l RZ	100.0	1													
PI-14 IV	Laguna	Filinvest SZ (Laguna)	250.0														1
PI-15 IV	Laguna	LIIP Calamba Ind'l Community SZ	114.7		1												1
PI-16 IV	Laguna	Ecocentrum Tourism Estate SZ	76.0													1	
PI-17 V	Albay	Legaspi City SZ	33.1		1					1			1	1			
PI-18 VII	Cebu	Cebu Light Ind'l Park RZ	63.0		1												1
PI-19 VII	Cebu	West Cebu Light Ind'l Park SZ	245.0			1						1					
PI-20 VII	Leyte	Tacloban SZ	236.9	1													
PI-21 IX	Zamboanga del Sur	Ayala Ind'l Park RZ	50.0		1												
PI-22 X	Agusan del Norte	Tubay Agri proces. Center SZ	196.0										1				
PI-23 X	Agusan del Norte	Nasipit Ind'l Estate SZ	296.0		1												
PI-24 X	Surigao del Norte	Philnico Ind'l Estate SZ	100.0				1										
PI-25 XI	Davao Oriental	First Ori. Business & Ind'l Park RZ	57.0										1	1	1		
PI-26 XII	South Cotabato	Filinvest SZ (South Cotabato)	120.0														1
PI-27 XII	Lanao del Sur	NSC SZ	274.0		1												
		sub-total of Planned Zone	4,342.1	3	15	1	1	3	-	2	1	1	3	2	1	1	5

(2) Studied Economic-Zone

Location		Name of Zone	Area	Types of Preferred Industries													
WRR	Province	(RZ; Regular Zone, SZ; Special Zone)	(ha)	N-M	L-M	Hea.	Ref.	H-T	Auto	Ele.	Che.	Mar.	Fo.	Gar.	Fur.	T-P	N-P
FS-01 III	Pngasinan	Eastern Pagasinan Ind'l Comp. SZ	57.0	1													
FS-02 III	Pngasinan	Pagasinan Ind'l Park SZ	97.0		1							1					1
FS-03 IV	Laguna	Laguna Technopark II SZ	68.0		1												1
		sub-total of Studied Zone	222.0	1	21	2	2	3	-	3	1	3	6	4	2	2	10
	Grand Total (Existing, Planned & Studied)		8,029.5	6	53	3	3	6	1	8	2	6	9	7	3	3	21

source: The Philippine Economic Zones, as of 28 February 1997 (PEZA)

Explanation for Types of Preferred Industries

N-M ; non-mentioned
L-M ; Light to Medium Industry & Manufacturing
Hea. ; Heavy Industry
Ref. ; Refinery
H-T ; High Technology & Precision Assembly
Auto ; Automobile & Parts Supply
Ele. ; Electronics & Electrical Manufacturing
Che. ; Chemical & Petro-Chemical
Mar. ; Marine-related, Shipbuilding & Export-Oriented
Fo. ; Food Processing, Processed Fruits, Can Vegetable & other Agri-based
Gar. ; Garments & Textile
Fur. ; Furniture
T-P ; Theme-Park
N-P ; Non-pollution

Table G-12 PROJECTS FOR IRRIGATION DEVELOPMENT (NIA)

Projects	Location	schedule since	schedule to	Irrigation (ha.)
A. ON-GOING PROJECTS				
1 Diversified Crops Irrigation Project II	NUC	1993	1998	-
2 Palawan Integrated Area Dev't Project II-IC	PAL	1991	1998	4,125
3 Bohol Irrigation Project I	BOL	1983	1997	4,960
4 Visayas CIS & Participatory Project	VI, VII & VIII	1992	1998	3,250
5 Kalitubog-Mardagao Irrigation Project	NCO & MAG	1989	2000	10,840
6 Second CIS Development Project	Nation wide	1991	1998	14,181
7 Kabulnan Irrigation & Development Project	MAG	1992	1999	11,500
8 Pampanga-Delta Development Project (IC)	PAM	1992	2000	10,692
9 Irrigation Operation Support Project II	Nation wide	1993	1998	-
10 Lower Agusan Development Project-IC	AGN	1996	2001	7,922
11 Irrigation Systems Improvement Project II	NLY	1996	2001	890
12 Caseenan Multi-purpose I/P Project-IC	TLC & NUE	1996	2003	46,500
13 Water Resources Development Project	Nation wide	1997	2002	-
14 Repair & Rehab. of NIS & CIS	Nation wide			-
15 Repair and Rehab. of NIS Access	Nation wide			-
16 Repair and Establishment of GW Pump	Nation wide			2,000
17 Small Reservoir Irrigation Project	Nation wide	1989	2000	-
18 Rehab.& Repair of D/F Protection CIS & NIS	Nation wide	1995	1999	-
19 F/S Detailed Engng. Proposed Project	Nation wide			-
20 Agri-Institutional Dev. Program	Nation wide			-
21 *Apayao-Abulog I/S Improvement Project*	KAP	1996	2000	6,000
22 Rehab. Project for affected areas by Mt.Pinatubo	TLC, ZAM & PAM	1997	2000	4,442
Sub-Total A				127,302
B. Priority Pipeline Projects				
1 Itbayat Agric. Development Project	BAS	1999		200
2 Catubig Valley Irrigation Project	NSM	1999		290
3 Dolores Irrigation Project	ESM	1999		210
4 Basey Irrigation Project	WSM	1999		205
5 Pump Projects for corn & other Crops	CGY & ISB	1999	2001	4,740
6 Addalam River Irrigation Project	QRN & ISB	1999	2001	6,130
7 Upland Irrigation Rural Dev't.Project	South Luzon	1999		3,000
8 Irrigation Sector Project II	Nation wide	1999	2003	8,450
9 RIS & Rural Environmental Improvement	AKL	1999	2001	380
10 Bohol Irrigation Project II	BOL	1999	2003	53,000
11 Lower Agno Irrig. Project	PAN	1999	2005	30,000
12 Buikidnon Tumalaong Irrigatio Project	BUK	2000	2002	2,940
13 Baligatan Mini-Hydro Project II	ISB	2000	2001	-
14 North Lawis Irrigation Project	ZAL	2000	2001	1,270
15 Revitalization of Central Luzon GW Irrigation	TLC	1999	2001	3,000
16 Liguasan Reclamation & Irrigation Project		2001	2005	-
17 Help for Catubig Agricultural P/S-I	NSM	2000	2004	4,550
18 Control of Sediment.& Silt in IC	Nation wide	2000	2004	-
19 Mapanuepe Lake Irrigation Project	ZAM	2000	2002	1,900
20 Sibalom-San Jose Reservoir Project	ANT	2000	2003	295
21 Lake Mainit Integrated Area DP/IC		2001	2005	-
22 Ilocos Sur Transbasin	ILS	2000	2004	4,000
23 Irrigation Project Phase II	ILN	2000	2009	12,400
Sub-Total B				136,960
C. OTHER PIPELINE PROJECTS				
1 Improvement of Pump O/M Irrigation Systems	ILN, CGY & CMS	2001	2002	-
2 Quipot Irrigation Project	BTG	2001	2003	2,350
3 Malitbogay Irrigation Project	NLY	2001	2003	1,015
4 Kadingilan Irrigation Project	BUK	2001	2005	6,000
5 Small Scale Irrigation Dev't.Project	Nation wide	2001	2006	11,351
6 Flood Control & Irrigation Dev't.Project-IC	CMS	2001	2006	10,000
7 Balintingon Reservoir Project	NUE	2001	2007	18,800
8 Wind Turbines for Pump Irrig.	Nation wide	2002	2003	2,500
9 Magat Watershed & Erosion-C Project	ISB, NUV & IFG	2002	2007	-
10 Matuno Irrigation Project	NUV	2002	2008	12,680
11 *Jalaur River Multi-purpose Project*	ILO	2003	2009	11,300
12 Mabini Irrigation Project	PAN	2003	2009	11,500
13 Asue Irrigation Project	ILO	2004	2010	7,120
14 Malitubog-Maridagao Irrig.Project II	NCO	2005	2011	9,100
Sub-total C				103,716
D. OTHER PROGRAMS				
1 O/M Subsidy for NIS		1995	1999	-
2 CARP- Irrigation Component	Nation wide	1995	1999	54,170
3 Agrarian Reform Infrstructure S/P	Nation wide	1996	1999	9,286
Sub-Total D				63,456

Data Source : Irrigation Development Program, CY 1997 to CY 2006, as of 1996 (NIA)

Table G-13 PROJECTED M/I (H) WATER DEMAND BY WRR

(Unit : MCM/year)

WRR	Usage	1,995 GW	1,995 SW	1,995 Total	2,000 GW	2,000 SW	2,000 Total	2,005 GW	2,005 SW	2,005 Total	2,010 GW	2,010 SW	2,010 Total	2,015 GW	2,015 SW	2,015 Total	2,020 GW	2,020 SW	2,020 Total	2,025 GW	2,025 SW	2,025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.1
	Industrial	5.3	67.7	72.9	9.4	67.7	77.1	13.0	67.7	80.7	18.4	67.7	86.0	25.8	67.7	93.5	36.5	67.7	104.1	51.9	67.7	119.6
	Sub-total	*51.3*	*69.1*	*120.4*	*66.9*	*70.8*	*137.8*	*84.5*	*73.1*	*157.5*	*106.4*	*75.8*	*182.2*	*132.8*	*79.2*	*212.1*	*163.9*	*83.1*	*247.0*	*202.0*	*87.6*	*289.6*
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	2.3	15.4	17.6	3.3	15.4	18.7	4.6	15.4	20.0	6.2	15.4	21.7	8.6	15.4	24.0	12.0	15.4	27.4
	Sub-total	*40.0*	*15.4*	*55.4*	*53.0*	*15.4*	*68.4*	*68.1*	*15.4*	*83.5*	*86.1*	*15.4*	*101.5*	*106.5*	*15.4*	*121.9*	*128.0*	*15.4*	*143.5*	*152.2*	*15.4*	*167.7*
III	Municipal	215.5	1.0	216.5	288.0	9.3	297.3	377.5	20.1	397.6	479.0	32.6	511.6	598.2	48.0	646.2	727.5	65.4	792.9	869.8	84.9	954.7
	Industrial	83.7	125.6	209.3	103.2	125.6	228.8	146.8	125.6	272.4	212.1	125.6	337.7	307.8	125.6	433.4	443.2	125.6	568.8	632.6	125.6	758.2
	Sub-total	*299.2*	*126.6*	*425.8*	*391.2*	*134.9*	*526.1*	*524.3*	*145.6*	*670.0*	*691.1*	*158.2*	*849.3*	*905.9*	*173.6*	*1,079.5*	*1,170.7*	*191.0*	*1,361.6*	*1,502.5*	*210.4*	*1,712.9*
IV	Municipal	255.1	956.0	1,211.1	287.1	1,275.8	1,562.9	317.2	1,551.8	1,868.9	344.3	1,885.3	2,229.5	383.1	2,094.2	2,477.3	405.6	2,283.4	2,689.0	482.1	2,618.7	3,100.8
	Industrial	202.2	423.6	625.8	204.8	423.6	628.4	294.6	423.6	718.2	441.4	423.6	865.0	670.3	423.6	1,093.9	1,000.8	423.6	1,424.4	1,505.3	423.6	1,928.9
	Sub-total	*457.2*	*1,379.6*	*1,836.9*	*491.8*	*1,699.4*	*2,191.2*	*611.7*	*1,975.4*	*2,587.1*	*785.7*	*2,308.9*	*3,094.6*	*1,053.3*	*2,517.8*	*3,571.1*	*1,406.4*	*2,707.0*	*4,113.4*	*1,987.5*	*3,042.3*	*5,029.7*
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.1
	Industrial	1.6	18.2	19.8	5.6	18.2	23.9	7.2	18.2	25.4	9.4	18.2	27.6	12.4	18.2	30.7	16.6	18.2	34.8	22.9	18.2	41.1
	Sub-total	*76.4*	*21.3*	*97.7*	*102.3*	*23.2*	*125.5*	*125.1*	*24.8*	*150.0*	*154.9*	*27.4*	*182.3*	*188.9*	*30.4*	*219.2*	*225.6*	*33.8*	*259.4*	*264.9*	*37.4*	*302.3*
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	46.6	523.6	570.2	64.4	523.6	588.1	71.6	523.6	595.2	77.5	523.6	601.2	82.2	523.6	605.8	85.7	523.6	609.3
	Sub-total	*149.3*	*526.2*	*675.6*	*189.1*	*528.5*	*717.7*	*254.1*	*531.6*	*785.8*	*318.8*	*535.6*	*854.4*	*391.6*	*540.4*	*932.0*	*469.9*	*546.0*	*1,015.9*	*557.0*	*552.5*	*1,109.5*
VII	Municipal	120.2	3.6	123.8	137.9	45.8	183.6	157.0	96.6	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	281.9	490.9	220.8	343.2	564.0
	Industrial	88.0	77.8	165.8	88.6	77.8	166.4	156.9	77.8	234.7	171.0	77.8	248.7	238.3	77.8	316.1	329.6	77.8	407.4	463.5	77.8	541.3
	Sub-total	*208.2*	*81.4*	*289.6*	*226.4*	*123.6*	*350.0*	*313.8*	*174.3*	*488.2*	*347.2*	*232.2*	*579.4*	*432.6*	*294.7*	*727.3*	*538.6*	*359.7*	*898.3*	*684.3*	*421.0*	*1,105.2*
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.6	125.9	236.5
	Industrial	20.4	11.0	31.4	38.8	11.0	49.8	51.3	11.0	62.4	69.9	11.0	80.9	95.7	11.0	106.7	132.2	11.0	143.1	184.5	11.0	195.5
	Sub-total	*60.6*	*22.0*	*82.6*	*87.4*	*29.9*	*117.3*	*109.7*	*41.2*	*151.1*	*139.6*	*56.3*	*195.9*	*177.9*	*75.7*	*253.6*	*226.9*	*99.7*	*326.6*	*295.1*	*136.9*	*432.0*
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	21.3	4.3	25.5	28.2	4.3	32.5	37.7	4.3	41.9	52.1	4.3	56.3	73.6	4.3	77.9
	Sub-total	*65.7*	*13.2*	*78.8*	*87.9*	*29.7*	*117.6*	*116.8*	*52.3*	*169.1*	*143.5*	*82.0*	*225.5*	*174.8*	*118.5*	*293.3*	*211.7*	*162.1*	*373.8*	*254.6*	*203.7*	*458.3*
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.6	49.3	198.9	191.9	65.6	257.5	241.6	79.2	320.8	301.2	87.6	388.8
	Industrial	43.3	167.1	210.4	42.0	167.1	209.1	49.6	167.1	216.7	52.4	167.1	219.5	74.0	167.1	241.1	106.2	167.1	273.3	157.5	167.1	324.7
	Sub-total	*123.3*	*170.2*	*293.5*	*135.5*	*185.1*	*320.6*	*168.5*	*198.6*	*367.1*	*202.0*	*216.4*	*418.4*	*265.9*	*232.7*	*498.6*	*347.8*	*246.4*	*594.2*	*458.7*	*254.8*	*713.5*
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.1	215.1	15.5	199.1	214.9	18.5	199.1	217.6	25.4	199.1	224.5	34.5	199.1	233.6	46.4	199.1	245.5	64.0	199.1	263.1
	Sub-total	*93.2*	*210.8*	*304.0*	*101.1*	*223.0*	*324.1*	*110.8*	*240.5*	*351.3*	*124.9*	*261.3*	*386.1*	*141.5*	*284.4*	*425.9*	*159.5*	*310.0*	*469.5*	*183.0*	*338.1*	*521.2*
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	210.1	0.0	210.1	286.2	0.0	286.2	375.1	0.0	375.1	475.0	0.0	475.0
	Industrial	6.3	85.7	92.0	6.8	85.7	92.5	8.0	85.7	93.7	10.5	85.7	96.1	13.7	85.7	99.4	18.2	85.7	103.9	25.0	85.7	110.7
	Sub-total	*74.9*	*85.7*	*160.5*	*107.3*	*85.7*	*193.0*	*155.8*	*85.7*	*241.4*	*220.6*	*85.7*	*306.3*	*300.0*	*85.7*	*385.6*	*393.4*	*85.7*	*479.0*	*500.0*	*85.7*	*585.6*
Nation	Municipal	1,184.8	1,002.3	2,187.1	1,466.7	1,430.1	2,896.8	1,808.5	1,839.5	3,648.0	2,206.0	2,336.1	4,542.1	2,677.9	2,729.4	5,407.2	3,170.1	3,120.9	6,290.9	3,763.2	3,666.8	7,430.0
	Industrial	514.4	1,719.1	2,233.5	573.4	1,719.1	2,292.4	835.0	1,719.1	2,554.1	1,114.8	1,719.1	2,833.8	1,593.9	1,719.1	3,313.0	2,272.4	1,719.1	3,991.5	3,278.5	1,719.1	4,997.6
	G.total	1,699.3	2,721.4	4,420.7	2,040.1	3,149.2	5,189.3	2,643.5	3,558.6	6,202.1	3,320.7	4,055.2	7,375.9	4,271.7	4,448.5	8,720.2	5,442.5	4,839.9	10,282.5	7,041.7	5,385.9	12,427.6

Table G-14 PROJECTED M/I (L) WATER DEMAND BY WRR

(Unit : MCM/year)

WRR	Usage	1,995 GW	1,995 SW	1,995 Total	2,000 GW	2,000 SW	2,000 Total	2,005 GW	2,005 SW	2,005 Total	2,010 GW	2,010 SW	2,010 Total	2,015 GW	2,015 SW	2,015 Total	2,020 GW	2,020 SW	2,020 Total	2,025 GW	2,025 SW	2,025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.0
	Industrial	5.3	67.7	72.9	8.5	67.7	76.1	11.8	67.7	79.4	15.0	67.7	82.7	18.5	67.7	86.2	22.0	67.7	89.7	25.2	67.7	92.8
	Sub-total	*51.3*	*69.1*	*120.4*	*65.9*	*70.8*	*136.8*	*83.3*	*73.1*	*156.3*	*103.0*	*75.8*	*178.9*	*125.5*	*79.2*	*204.7*	*149.4*	*83.1*	*232.6*	*175.3*	*87.6*	*262.9*
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	1.9	15.4	17.3	3.0	15.4	18.4	3.7	15.4	19.1	4.5	15.4	19.9	5.2	15.4	20.6	5.9	15.4	21.3
	Sub-total	*40.0*	*15.4*	*55.4*	*52.5*	*15.4*	*67.9*	*67.8*	*15.4*	*83.2*	*85.2*	*15.4*	*100.7*	*104.7*	*15.4*	*120.1*	*124.6*	*15.4*	*140.0*	*146.0*	*15.4*	*161.5*
III	Municipal	215.5	1.0	216.5	288.0	9.3	297.3	377.5	20.1	397.6	479.0	32.6	511.6	598.2	48.0	646.2	727.5	65.4	792.9	869.8	84.9	954.7
	Industrial	83.7	125.6	209.3	96.1	125.6	221.7	132.6	125.6	258.2	173.1	125.6	298.7	220.4	125.6	346.0	267.6	125.6	393.2	307.0	125.6	432.6
	Sub-total	*299.2*	*126.6*	*425.8*	*384.1*	*134.9*	*519.0*	*510.1*	*145.6*	*655.7*	*652.2*	*158.2*	*810.4*	*818.6*	*173.6*	*992.2*	*995.1*	*191.0*	*1,186.1*	*1,176.8*	*210.4*	*1,387.3*
IV	Municipal	255.1	956.0	1,211.1	287.1	1,275.8	1,562.9	317.2	1,551.8	1,868.9	344.3	1,885.3	2,229.5	383.1	2,094.2	2,477.3	405.6	2,283.4	2,689.0	482.1	2,618.7	3,100.8
	Industrial	202.2	423.6	625.8	202.5	423.6	626.1	266.6	423.6	690.2	414.7	423.6	838.3	526.2	423.6	949.8	631.2	423.6	1,054.8	730.5	423.6	1,154.1
	Sub-total	*457.2*	*1,379.6*	*1,836.9*	*489.5*	*1,699.4*	*2,189.0*	*583.8*	*1,975.4*	*2,559.2*	*759.0*	*2,308.9*	*3,067.9*	*909.3*	*2,517.8*	*3,427.1*	*1,036.8*	*2,707.0*	*3,743.8*	*1,212.6*	*3,042.3*	*4,254.9*
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.1
	Industrial	1.6	18.2	19.8	3.9	18.2	22.2	6.5	18.2	24.7	7.7	18.2	25.9	8.9	18.2	27.1	10.0	18.2	28.3	11.1	18.2	29.4
	Sub-total	*76.4*	*21.3*	*97.7*	*100.6*	*23.2*	*123.8*	*124.4*	*24.8*	*149.3*	*153.2*	*27.4*	*180.5*	*185.3*	*30.4*	*215.7*	*219.0*	*33.8*	*252.9*	*253.1*	*37.4*	*290.5*
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	44.9	523.6	568.6	45.7	523.6	569.3	45.0	523.6	568.6	44.0	523.6	567.7	42.9	523.6	566.6	41.6	523.6	565.2
	Sub-total	*149.3*	*526.2*	*675.6*	*187.5*	*528.5*	*716.0*	*235.4*	*531.6*	*767.0*	*292.2*	*535.6*	*827.8*	*358.1*	*540.4*	*898.5*	*430.6*	*546.0*	*976.7*	*512.9*	*552.5*	*1,065.4*
VII	Municipal	120.2	3.6	123.8	137.9	45.8	183.6	157.0	96.6	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	281.9	490.9	220.8	343.2	564.0
	Industrial	88.0	77.8	165.8	85.8	77.8	163.6	141.3	77.8	219.4	139.6	77.8	217.3	170.7	77.8	248.4	199.0	77.8	276.8	224.9	77.8	302.7
	Sub-total	*208.2*	*81.4*	*289.6*	*223.6*	*123.6*	*347.2*	*298.3*	*174.3*	*473.0*	*315.8*	*232.2*	*549.0*	*365.0*	*294.7*	*659.7*	*408.0*	*359.7*	*767.7*	*445.7*	*421.0*	*866.7*
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.6	125.9	236.5
	Industrial	20.4	11.0	31.4	34.5	11.0	45.5	46.5	11.0	57.4	57.1	11.0	68.0	68.5	11.0	79.5	79.8	11.0	90.8	89.6	11.0	100.5
	Sub-total	*60.6*	*22.0*	*82.6*	*83.1*	*29.9*	*112.9*	*104.9*	*41.2*	*146.1*	*126.8*	*56.3*	*183.1*	*150.8*	*75.7*	*226.5*	*174.6*	*99.7*	*274.3*	*200.1*	*136.9*	*337.1*
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	19.2	4.3	23.5	23.0	4.3	27.3	27.0	4.3	31.2	31.4	4.3	35.7	35.7	4.3	40.0
	Sub-total	*65.7*	*13.2*	*78.8*	*87.9*	*29.7*	*117.6*	*114.7*	*52.3*	*167.0*	*138.3*	*82.0*	*220.3*	*164.1*	*118.5*	*282.6*	*191.1*	*162.1*	*353.2*	*216.7*	*203.7*	*420.5*
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.6	49.3	198.9	191.9	65.6	257.5	241.6	79.2	320.8	301.2	87.6	388.8
	Industrial	43.3	167.1	210.4	41.8	167.1	208.9	42.6	167.1	209.7	42.7	167.1	209.9	53.0	167.1	220.1	64.1	167.1	231.2	76.4	167.1	243.6
	Sub-total	*123.3*	*170.2*	*293.5*	*135.3*	*185.1*	*320.4*	*161.4*	*198.6*	*360.0*	*192.4*	*216.4*	*408.8*	*244.9*	*232.7*	*477.6*	*305.7*	*246.4*	*552.1*	*377.7*	*254.8*	*632.4*
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.1	215.1	15.5	199.1	214.7	16.7	199.1	215.8	20.7	199.1	219.8	24.7	199.1	223.8	28.0	199.1	227.1	31.0	199.1	230.1
	Sub-total	*93.2*	*210.8*	*304.0*	*100.9*	*223.0*	*323.8*	*109.0*	*240.5*	*349.5*	*120.2*	*261.3*	*381.5*	*131.7*	*284.4*	*416.1*	*141.2*	*310.0*	*451.1*	*150.1*	*338.1*	*488.2*
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	210.1	0.0	210.1	286.2	0.0	286.2	375.1	0.0	375.1	475.0	0.0	475.0
	Industrial	6.3	85.7	92.0	6.2	85.7	91.9	7.2	85.7	92.9	8.6	85.7	94.3	9.9	85.7	95.5	11.0	85.7	96.7	12.1	85.7	97.8
	Sub-total	*74.9*	*85.7*	*160.5*	*106.7*	*85.7*	*192.4*	*155.0*	*85.7*	*240.7*	*218.7*	*85.7*	*304.4*	*296.1*	*85.7*	*381.7*	*386.1*	*85.7*	*471.8*	*487.1*	*85.7*	*572.8*
Nation	Municipal	1,184.8	1,002.3	2,187.1	1,466.7	1,430.1	2,896.8	1,808.5	1,839.5	3,648.0	2,206.0	2,336.1	4,542.1	2,677.9	2,729.4	5,407.2	3,170.1	3,120.9	6,290.9	3,763.2	3,666.8	7,430.0
	Industrial	514.4	1,719.1	2,233.5	551.0	1,719.1	2,270.1	739.9	1,719.1	2,459.0	950.9	1,719.1	2,670.0	1,176.2	1,719.1	2,895.3	1,392.3	1,719.1	3,111.4	1,591.0	1,719.1	3,310.1
	G.total	1,699.3	2,721.4	4,420.7	2,017.8	3,149.2	5,166.9	2,548.4	3,558.6	6,107.0	3,156.9	4,055.2	7,212.0	3,854.1	4,448.5	8,302.6	4,562.4	4,839.9	9,402.3	5,354.2	5,385.9	10,740.1

Table G-15 PROJECTED M/I (H) WATER DEMAND BY MRB

(Unit: MCM/year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.1	0.0	0.5	19.4	10.7	0.0	0.7	19.4	13.7	0.0	0.9	19.4	17.0	0.0	1.1	19.4	20.8	0.0	1.6	19.4
Laoag	6.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	16.5	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.2	3.4	35.8	0.0	0.3	3.4	44.4	0.0	0.4	3.4
Others	32.4	1.4	5.1	44.8	39.0	3.2	9.0	44.8	46.7	5.4	12.4	44.8	55.4	8.2	17.6	44.8	65.0	11.6	24.7	44.8	74.5	15.5	34.9	44.8	84.9	19.9	49.1	44.8
WRR I: Total	46.0	1.4	5.3	67.7	57.5	3.2	9.4	67.7	71.5	5.4	13.0	67.7	88.0	8.2	18.4	67.7	107.0	11.6	25.8	67.7	127.4	15.5	36.5	67.7	150.1	19.9	51.9	67.7
Cagayan	35.4	0.0	0.6	1.1	46.3	0.0	2.1	1.1	59.9	0.0	2.9	1.1	76.4	0.0	4.0	1.1	94.4	0.0	5.5	1.1	113.4	0.0	7.6	1.1	134.1	0.0	10.6	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.3	5.1	2.2	0.0	0.4	5.1	2.2	0.0	0.5	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.2	9.2	3.2	0.0	0.3	9.2	3.5	0.0	0.4	9.2	3.8	0.0	0.5	9.2	3.9	0.0	0.7	9.2	3.9	0.0	0.9	9.2
WRR II: Total	39.3	0.0	0.7	15.4	50.7	0.0	2.3	15.4	64.8	0.0	3.3	15.4	81.5	0.0	4.6	15.4	100.2	0.0	6.2	15.4	119.4	0.0	8.6	15.4	140.2	0.0	12.0	15.4
Pampanga	127.2	0.0	56.1	14.1	169.7	0.0	68.6	14.1	222.1	0.0	87.9	14.1	281.5	0.0	127.0	14.1	351.2	0.0	181.5	14.1	426.7	0.0	265.4	14.1	509.8	0.0	379.8	14.1
Agno	37.3	1.0	10.3	0.7	51.5	9.3	13.7	0.7	69.4	20.1	18.8	0.7	83.9	32.6	26.5	0.7	114.4	45.0	37.8	0.7	145.4	65.4	54.5	0.7	171.3	84.9	77.7	0.7
Others	51.0	0.0	21.3	110.7	66.8	0.0	28.7	110.7	86.0	0.0	40.9	110.7	107.6	0.0	59.0	110.7	132.6	0.0	85.6	110.7	159.4	0.0	123.3	110.7	188.8	0.0	176.0	110.7
WRR III: Total	215.5	1.0	87.7	125.6	288.0	9.3	103.2	125.6	377.5	20.1	146.9	125.6	479.0	32.6	212.1	125.6	598.2	45.0	304.8	125.6	727.5	65.4	443.2	125.6	869.9	84.9	632.6	125.6
Pasig-Laguna Bay	161.2	693.4	136.2	238.4	159.1	924.9	157.9	238.4	195.1	1,125.0	199.4	238.4	213.7	1,366.7	297.4	238.4	238.1	1,518.2	451.5	238.4	251.8	1,655.4	674.2	238.4	270.6	1,808.4	1,014.1	238.4
Amnay-Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.4	0.1
Others	93.9	263.0	65.9	185.1	106.9	350.9	66.5	185.1	119.0	426.8	96.0	185.1	130.6	538.5	143.9	185.1	144.9	576.0	218.5	185.1	153.8	628.1	326.3	185.1	161.5	720.3	490.8	185.1
WRR IV: Total	255.1	956.0	202.2	423.6	267.1	1,275.8	214.8	423.6	317.2	1,551.8	295.6	423.6	344.3	1,905.3	441.4	423.6	383.1	2,094.2	670.3	423.6	405.6	2,283.4	1,000.9	423.6	432.1	2,528.7	1,505.3	423.6
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	2.4	2.1	46.1	0.0	3.0	2.1	56.4	0.0	3.9	2.1	68.0	0.0	5.2	2.1	80.0	0.0	6.9	2.1	92.1	0.0	9.6	2.1
Others	45.1	3.0	0.9	16.1	58.7	4.9	3.3	16.1	71.9	6.6	4.2	16.1	89.1	9.1	5.5	16.1	108.5	12.1	7.2	16.1	129.0	15.6	9.6	16.1	149.9	19.2	13.3	16.1
WRR V: Total	74.8	3.0	1.6	18.2	96.7	4.9	5.6	18.2	118.0	6.6	7.2	18.2	145.5	9.1	9.4	18.2	176.4	12.1	12.4	18.2	209.0	15.6	16.6	18.2	242.0	19.2	22.9	18.2
Panay	0.1	2.3	0.1	1.9	0.1	4.4	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.5	0.1	1.9	0.1	15.2	0.2	1.9	0.1	20.3	0.2	1.9	0.1	26.2	0.2	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.7	140.7	23.8	0.0	14.2	140.7	26.3	0.0	16.0	140.7	29.4	0.0	19.5	140.7	32.0	0.0	26.1	140.7	34.6	0.0	21.6	140.7
Jalaur	12.6	0.0	0.3	0.2	25.3	0.0	0.3	0.2	33.0	0.0	0.4	0.2	47.9	0.0	0.5	0.2	66.0	0.0	0.5	0.2	87.0	0.0	0.5	0.2	111.3	0.0	0.6	0.2
Others	74.1	0.2	33.7	380.9	101.0	0.5	34.5	380.9	133.5	0.8	45.6	380.9	172.9	1.1	53.0	380.9	218.5	1.6	57.3	380.9	268.5	2.1	60.8	380.9	325.2	2.7	63.4	380.9
WRR VI: Total	103.7	2.6	45.6	523.6	142.6	4.9	46.6	523.6	189.7	8.0	61.4	523.6	247.2	12.0	71.6	523.6	314.1	16.8	77.5	523.6	387.7	22.4	82.2	523.6	471.3	28.9	85.7	523.6
WRR VII: Total	120.2	3.6	68.0	77.8	137.8	45.9	68.6	77.8	157.0	96.8	156.9	77.8	176.2	154.5	171.0	77.8	194.3	216.9	238.1	77.8	209.0	359.8	329.6	77.8	226.8	553.7	455.5	77.8
WRR VIII: Total	40.2	11.0	29.4	11.0	48.6	18.9	36.5	11.0	58.4	30.2	51.5	11.0	69.7	45.3	69.9	11.0	82.3	64.7	95.7	11.0	94.8	85.7	132.2	11.0	110.6	125.9	184.5	11.0
WRR IX: Total	64.3	6.9	1.4	4.3	76.5	25.1	9.5	4.3	95.5	48.0	21.3	4.3	115.5	77.7	26.2	4.3	137.1	114.2	37.7	4.3	159.7	157.8	52.1	4.3	181.0	199.4	75.6	4.3
Agusan	5.5	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.4	0.0	0.1	1.8	30.7	0.0	0.2	1.8
Tagoloan	13.0	0.6	15.0	29.7	14.6	4.7	15.4	29.7	15.8	8.2	16.2	29.7	16.5	12.9	19.1	29.7	16.6	17.2	22.2	29.7	15.3	20.8	39.0	29.7	14.7	23.0	51.9	29.7
Cagayan De Oro	54.5	1.6	22.7	39.4	64.5	10.4	22.1	39.4	84.2	18.4	26.1	39.4	100.5	28.4	27.5	39.4	142.8	37.7	39.9	39.4	193.7	45.6	55.8	39.4	242.8	50.4	82.8	39.4
Others	6.9	0.5	4.6	96.2	8.1	2.9	4.4	96.2	10.6	5.1	5.2	96.2	12.3	8.0	5.5	96.2	15.3	10.6	7.6	96.2	18.8	12.9	11.2	96.2	23.0	14.2	15.6	96.2
WRR X: Total	80.1	3.0	43.3	167.1	93.5	18.0	42.0	167.1	118.9	31.5	49.6	167.1	149.6	49.3	52.4	167.1	191.9	65.6	74.0	167.1	241.6	79.2	106.2	167.1	301.2	87.6	152.5	167.1
Tagum-Libuganon	4.3	0.0	0.3	39.1	4.6	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.5	39.1	5.6	0.0	0.6	39.1	5.9	0.0	0.8	39.1	6.3	0.0	1.2	39.1
Buayan-Malungon	8.2	1.0	4.0	129.1	9.7	2.0	3.9	129.1	10.9	3.5	4.6	129.1	11.8	5.3	6.3	129.1	12.8	7.3	8.6	129.1	13.4	9.5	11.5	129.1	13.8	11.9	15.9	129.1
Davao	60.5	7.6	10.1	10.6	56.2	15.5	10.0	10.6	71.3	27.0	14.7	10.6	76.7	40.5	16.0	10.6	82.4	55.6	21.8	10.6	87.2	72.3	29.3	10.6	92.5	90.6	40.4	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	10.9	1.9	20.3	5.8	16.3	2.6	20.3	6.3	22.4	3.5	20.3	6.6	29.1	4.7	20.3	6.9	36.5	6.5	20.3
WRR XI: Total	77.2	11.7	16.0	199.1	65.8	23.8	15.6	199.1	92.5	41.4	18.5	199.1	99.5	62.1	25.4	199.1	107.1	85.3	34.5	199.1	112.2	110.9	46.4	199.1	119.1	139.0	64.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.6	9.6	114.6	0.0	5.4	9.6	167.2	0.0	7.0	9.6	232.3	0.0	9.2	9.6	309.3	0.0	12.2	9.6	396.1	0.0	16.8	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.5	72.2	16.2	0.0	0.6	72.2	24.6	0.0	0.7	72.2	35.2	0.0	1.0	72.2	49.6	0.0	1.3	72.2	62.5	0.0	1.7	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.8	3.9	17.0	0.0	2.1	3.9	18.3	0.0	2.7	3.9	18.7	0.0	3.6	3.9	17.9	0.0	4.7	3.9	16.4	0.0	6.5	3.9
WRR XII: Total	68.5	0.0	6.3	85.7	100.5	0.0	6.8	85.7	147.8	0.0	8.0	85.7	210.1	0.0	10.3	85.7	286.2	0.0	13.7	85.7	375.1	0.0	18.2	85.7	475.0	0.0	25.0	85.7
Nation Total	1,185	1,062	514	1,719	1,463	1,450	573	1,719	1,809	1,839	835	1,719	2,206	2,336	1,315	1,719	2,678	2,729	1,594	1,719	3,170	3,199	2,272	1,719	3,763	3,872	3,279	1,719
M/I Total	2,247		2,234		2,913		2,292		3,648		2,554		4,542		3,034		5,407		3,313		6,369		3,992		7,635		4,998	

Table G-16 PROJECTED M/I (L) WATER DEMAND BY MRB

(Unit: MCM/year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.1	0.0	0.4	19.4	10.7	0.0	0.5	19.4	13.7	0.0	0.7	19.4	17.0	0.0	0.8	19.4	20.8	0.0	0.9	19.4
Laoag	6.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	16.5	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.1	3.4	35.8	0.0	0.2	3.4	44.4	0.0	0.2	3.4
Others	32.4	1.4	5.4	44.8	39.3	3.2	8.1	44.8	46.7	5.4	11.2	44.8	55.4	8.2	14.4	44.8	65.0	11.6	17.7	44.8	74.5	15.5	21.1	44.8	84.9	19.9	24.1	44.8
WRR I: Total	46.0	1.4	5.3	67.7	57.5	3.2	8.5	67.7	71.5	5.4	11.8	67.7	88.0	8.2	15.0	67.7	107.0	11.6	18.5	67.7	127.4	15.5	22.0	67.7	150.1	19.9	25.2	67.7
Cagayan	35.4	0.0	0.6	1.1	46.3	0.0	1.6	1.1	59.9	0.0	2.6	1.1	76.4	0.0	3.3	1.1	94.4	0.0	3.9	1.1	113.4	0.0	4.6	1.1	134.1	0.0	5.1	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.2	5.1	2.2	0.0	0.2	5.1	2.2	0.0	0.2	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.1	9.2	3.2	0.0	0.2	9.2	3.5	0.0	0.3	9.2	3.8	0.0	0.3	9.2	3.9	0.0	0.4	9.2	3.9	0.0	0.5	9.2
WRR II: Total	39.3	0.0	0.7	15.4	50.7	0.0	1.9	15.4	64.8	0.0	3.0	15.4	81.5	0.0	3.7	15.4	100.2	0.0	4.5	15.4	119.4	0.0	5.2	15.4	140.2	0.0	5.8	15.4
Pampanga	127.2	0.0	56.1	14.1	169.7	0.0	57.5	14.1	222.1	0.0	79.4	14.1	281.5	0.0	103.7	14.1	351.2	0.0	132.0	14.1	426.7	0.0	160.2	14.1	509.8	0.0	183.8	14.1
Agno	37.3	1.0	10.3	0.7	51.5	9.3	11.8	0.7	69.4	20.1	15.3	0.7	83.9	32.6	21.3	0.7	114.4	45.0	27.1	0.7	145.4	65.4	32.9	0.7	171.3	84.9	37.7	0.7
Others	51.0	0.0	21.3	110.7	66.8	0.0	26.7	110.7	86.0	0.0	36.9	110.7	107.6	0.0	49.2	110.7	132.6	0.0	61.3	110.7	159.4	0.0	74.5	110.7	188.8	0.0	85.4	110.7
WRR III: Total	215.5	1.0	87.7	125.6	288.0	9.3	96.0	125.6	377.5	20.1	132.6	125.6	479.0	32.6	173.1	125.6	598.2	45.0	220.4	125.6	727.5	65.4	267.6	125.6	869.9	84.9	307.0	125.6
Pasig-Laguna Bay	161.2	693.4	136.2	238.4	159.1	924.9	156.4	238.4	195.1	1,125.0	179.6	238.4	213.7	1,366.7	279.4	238.4	238.1	1,518.2	355.5	238.4	251.8	1,655.4	425.2	238.4	270.6	1,808.4	492.1	238.4
Amnay-Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.1
Others	93.9	263.0	65.9	185.1	106.9	350.9	66.0	185.1	119.0	426.8	86.9	185.1	130.6	538.5	138.2	185.1	144.9	576.0	171.6	185.1	153.8	628.1	205.8	185.1	161.5	720.3	239.2	185.1
WRR IV: Total	255.1	956.0	202.2	423.6	267.1	1,275.8	202.5	423.6	317.2	1,551.8	266.6	423.6	344.3	1,905.3	414.7	423.6	383.1	2,094.2	526.1	423.6	405.6	2,283.4	631.2	423.6	432.1	2,528.7	730.5	423.6
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	1.6	2.1	46.1	0.0	2.7	2.1	56.4	0.0	3.2	2.1	68.0	0.0	3.7	2.1	80.0	0.0	4.2	2.1	92.1	0.0	4.7	2.1
Others	45.1	3.0	0.9	16.1	58.7	4.9	2.3	16.1	71.9	6.6	3.8	16.1	89.1	9.1	4.5	16.1	108.5	12.1	5.2	16.1	129.0	15.6	5.8	16.1	149.9	19.2	6.5	16.1
WRR V: Total	74.8	3.0	1.6	18.2	96.7	4.9	3.9	18.2	118.0	6.6	6.5	18.2	145.5	9.1	7.7	18.2	176.4	12.1	8.9	18.2	209.0	15.6	10.0	18.2	242.0	19.2	11.1	18.2
Panay	0.1	2.3	0.1	1.9	0.1	4.4	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.5	0.1	1.9	0.1	15.2	0.1	1.9	0.1	20.3	0.1	1.9	0.1	26.2	0.1	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.3	140.7	23.8	0.0	11.5	140.7	26.1	0.0	11.3	140.7	29.4	0.0	11.4	140.7	32.0	0.0	10.8	140.7	34.6	0.0	10.5	140.7
Jalaur	12.6	0.0	0.3	0.2	25.3	0.0	0.3	0.2	33.0	0.0	0.3	0.2	47.9	0.0	0.3	0.2	66.0	0.0	0.3	0.2	87.0	0.0	0.3	0.2	111.3	0.0	0.3	0.2
Others	74.1	0.2	33.7	380.9	101.0	0.5	33.2	380.9	133.5	0.8	33.8	380.9	172.9	1.1	33.3	380.9	218.5	1.6	32.6	380.9	268.5	2.1	31.7	380.9	325.2	2.7	30.8	380.9
WRR VI: Total	103.7	2.6	45.6	523.6	142.6	4.9	44.9	523.6	189.7	8.0	45.7	523.6	247.2	12.0	45.0	523.6	314.1	16.8	44.3	523.6	387.7	22.4	42.9	523.6	471.3	28.9	41.6	523.6
WRR VII: Total	120.2	3.6	68.0	77.8	137.8	45.8	65.5	77.8	157.0	96.8	142.7	77.8	176.2	154.5	139.6	77.8	194.3	216.9	130.7	77.8	209.0	359.9	190.0	77.8	226.8	553.7	224.9	77.8
WRR VIII: Total	40.2	11.0	29.4	11.0	48.6	18.9	34.5	11.0	58.4	30.2	46.5	11.0	69.7	45.3	57.1	11.0	82.3	64.7	65.5	11.0	94.8	68.7	79.8	11.0	110.6	125.9	89.6	11.0
WRR IX: Total	64.3	6.9	1.4	4.3	76.5	25.1	9.5	4.3	95.5	48.0	19.2	4.3	115.5	77.7	25.0	4.3	137.1	114.2	27.0	4.3	159.7	157.8	31.4	4.3	181.0	199.4	35.7	4.3
Agusan	9.3	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.4	0.0	0.1	1.8	30.7	0.0	0.1	1.8
Tagoloan	13.0	0.6	15.9	29.7	14.6	4.7	15.4	29.7	15.8	8.2	15.6	29.7	16.5	12.9	15.7	29.7	16.6	17.2	19.5	29.7	15.3	20.8	23.6	29.7	14.7	23.0	28.1	29.7
Cagayan De Oro	54.5	1.6	22.7	39.4	64.5	10.4	22.0	39.4	84.2	18.4	22.4	39.4	100.5	28.4	22.5	39.4	142.8	37.7	27.8	39.4	193.7	45.6	33.7	39.4	242.8	50.4	40.2	39.4
Others	6.9	0.5	4.6	96.1	8.1	2.9	4.4	96.2	10.6	5.1	4.5	96.2	12.3	8.0	4.5	96.2	15.3	10.6	5.6	96.2	18.8	12.9	6.8	96.2	23.0	14.2	8.1	96.2
WRR X: Total	80.1	3.0	43.3	167.1	93.5	18.0	41.8	167.1	118.9	31.5	42.6	167.1	149.6	49.3	42.7	167.1	191.9	65.6	53.0	167.1	241.6	79.2	64.1	167.1	301.2	87.6	76.4	167.1
Tagum-Libuganon	4.3	0.0	0.3	39.1	4.6	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.4	39.1	5.6	0.0	0.4	39.1	5.9	0.0	0.5	39.1	6.3	0.0	0.6	39.1
Buayan-Malungon	8.2	1.0	4.0	129.1	9.7	2.0	3.9	129.1	10.9	3.5	4.2	129.1	11.8	5.3	5.1	129.1	12.8	7.3	6.5	129.1	13.4	9.5	7.0	129.1	13.8	11.9	7.7	129.1
Davao	60.5	7.6	10.1	10.6	56.2	15.5	9.8	10.6	71.3	27.0	10.6	10.6	76.7	40.5	13.4	10.6	82.4	55.6	15.6	10.6	87.2	72.3	17.3	10.6	92.1	90.6	19.6	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	10.9	1.7	20.3	5.8	16.3	2.1	20.3	6.5	22.4	2.5	20.3	6.6	29.1	2.8	20.3	6.9	36.5	3.2	20.3
WRR XI: Total	77.2	11.7	16.0	199.1	65.8	23.8	15.5	199.1	92.5	41.4	16.7	199.1	99.5	62.1	20.7	199.1	107.1	85.3	24.7	199.1	112.2	110.9	28.0	199.1	119.1	139.0	31.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.2	9.6	114.6	0.0	4.9	9.6	167.2	0.0	5.7	9.6	232.3	0.0	6.6	9.6	309.3	0.0	7.4	9.6	396.1	0.0	8.2	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.4	72.2	16.2	0.0	0.5	72.2	24.6	0.0	0.6	72.2	35.2	0.0	0.7	72.2	49.0	0.0	0.8	72.2	62.5	0.0	0.8	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.6	3.9	17.0	0.0	1.9	3.9	18.3	0.0	2.2	3.9	18.7	0.0	2.5	3.9	17.9	0.0	2.9	3.9	16.4	0.0	3.4	3.9
WRR XII: Total	68.5	0.0	6.3	85.7	100.5	0.0	6.2	85.7	147.8	0.0	7.3	85.7	210.1	0.0	8.6	85.7	286.2	0.0	9.8	85.7	375.1	0.0	11.0	85.7	475.0	0.0	12.3	85.7
Nation Total	1,185	1,062	514	1,719	1,467	1,450	551	1,719	1,809	1,839	740	1,719	2,206	2,336	951	1,719	2,678	2,729	1,176	1,719	3,170	3,199	1,392	1,719	3,763	3,872	1,591	1,719
M/I Total	2,247		2,234		2,917		2,270		3,648		2,459		4,542		2,670		5,407		2,895		6,369		3,111		7,635		3,310	

Table G-17 M/I (H) DEMAND WITH GW BALANCING BY WRR

(unit : MM M/year)

WRR	Usage	1995 GW	1995 SW	1995 Total	2000 GW	2000 SW	2000 Total	2005 GW	2005 SW	2005 Total	2010 GW	2010 SW	2010 Total	2015 GW	2015 SW	2015 Total	2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.1
	Industrial	5.3	67.7	72.9	9.4	67.7	77.1	13.0	67.7	80.7	18.4	67.7	86.0	25.8	67.7	93.5	36.5	67.7	104.1	51.9	67.7	119.6
	Sub-total	*51.3*	*69.1*	*120.4*	*66.9*	*70.8*	*137.8*	*84.5*	*73.1*	*157.5*	*106.4*	*75.8*	*182.2*	*132.8*	*79.2*	*212.1*	*163.9*	*83.1*	*247.0*	*202.0*	*87.6*	*289.6*
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	2.3	15.4	17.8	3.3	15.4	18.7	4.6	15.4	20.0	6.2	15.4	21.7	8.6	15.4	24.0	12.0	15.4	27.4
	Sub-total	*40.0*	*15.4*	*55.4*	*53.0*	*15.4*	*68.4*	*68.1*	*15.4*	*83.5*	*86.1*	*15.4*	*101.5*	*106.5*	*15.4*	*121.9*	*128.0*	*15.4*	*143.5*	*152.2*	*15.4*	*167.7*
III	Municipal	215.5	1.0	216.5	280.0	24.3	304.3	359.5	56.2	415.7	449.6	168.8	618.4	542.0	309.7	851.7	603.8	485.2	1,088.9	672.5	726.8	1,399.3
	Industrial	83.7	125.6	209.3	96.2	125.6	221.8	128.7	125.6	254.3	105.3	125.6	230.9	102.2	125.6	227.8	147.2	125.6	272.8	188.0	125.6	313.6
	Sub-total	*299.2*	*126.6*	*425.8*	*376.2*	*149.9*	*526.1*	*488.2*	*181.8*	*670.0*	*555.0*	*294.4*	*849.3*	*644.3*	*435.3*	*1,079.5*	*751.0*	*610.8*	*1,361.8*	*860.5*	*852.4*	*1,712.9*
IV	Municipal	255.1	956.0	1,211.1	287.1	1,309.4	1,596.4	317.2	1,657.2	1,974.4	340.3	2,169.4	2,509.7	383.1	2,542.6	2,925.7	403.8	3,095.3	3,499.1	443.4	3,964.0	4,407.5
	Industrial	202.2	423.6	625.8	171.2	423.6	594.8	189.1	423.6	612.7	161.3	423.6	584.9	221.8	423.6	645.4	190.7	423.6	614.3	198.7	423.6	622.3
	Sub-total	*457.3*	*1,379.6*	*1,836.9*	*458.3*	*1,733.0*	*2,191.2*	*506.3*	*2,080.8*	*2,587.1*	*501.6*	*2,593.0*	*3,094.6*	*604.9*	*2,966.2*	*3,571.1*	*594.5*	*3,518.9*	*4,113.4*	*642.1*	*4,387.6*	*5,029.7*
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.1
	Industrial	1.6	18.2	19.8	5.6	18.2	23.9	7.2	18.2	25.4	9.4	18.2	27.6	12.4	18.2	30.7	16.6	18.2	34.8	22.9	18.2	41.1
	Sub-total	*76.4*	*21.3*	*97.7*	*102.3*	*23.2*	*125.5*	*125.1*	*24.8*	*150.0*	*154.9*	*27.4*	*182.3*	*188.9*	*30.4*	*219.2*	*225.6*	*33.8*	*259.4*	*264.9*	*37.4*	*302.3*
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	46.6	523.6	570.2	64.4	523.6	588.1	71.6	523.6	595.2	77.5	523.6	601.2	82.2	523.6	605.8	85.7	523.6	609.3
	Sub-total	*149.3*	*526.2*	*675.6*	*189.1*	*528.5*	*717.7*	*254.1*	*531.6*	*785.8*	*318.8*	*535.6*	*854.4*	*391.6*	*540.4*	*932.0*	*469.9*	*546.0*	*1,015.9*	*557.0*	*552.5*	*1,109.5*
VII	Municipal	120.2	3.6	123.8	137.8	45.8	183.6	157.0	96.6	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	373.1	582.1	230.8	575.4	796.2
	Industrial	88.0	77.8	165.8	88.6	77.8	166.4	156.9	77.8	234.7	171.0	77.8	248.7	238.3	77.8	316.1	238.4	77.8	316.2	231.3	77.8	309.1
	Sub-total	*208.2*	*81.4*	*289.6*	*226.4*	*123.6*	*350.0*	*313.8*	*174.3*	*488.2*	*347.2*	*232.2*	*579.4*	*432.6*	*294.7*	*727.3*	*447.4*	*450.9*	*898.3*	*462.1*	*653.2*	*1,105.3*
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.6	125.9	236.5
	Industrial	20.4	11.0	31.4	38.8	11.0	49.8	51.5	11.0	62.4	69.9	11.0	80.9	95.3	11.0	106.2	132.2	11.0	143.1	184.5	11.0	195.5
	Sub-total	*60.6*	*22.0*	*82.6*	*87.4*	*29.9*	*117.3*	*109.9*	*41.2*	*151.1*	*139.6*	*56.3*	*195.9*	*177.9*	*75.7*	*253.6*	*226.9*	*99.7*	*326.6*	*295.1*	*136.9*	*432.0*
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	21.3	4.3	25.5	28.2	4.3	32.5	37.7	4.3	41.9	52.1	4.3	56.3	73.6	4.3	77.9
	Sub-total	*65.7*	*13.2*	*78.8*	*87.9*	*29.7*	*117.6*	*116.8*	*52.3*	*169.1*	*143.5*	*82.0*	*225.5*	*174.8*	*118.5*	*293.3*	*211.7*	*162.1*	*373.8*	*254.6*	*203.7*	*458.3*
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.6	49.3	198.9	191.9	65.6	257.5	239.6	83.4	323.0	288.1	124.5	412.6
	Industrial	43.3	167.1	210.4	42.0	167.1	209.1	49.6	167.1	216.7	52.4	167.1	219.5	74.0	167.1	241.1	105.1	167.1	272.2	145.6	167.1	312.8
	Sub-total	*123.3*	*170.2*	*293.5*	*135.5*	*185.1*	*320.6*	*168.5*	*198.6*	*367.1*	*202.0*	*216.4*	*418.4*	*265.9*	*232.7*	*498.6*	*344.7*	*250.5*	*595.2*	*433.7*	*291.7*	*725.4*
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.3	215.1	15.8	199.1	214.9	18.5	199.1	217.6	25.4	199.1	224.5	34.5	199.1	233.6	46.4	199.1	245.5	64.0	199.1	263.1
	Sub-total	*93.2*	*210.8*	*304.0*	*101.1*	*223.0*	*324.1*	*110.8*	*240.5*	*351.3*	*124.9*	*261.3*	*386.1*	*141.5*	*284.4*	*425.9*	*159.5*	*310.0*	*469.5*	*183.0*	*338.1*	*521.2*
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	201.3	9.0	210.3	264.6	21.6	286.2	317.9	58.5	376.4	371.5	105.2	476.7
	Industrial	6.3	85.7	92.0	6.8	85.7	92.5	8.0	85.7	93.7	10.5	85.7	96.1	13.7	85.7	99.4	17.0	85.7	102.6	23.3	85.7	108.9
	Sub-total	*74.9*	*85.7*	*160.5*	*107.3*	*85.7*	*193.0*	*155.8*	*85.7*	*241.4*	*211.6*	*94.7*	*306.3*	*278.3*	*107.3*	*385.6*	*334.9*	*144.2*	*479.0*	*394.8*	*190.8*	*585.6*
Nation	Municipal	1,185	1,002	2,187	1,459	1,479	2,937	1,790	1,981	3,772	2,164	2,765	4,929	2,600	3,461	6,061	2,985	4,506	7,492	3,411	6,028	9,439
	Industrial	514	1,719	2,234	533	1,719	2,252	711	1,719	2,431	728	1,719	2,447	940	1,719	2,659	1,073	1,719	2,792	1,282	1,719	3,001
	Grand	1,699	2,721	4,421	1,992	3,198	5,189	2,502	3,700	6,202	2,891	4,484	7,376	3,540	5,180	8,720	4,058	6,225	10,284	4,692	7,747	12,439

Table G-18 M/I (L) DEMAND WITH GW BALANCING BY WRR

(unit : MM M/year)

WRR	Usage	1995 GW	1995 SW	1995 Total	2000 GW	2000 SW	2000 Total	2005 GW	2005 SW	2005 Total	2010 GW	2010 SW	2010 Total	2015 GW	2015 SW	2015 Total	2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.1
	Industrial	5.3	67.7	72.9	8.5	67.7	76.1	11.8	67.7	79.4	15.0	67.7	82.7	18.5	67.7	86.2	22.0	67.7	89.7	25.2	67.7	92.8
	Sub-total	*51.3*	*69.1*	*120.4*	*65.9*	*70.8*	*136.8*	*83.2*	*73.1*	*156.3*	*103.0*	*75.8*	*178.9*	*125.5*	*79.2*	*204.7*	*149.4*	*83.1*	*232.6*	*175.3*	*87.6*	*262.9*
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	1.9	15.4	17.3	3.0	15.4	18.4	3.7	15.4	19.1	4.5	15.4	19.9	5.2	15.4	20.6	5.8	15.4	21.3
	Sub-total	*40.0*	*15.4*	*55.4*	*52.5*	*15.4*	*67.9*	*67.8*	*15.4*	*83.2*	*85.2*	*15.4*	*100.7*	*104.7*	*15.4*	*120.1*	*124.6*	*15.4*	*140.0*	*146.0*	*15.4*	*161.5*
III	Municipal	215.5	1.0	216.5	280.0	25.5	305.5	359.5	58.6	418.1	449.6	142.8	592.4	542.0	251.3	793.4	603.8	367.9	971.6	672.5	487.3	1,159.7
	Industrial	83.7	125.6	209.3	87.9	125.6	213.5	112.0	125.6	237.6	92.4	125.6	218.0	73.2	125.6	198.8	88.9	125.6	214.5	102.0	125.6	227.6
	Sub-total	*299.2*	*126.6*	*425.8*	*367.9*	*151.1*	*519.0*	*471.5*	*184.2*	*655.7*	*542.0*	*268.4*	*810.4*	*615.3*	*376.9*	*992.2*	*692.7*	*493.5*	*1,186.1*	*774.4*	*612.8*	*1,387.3*
IV	Municipal	255.1	956.0	1,211.1	287.1	1,310.7	1,597.8	317.2	1,674.0	1,991.2	340.3	2,146.1	2,486.4	383.1	2,417.1	2,800.2	403.8	2,735.2	3,139.0	443.4	3,203.9	3,647.3
	Industrial	202.2	423.6	625.8	167.6	423.6	591.2	144.4	423.6	568.0	157.8	423.6	581.5	203.3	423.6	626.9	181.2	423.6	604.8	184.0	423.6	607.6
	Sub-total	*457.2*	*1,379.6*	*1,836.9*	*454.6*	*1,734.4*	*2,189.0*	*461.5*	*2,097.6*	*2,559.2*	*498.2*	*2,569.7*	*3,067.9*	*586.4*	*2,840.7*	*3,427.1*	*585.0*	*3,158.8*	*3,743.8*	*627.4*	*3,627.5*	*4,254.9*
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.1
	Industrial	1.6	18.2	19.8	3.9	18.2	22.2	6.5	18.2	24.7	7.7	18.2	25.9	8.9	18.2	27.1	10.0	18.2	28.3	11.1	18.2	29.4
	Sub-total	*76.4*	*21.3*	*97.7*	*100.6*	*23.2*	*123.8*	*124.4*	*24.8*	*149.3*	*153.2*	*27.4*	*180.5*	*185.3*	*30.4*	*215.7*	*219.0*	*33.8*	*252.9*	*253.1*	*37.4*	*290.5*
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	44.9	523.6	568.6	45.7	523.6	569.3	45.0	523.6	568.6	44.0	523.6	567.7	42.9	523.6	566.6	41.6	523.6	565.2
	Sub-total	*149.3*	*526.2*	*675.6*	*187.5*	*528.5*	*716.0*	*235.4*	*531.6*	*767.0*	*292.2*	*535.6*	*827.8*	*358.1*	*540.4*	*898.5*	*430.6*	*546.0*	*976.7*	*512.9*	*552.5*	*1,065.4*
VII	Municipal	120.2	3.6	123.8	137.6	45.8	183.6	157.0	96.6	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	281.9	490.9	220.8	343.2	564.0
	Industrial	88.0	77.8	165.8	85.8	77.8	163.6	141.7	77.8	219.4	139.6	77.8	217.3	170.7	77.8	248.4	199.0	77.8	276.8	224.9	77.8	302.7
	Sub-total	*208.2*	*81.4*	*289.6*	*223.6*	*123.6*	*347.2*	*298.6*	*174.3*	*473.0*	*315.8*	*232.2*	*548.0*	*365.0*	*294.7*	*659.7*	*408.0*	*359.7*	*767.7*	*445.7*	*421.0*	*866.7*
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.6	125.9	236.5
	Industrial	20.4	11.0	31.4	34.5	11.0	45.5	46.5	11.0	57.4	57.1	11.0	68.0	68.5	11.0	79.5	79.8	11.0	90.8	89.6	11.0	100.5
	Sub-total	*60.6*	*22.0*	*82.6*	*83.1*	*29.9*	*112.9*	*104.9*	*41.2*	*146.1*	*126.8*	*56.3*	*183.1*	*150.8*	*75.7*	*226.5*	*174.6*	*99.7*	*274.3*	*200.1*	*136.9*	*337.1*
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	19.2	4.3	23.5	23.0	4.3	27.3	27.0	4.3	31.2	31.4	4.3	35.7	35.7	4.3	40.0
	Sub-total	*65.7*	*13.2*	*78.8*	*87.9*	*29.7*	*117.6*	*114.7*	*52.3*	*167.0*	*138.3*	*82.0*	*220.3*	*164.1*	*118.5*	*282.6*	*191.1*	*162.1*	*353.2*	*216.7*	*203.7*	*420.5*
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.6	49.3	198.9	191.9	65.6	257.5	239.6	82.9	322.6	288.1	113.4	401.5
	Industrial	43.3	167.1	210.4	41.8	167.1	208.9	42.6	167.1	209.7	42.7	167.1	209.9	53.0	167.1	220.1	63.4	167.1	230.6	75.7	167.1	242.8
	Sub-total	*123.3*	*170.2*	*293.5*	*135.3*	*185.1*	*320.4*	*161.4*	*198.6*	*360.0*	*192.4*	*216.4*	*408.8*	*244.9*	*232.7*	*477.6*	*303.1*	*250.1*	*553.2*	*363.7*	*280.6*	*644.3*
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.1	215.1	15.5	199.1	214.7	16.7	199.1	215.8	20.7	199.1	219.8	24.7	199.1	223.8	28.0	199.1	227.1	31.0	199.1	230.1
	Sub-total	*93.2*	*210.8*	*304.0*	*100.9*	*223.0*	*323.8*	*109.0*	*240.5*	*349.5*	*120.2*	*261.3*	*381.5*	*131.7*	*284.4*	*416.1*	*141.2*	*310.0*	*451.1*	*150.1*	*338.1*	*488.2*
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	201.1	9.0	210.1	264.6	21.6	286.2	317.9	58.0	375.9	371.5	104.3	475.8
	Industrial	6.3	85.7	92.0	6.2	85.7	91.9	7.2	85.7	92.9	8.6	85.7	94.2	9.8	85.7	95.5	10.2	85.7	95.9	11.3	85.7	97.0
	Sub-total	*74.9*	*85.7*	*160.5*	*106.7*	*85.7*	*192.4*	*155.0*	*85.7*	*240.7*	*209.7*	*94.7*	*304.3*	*274.4*	*107.3*	*381.7*	*328.1*	*143.7*	*471.8*	*382.8*	*189.9*	*572.8*
Nation	Municipal	1,185	1,002	2,187	1,459	1,481	2,940	1,790	2,000	3,791	2,164	2,716	4,880	2,600	3,277	5,877	2,985	3,937	6,922	3,411	4,784	8,195
	Industrial	514	1,719	2,234	508	1,719	2,227	597	1,719	2,316	613	1,719	2,332	706	1,719	2,425	762	1,719	2,481	838	1,719	2,557
	Grand	1,699	2,721	4,421	1,967	3,200	5,167	2,388	3,719	6,107	2,777	4,435	7,212	3,306	4,996	8,303	3,747	5,656	9,403	4,248	6,504	10,752

Table G-19 M/I (H) DEMAND WITH GW BALANCING BY MRB

(Unit: MCM/year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.3	0.0	0.5	19.4	10.7	0.0	0.7	19.4	13.1	0.0	0.9	19.4	17.0	0.0	1.3	19.4	20.8	0.0	1.6	19.4
Laoag	8.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	14.8	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.2	3.4	35.8	0.0	0.3	3.4	44.4	0.0	0.4	3.4
Others	32.4	1.4	5.1	44.5	39.0	3.2	9.0	44.5	46.7	5.4	12.4	44.5	55.4	8.2	17.6	44.5	65.0	11.6	24.7	44.5	74.5	15.5	34.9	44.5	84.9	19.9	49.7	44.5
WRR I. Total	46.0	1.4	5.3	67.7	57.5	3.2	9.4	67.7	71.5	5.4	13.0	67.7	88.0	8.2	18.4	67.7	107.0	11.6	25.8	67.7	127.4	15.5	36.5	67.7	150.1	19.9	51.9	67.7
Cagayan	35.4	0.0	0.6	1.1	46.3	0.0	2.4	1.1	59.9	0.0	2.9	1.1	76.1	0.0	4.0	1.1	94.4	0.0	5.5	1.1	113.4	0.0	7.6	1.1	134.1	0.0	10.6	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.3	5.1	2.2	0.0	0.4	5.1	2.2	0.0	0.5	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.2	9.2	3.2	0.0	0.3	9.2	3.5	0.0	0.4	9.2	3.8	0.0	0.5	9.2	3.9	0.0	0.7	9.2	3.9	0.0	0.9	9.2
WRR II. Total	39.3	0.0	0.7	15.4	50.7	0.0	2.7	15.4	64.9	0.0	3.3	15.4	81.5	0.0	4.6	15.4	100.2	0.0	6.2	15.4	119.4	0.0	8.6	15.4	140.2	0.0	12.0	15.4
Pampanga	127.2	0.0	50.1	14.1	165.0	4.2	57.6	14.1	211.6	10.8	77.1	14.1	268.3	64.0	65.1	14.1	318.3	123.1	61.2	14.1	354.3	172.3	58.2	14.1	394.3	266.2	112.6	14.1
Agno	37.3	1.0	10.3	0.7	49.9	19.2	11.6	0.7	65.7	40.3	15.8	0.7	83.9	75.1	12.9	0.7	103.6	129.4	12.6	0.7	116.3	225.5	18.1	0.7	131.3	336.9	23.1	0.7
Others	51.0	0.0	23.3	110.7	65.1	1.9	26.9	110.7	82.2	3.0	35.8	110.7	101.4	29.7	29.3	110.7	120.7	57.2	28.5	110.7	133.2	82.4	41.0	110.7	146.9	125.7	52.3	110.7
WRR III. Total	215.5	1.0	83.7	125.6	280.0	24.3	96.2	125.6	359.5	56.2	126.7	125.6	439.6	168.8	105.3	125.6	542.0	309.7	102.2	125.6	603.8	455.2	117.3	125.6	672.5	728.8	188.0	125.6
Pasig Laguna Bay	161.2	691.1	136.2	238.4	150.1	947.5	115.3	238.4	198.1	1,198.0	127.4	238.4	211.4	1,558.3	106.6	238.4	278.1	1,820.3	119.6	238.4	250.2	2,262.4	129.5	238.4	277.8	2,566.7	133.8	238.4
Angat Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Others	93.9	263.0	65.9	185.1	106.9	361.9	55.8	185.1	119.0	461.2	61.7	185.1	129.9	611.0	52.6	185.1	144.9	722.2	72.3	185.1	153.0	692.7	62.2	185.1	165.6	1,157.0	64.9	185.1
WRR IV. Total	255.1	956.9	202.2	423.6	257.1	1,309.4	171.2	423.6	317.2	1,659.2	189.1	423.6	340.3	2,169.4	161.3	423.6	383.1	2,542.6	221.6	423.6	403.8	3,065.3	192.7	423.6	443.4	3,944.0	198.7	423.6
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	2.4	2.1	46.1	0.0	3.0	2.1	56.4	0.0	3.9	2.1	68.0	0.0	3.2	2.1	80.0	0.0	6.9	2.1	92.1	0.0	9.6	2.1
Others	45.1	3.0	0.9	16.1	56.7	4.9	3.3	16.1	71.9	6.6	4.2	16.1	89.1	9.1	5.5	16.1	108.8	12.1	7.2	16.1	129.0	15.6	9.6	16.1	149.8	19.2	13.3	16.1
WRR V. Total	74.8	3.0	1.6	18.2	96.7	4.9	5.8	18.2	129.9	6.6	7.2	18.2	145.5	9.1	9.4	18.2	176.8	12.1	12.4	18.2	209.0	15.6	16.5	18.2	242.0	19.2	22.9	18.2
Panay	0.1	2.5	0.1	1.9	0.1	4.0	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.5	0.1	1.9	0.1	15.2	0.1	1.9	0.1	20.5	0.2	1.9	0.1	26.2	0.2	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.7	140.7	23.1	0.0	16.2	140.7	26.1	0.0	18.0	140.7	29.4	0.0	19.5	140.7	32.0	0.0	20.7	140.7	34.6	0.0	21.6	140.7
Jalaur	12.6	0.0	0.3	0.2	21.5	0.0	0.3	0.2	33.0	0.0	0.4	0.2	47.9	0.0	0.5	0.2	66.0	0.0	0.5	0.2	87.0	0.0	0.5	0.2	111.3	0.0	0.6	0.2
Others	71.1	0.2	33.7	380.9	101.0	0.5	34.5	380.9	133.5	0.9	47.6	380.9	172.0	3.3	53.0	380.9	218.5	4.6	57.3	380.9	258.5	2.1	60.5	380.9	325.2	2.2	63.4	380.9
WRR VI. Total	103.7	2.6	45.6	521.6	142.6	4.9	46.6	521.6	189.7	8.0	64.4	521.6	247.2	12.0	71.6	521.6	314.1	16.8	77.5	521.6	367.9	22.4	82.2	521.6	471.7	28.9	85.7	521.6
WRR VII. Total	120.2	3.6	85.0	77.8	137.8	45.8	98.6	77.8	157.0	96.6	159.9	77.8	176.2	158.5	171.0	77.8	194.3	216.9	239.3	77.8	209.0	359.8	256.4	77.8	230.8	553.1	251.3	77.8
WRR VIII. Total	40.2	11.0	20.4	11.0	48.6	18.0	38.8	11.0	58.4	30.2	51.9	11.0	67.7	45.3	69.9	11.0	82.3	61.7	95.7	11.0	94.9	88.1	132.2	11.0	110.6	125.9	158.5	11.0
WRR IX. Total	64.1	8.9	8.4	4.3	78.5	25.4	9.5	4.3	95.5	48.0	21.3	4.3	115.3	77.7	28.2	4.3	137.1	114.2	37.7	4.3	159.7	151.8	52.1	4.3	181.0	199.4	73.6	4.3
Agusan	5.3	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.1	0.0	0.1	1.8	29.1	0.0	0.1	1.8
Tagoloan	13.0	0.9	15.9	29.7	11.6	4.7	15.4	29.7	15.8	9.2	19.2	29.7	16.5	12.9	19.3	29.7	16.6	17.2	27.2	29.7	15.9	22.0	38.6	29.7	14.3	31.9	53.6	29.7
Cagayan De Oro	54.8	1.8	22.7	39.4	64.5	10.4	22.1	39.4	54.2	19.1	26.1	39.4	108.5	29.4	27.5	39.4	142.8	37.7	39.9	39.4	192.3	47.9	55.2	39.4	222.2	72.4	76.5	39.4
Others	6.9	0.5	4.6	96.2	8.1	2.9	4.4	96.2	10.0	5.1	5.2	96.2	12.3	5.5	5.5	96.2	15.3	10.6	7.8	96.2	18.7	13.5	11.1	96.2	22.0	19.5	15.4	96.2
WRR X. Total	80.1	3.0	43.3	167.1	93.5	18.0	42.0	167.1	119.9	34.5	49.6	167.1	149.6	49.3	52.4	167.1	191.9	65.6	74.0	167.1	249.6	83.4	105.1	167.1	288.1	124.5	145.6	167.1
Tagum Libuganon	4.3	0.0	0.3	39.1	4.8	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.5	39.1	5.6	0.0	0.6	39.1	5.9	0.0	0.5	39.1	6.3	0.0	1.2	39.1
Buayan Malungon	8.2	1.0	4.0	129.1	9.7	2.0	3.9	129.1	10.8	3.8	4.6	129.1	11.8	5.3	6.3	129.1	12.8	7.3	8.6	129.1	13.4	9.5	11.5	129.1	13.8	11.9	15.9	129.1
Davao	60.5	7.6	10.1	10.6	66.2	15.5	10.9	10.6	71.5	27.0	11.7	10.6	76.7	40.5	16.0	10.6	82.4	55.6	21.8	10.6	67.2	72.3	29.3	10.6	92.1	96.6	40.4	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	8.9	1.9	20.3	5.8	16.3	2.8	20.3	6.3	22.4	3.5	20.3	6.6	29.1	4.7	20.3	6.9	38.5	8.5	20.3
WRR XI. Total	77.2	11.7	16.0	199.1	85.4	21.8	15.6	199.1	92.3	41.4	18.5	199.1	99.5	62.1	25.4	199.1	107.4	85.3	33.5	199.1	113.2	110.9	46.1	199.1	119.1	139.0	64.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.6	9.6	114.6	0.0	5.1	9.6	159.5	0.0	7.0	9.6	213.7	0.0	9.2	9.6	260.1	0.9	11.4	9.6	307.2	1.2	15.6	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.5	72.2	16.2	0.0	0.6	72.2	23.1	9.0	0.7	72.2	32.1	21.6	1.0	72.2	39.9	57.3	1.2	72.2	47.9	103.5	1.6	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.0	3.9	17.0	0.0	2.1	3.9	18.3	0.0	2.7	3.9	18.1	0.0	3.6	3.9	17.9	0.3	4.5	3.9	16.4	0.5	6.0	3.9
WRR XII. Total	68.5	0.0	6.3	85.7	100.5	0.0	6.9	85.7	147.8	0.0	6.0	85.7	201.1	9.0	10.5	85.7	263.5	25.6	13.7	85.7	317.9	56.5	17.0	85.7	371.5	105.7	23.3	85.7
Nation Total	1,165	1,092	514	1,719	1,459	1,479	533	1,719	1,770	1,561	711	1,719	2,164	2,765	728	1,719	2,660	3,461	930	1,719	2,985	4,493	1,073	1,719	3,411	6,067	1,262	1,719
M/I Total	2,167		2,234		2,937		2,252		3,332		2,431		4,929		2,447		6,061		2,650		7,478		2,792		9,477		3,981	

Table G-20 M/I (L) DEMAND WITH GW BALANCING BY MRB

(Unit: MCM/year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.3	0.0	0.4	19.4	10.7	0.0	0.5	19.4	13.7	0.0	0.7	19.4	17.0	0.0	0.8	19.4	20.8	0.0	0.9	19.4
Laoag	8.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	16.5	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.1	3.4	35.8	0.0	0.2	3.4	44.4	0.0	0.2	3.4
Others	32.4	1.4	5.1	44.5	39.0	3.2	8.4	44.5	46.7	5.4	11.2	44.5	55.4	8.2	14.4	44.5	65.0	11.6	17.7	44.5	74.5	15.5	21.1	44.5	84.9	19.9	24.1	44.5
WRR I. Total	46.0	1.4	5.3	67.7	57.5	3.2	8.5	67.7	71.5	5.4	11.8	67.7	88.0	8.2	15.0	67.7	107.0	11.6	18.5	67.7	127.4	15.5	22.0	67.7	150.1	19.9	25.2	67.7
Cagayan	35.4	0.0	0.6	1.1	46.5	0.0	1.6	1.1	59.9	0.0	2.6	1.1	76.1	0.0	3.3	1.1	94.4	0.0	3.9	1.1	113.4	0.0	4.6	1.1	134.1	0.0	5.1	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.2	5.1	2.2	0.0	0.2	5.1	2.2	0.0	0.2	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.1	9.2	3.2	0.0	0.2	9.2	3.5	0.0	0.3	9.2	3.8	0.0	0.3	9.2	3.9	0.0	0.4	9.2	3.9	0.0	0.5	9.2
WRR II. Total	39.3	0.0	0.7	15.4	50.7	0.0	1.9	15.4	64.9	0.0	3.0	15.4	81.5	0.0	3.7	15.4	100.2	0.0	4.5	15.4	119.4	0.0	5.2	15.4	140.2	0.0	5.8	15.4
Pampanga	127.2	0.0	50.1	14.1	165.0	4.9	52.6	14.1	211.6	12.3	67.1	14.1	264.3	48.4	55.3	14.1	318.3	89.1	45.8	14.1	354.3	107.0	53.2	14.1	394.3	121.8	61.1	14.1
Agno	37.3	1.0	10.3	0.7	49.9	15.3	10.8	0.7	65.7	40.6	13.8	0.7	83.9	71.9	11.4	0.7	103.0	122.2	9.0	0.7	116.3	211.1	16.9	0.7	131.3	307.4	12.5	0.7
Others	51.0	0.0	23.3	110.7	65.1	2.5	24.5	110.7	82.2	5.7	31.2	110.7	101.4	22.5	25.7	110.7	120.7	41.0	20.4	110.7	133.2	49.7	24.7	110.7	146.9	57.1	28.4	110.7
WRR III. Total	215.5	1.0	83.7	125.6	280.0	25.5	87.9	125.6	359.5	58.6	112.0	125.6	439.6	142.8	92.4	125.6	542.0	251.3	71.2	125.6	603.8	367.9	85.9	125.6	672.5	487.3	102.0	125.6
Pasig Laguna Bay	161.2	693.1	136.2	238.4	150.1	938.4	112.9	238.4	198.1	1,207.8	97.3	238.4	211.4	1,542.6	106.3	238.4	239.1	1,755.7	133.0	238.4	250.1	1,959.8	122.1	238.4	277.8	2,294.6	124.0	238.4
Angat Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1
Others	93.9	263.0	65.9	185.1	106.9	362.3	54.6	185.1	119.0	466.7	47.0	185.1	126.9	603.4	51.5	185.1	144.9	681.3	66.1	185.1	153.0	775.3	59.1	185.1	165.6	909.1	60.0	185.1
WRR IV. Total	255.1	956.0	202.2	423.6	257.1	1,310.7	167.6	423.6	317.2	1,674.0	144.4	423.6	340.3	2,146.1	157.8	423.6	383.1	2,412.4	201.3	423.6	403.8	2,735.2	181.2	423.6	443.4	3,203.9	153.0	423.6
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	1.6	2.1	46.1	0.0	2.7	2.1	56.4	0.0	3.2	2.1	68.0	0.0	3.7	2.1	80.0	0.0	4.2	2.1	92.1	0.0	4.7	2.1
Others	45.1	3.0	0.9	16.1	58.7	4.9	2.3	16.1	71.9	6.5	3.8	16.1	89.1	9.1	4.5	16.1	108.5	12.4	5.2	16.1	129.0	15.6	5.5	16.1	149.8	19.2	6.5	16.1
WRR V. Total	74.8	3.0	1.6	18.2	96.7	4.9	3.9	18.2	118.0	6.6	6.5	18.2	145.5	9.1	7.7	18.2	176.4	12.1	4.9	18.2	209.0	19.6	10.0	18.2	242.0	19.2	11.4	18.2
Panay	0.1	2.3	0.1	1.9	0.1	4.4	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.8	0.1	1.9	0.1	15.2	0.1	1.9	0.1	20.3	0.1	1.9	0.1	26.2	0.1	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.3	140.7	23.1	0.0	11.5	140.7	26.3	0.0	11.3	140.7	29.4	0.0	11.1	140.7	32.0	0.0	10.8	140.7	34.6	0.0	10.5	140.7
Jalaur	12.6	0.0	0.3	0.2	21.1	0.0	0.3	0.2	33.0	0.0	0.3	0.2	47.9	0.0	0.3	0.2	66.0	0.0	0.3	0.2	87.0	0.0	0.3	0.2	111.3	0.0	0.3	0.2
Others	74.1	0.2	33.7	380.9	101.0	0.5	34.2	380.9	133.5	0.8	35.8	380.9	172.9	1.1	33.3	380.9	218.5	1.6	32.6	380.9	264.5	2.1	31.7	380.9	325.1	2.2	30.3	380.9
WRR VI. Total	103.7	2.6	45.6	521.6	142.6	4.9	44.9	521.6	189.7	8.0	45.7	521.6	247.2	12.0	45.0	521.6	314.1	16.8	44.0	521.6	357.2	22.4	42.9	521.6	471.3	28.9	41.6	521.6
WRR VII. Total	120.2	3.6	88.0	77.8	137.6	45.8	65.8	77.8	157.0	96.6	141.7	77.8	176.2	154.5	139.6	77.8	194.3	216.9	170.7	77.8	209.0	359.8	199.0	77.8	229.9	553.7	224.9	77.8
WRR VIII. Total	40.2	11.0	20.4	11.0	48.6	18.9	34.5	11.0	58.4	30.2	46.3	11.0	67.7	45.3	57.1	11.0	82.3	64.7	68.5	11.0	94.8	58.7	79.8	11.0	110.6	115.9	89.6	11.0
WRR IX. Total	64.3	8.9	1.4	4.3	78.5	25.4	9.5	4.3	95.5	48.0	19.2	4.3	115.3	77.7	23.0	4.3	137.1	114.2	27.0	4.3	159.7	157.8	31.4	4.3	191.0	199.4	35.7	4.3
Agusan	5.3	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.4	0.0	0.1	1.8	29.1	0.0	0.1	1.8
Tagoloan	13.0	0.8	15.9	29.7	14.8	4.7	15.4	29.7	15.8	8.7	15.6	29.7	16.5	12.9	15.7	29.7	16.6	17.2	19.3	29.7	15.5	21.8	23.3	29.7	14.7	29.9	27.8	29.7
Cagayan De Oro	54.8	1.8	22.7	39.4	64.5	10.4	22.0	39.4	64.2	18.1	22.4	39.4	108.5	28.4	22.5	39.4	142.8	37.7	27.8	39.4	192.1	47.7	33.3	39.4	222.2	65.1	39.8	39.4
Others	6.9	0.5	4.6	96.2	8.1	2.9	4.4	96.2	10.0	5.1	4.5	96.2	12.3	8.0	4.5	96.2	15.3	10.6	5.6	96.2	18.7	13.4	6.7	96.2	22.0	18.4	8.0	96.2
WRR X. Total	80.1	3.0	43.3	167.1	93.5	18.0	41.8	167.1	118.9	31.5	42.6	167.1	149.6	49.3	42.7	167.1	191.9	65.6	55.0	167.1	239.6	82.9	63.4	167.1	258.1	113.4	75.7	167.1
Tagum Libuganon	4.3	0.0	0.3	39.1	4.6	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.4	39.1	5.6	0.0	0.4	39.1	5.9	0.0	0.5	39.1	6.3	0.0	0.6	39.1
Buayan Malungon	8.2	1.0	4.0	129.1	9.7	2.0	3.9	129.1	10.8	3.5	4.2	129.1	11.8	5.3	5.1	129.1	12.8	7.3	6.1	129.1	13.4	9.5	7.0	129.1	13.8	11.9	7.7	129.1
Davao	60.5	7.6	10.1	10.6	66.2	15.5	9.8	10.6	71.5	27.0	10.6	10.6	76.7	40.5	13.1	10.6	82.4	55.6	15.6	10.6	67.2	72.1	17.7	10.6	92.1	90.5	19.6	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	10.9	1.7	20.3	5.8	16.3	2.1	20.3	6.3	22.4	2.5	20.3	6.6	29.1	2.8	20.3	6.9	36.5	3.2	20.3
WRR XI. Total	77.2	11.7	16.0	199.1	85.4	23.8	15.5	199.1	92.3	41.4	16.7	199.1	99.5	62.1	20.7	199.1	107.1	85.3	24.7	199.1	113.2	109.9	28.0	199.1	119.1	139.0	31.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.2	9.6	113.5	0.0	4.9	9.6	159.5	0.0	5.7	9.6	213.7	0.0	6.6	9.6	260.1	0.5	6.9	9.6	307.2	0.6	7.6	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.4	72.2	16.2	0.0	0.5	72.2	23.5	9.0	0.6	72.2	32.2	21.6	0.7	72.2	39.9	57.3	0.7	72.2	47.9	103.5	0.8	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.6	3.9	17.0	0.0	1.9	3.9	18.3	0.0	2.2	3.9	18.7	0.0	2.5	3.9	17.9	0.2	2.2	3.9	16.4	0.2	2.9	3.9
WRR XII. Total	68.5	0.0	6.3	85.7	100.5	0.0	6.2	85.7	147.8	0.0	7.2	85.7	201.1	9.0	6.6	85.7	264.6	21.6	9.9	85.7	317.9	58.0	10.2	85.7	371.5	104.3	11.3	85.7
Nation Total	1,165	1,092	514	1,719	1,459	1,461	510	1,719	1,790	2,060	597	1,719	2,161	2,756	613	1,719	2,660	3,277	766	1,719	2,985	4,015	762	1,719	3,411	4,945	838	1,719
M/I Total	2,182		2,234		2,986		2,229		3,792		2,316		4,980		2,332		5,977		2,425		7,040		2,451		8,475		2,557	

Table G-21 CONVERSION (H) BY PROVINCE

(Unit, MCM/year)

WRR	Province	2000 I-M	2000 M-M	2005 I-M	2005 M-M	2010 I-M	2010 M-M	2015 I-M	2015 M-M	2020 I-M	2020 M-M	2025 I-M	2025 M-M
I	Abra	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Benguet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Ilocos Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Ilocos Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	La Union	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Batanes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Cagayan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Ifugao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Isabela	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Kalinga-Apayao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Mountain Province	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Nueva Vizcaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Quirino	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Bataan	-8.2	-8.0	-20.6	-18.0	-36.7	-29.4	-53.2	-41.0	-76.6	-52.9	-109.4	-64.9
III	Bulacan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-22.1	0.0
III	Nueva Ecija	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Pampanga	0.0	0.0	0.0	0.0	-70.1	0.0	-152.3	-15.1	-219.4	-70.9	-313.1	-132.5
III	Pangasinan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Tarlac	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Zambales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Aurora	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Batangas	0.0	0.0	0.0	0.0	-28.8	0.0	-108.9	0.0	-213.8	-1.8	-121.6	-38.7
IV	Cavite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-38.0	0.0	-92.1	0.0
IV	Laguna	-17.1	0.0	-55.5	0.0	-107.9	-4.0	-100.9	0.0	-182.2	0.0	-303.9	0.0
IV	Marinduque	0.0	0.0	0.0	0.0	-7.5	0.0	-21.2	0.0	-40.8	0.0	70.2	0.0
IV	Metro Manila	-17.8	0.0	-66.7	0.0	-135.9	0.0	-217.5	0.0	-335.3	0.0	-515.1	0.0
IV	Occidental Mindoro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Oriental Mindoro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Palawan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Quezon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Rizal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.8	0.0
IV	Romblon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Albay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Camarines Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Camarines Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Catanduanes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Masbate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Sorsogon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Aklan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Antique	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Capiz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Guimaras	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Iloilo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Negros Occidental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Bohol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Cebu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-91.2	0.0	-232.2	0.0
VII	Negros Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Siquijor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Biliran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Eastern Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Leyte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Northern Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Southern Leyte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Western Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Basilan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Sulu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Tawi-Tawi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Zamboanga del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Zamboanga del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Agusan del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Agusan del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Bukidnon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Camiguin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	0.0	-2.5
X	Misamis Occidental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-1.2	-1.6	-10.7
X	Misamis Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.3	0.0
X	Surigao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Surigao del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Lanao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3	-21.1	-1.7	-52.2
XII	Lanao del Sur	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	0.0	-36.1	0.0	-51.3
XII	Maguindanao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	North Cotabato	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Sarangani	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	South Cotabato	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Sultan Kudarat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

notes : In a column of the above Table, "I-M" means conversion amount from industrial GW to municipal SW, "M-M" means conversion amount from municipal GW to municipal SW.

Table G-22 CONVERSION (L) BY PROVINCE

(Unit, MCM/year)

WRR	Province	2000 I-M	2000 M-M	2005 I-M	2005 M-M	2010 I-M	2010 M-M	2015 I-M	2015 M-M	2020 I-M	2020 M-M	2025 I-M	2025 M-M
I	Abra	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Benguet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Ilocos Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	Ilocos Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I	La Union	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Batanes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Cagayan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Ifugao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Isabela	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Kalinga-Apayao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Mountain Province	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Nueva Vizcaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	Quirino	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Bataan	-7.0	-8.0	-18.3	-18.0	-29.9	-29.4	-38.1	-41.0	-46.3	-52.9	-53.3	-64.9
III	Bulacan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Nueva Ecija	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Pampanga	0.0	0.0	0.0	0.0	-50.8	0.0	-109.1	-15.1	-132.4	-70.9	-151.9	-132.5
III	Pangasinan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Tarlac	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	Zambales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Aurora	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Batangas	0.0	0.0	0.0	0.0	-23.1	0.0	-78.1	0.0	-134.8	-1.8	-156.1	-38.7
IV	Cavite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-11.0	0.0
IV	Laguna	-16.6	0.0	-46.7	0.0	-101.4	4.0	-65.7	0.0	-91.9	0.0	-114.4	0.0
IV	Marinduque	0.0	0.0	0.0	0.0	-6.0	0.0	-13.0	0.0	-19.7	0.0	-26.0	0.0
IV	Metro Manila	17.0	0.0	-56.7	0.0	-126.4	0.0	-166.1	0.0	-263.6	0.0	-238.9	0.0
IV	Occidental Mindoro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Oriental Mindoro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Palawan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Quezon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Rizal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IV	Romblon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Albay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Camarines Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Camarines Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Catanduanes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Masbate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	Sorsogon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Aklan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Antique	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Capiz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Guimaras	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Iloilo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	Negros Occidental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Bohol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Cebu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Negros Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	Siquijor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Biliran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Eastern Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Leyte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Northern Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Southern Leyte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	Western Samar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Basilan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Sulu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Tawi-Tawi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Zamboanga del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	Zamboanga del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Agusan del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Agusan del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Bukidnon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Camiguin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	0.0	-2.5
X	Misamis Occidental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7	-1.2	-0.8	-10.7
X	Misamis Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	Surigao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Davao Oriental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	Surigao del Sur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Lanao del Norte	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	-21.1	-0.8	-52.2
XII	Lanao del Sur	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	0.0	-36.1	0.0	-51.3
XII	Maguindanao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	North Cotabato	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Sarangani	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	South Cotabato	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	Sultan Kudarat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

notes : In a column of the above Table, "I-M" means conversion amount from industrial GW to municipal SW, "M-M" means conversion amount from municipal GW to municipal SW.

Table G-23 CONVERSION (H) BY WRR

(Unit : MCM/year)

WRR	2000		2005		2010		2015		2020		2025	
	I-M	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*
I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	-8.2	-8.0	-20.6	-18.0	-106.8	-29.4	-205.5	-56.1	-296.0	-123.8	-444.6	-197.4
IV	-34.9	0.0	-122.2	0.0	-280.2	-4.0	-448.4	0.0	-810.1	-1.8	-1,306.6	-38.7
V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-91.2	0.0	-232.2	0.0
VIII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-2.0	-11.9	-13.1
XI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	-1.3	-57.2	-1.7	-103.4
Nation	-43.1	-8.0	-142.8	-18.0	-386.9	-42.3	-654.0	-77.7	-1,199.6	-184.8	-1,997.0	-352.7

Table G-24 CONVERSION (L) BY WRR

(Unit : MCM/year)

WRR	2000		2005		2010		2015		2020		2025	
	I-M	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*	*I-M*	*M-M*
I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	-7.0	-8.0	-18.1	-18.0	-80.8	-29.4	-147.2	-56.1	-178.7	-123.8	-205.0	-197.4
IV	-33.5	0.0	-105.4	0.0	-256.9	-4.0	-322.9	0.0	-450.0	-1.8	-546.5	-38.7
V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7	-2.0	-0.8	-13.1
XI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XII	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	-0.8	-57.2	-0.8	-103.4
Nation	-40.5	-8.0	-123.5	-18.0	-337.6	-42.3	-470.1	-77.7	-630.1	-184.8	-753.1	-352.7

Table G-25 CONVERSION (II) BY MRB

(Unit : MCM/year)

MRB	2000		2005		2010		2015		2020		2025	
	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M
Abra	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laoag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-I; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cagayan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Abulug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-II; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pampanga	0.0	0.0	0.0	0.0	-70.1	0.0	-152.3	-15.1	-219.4	-70.9	-334.5	-132.5
Agno	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	-8.2	-8.0	-20.6	-18.0	-36.7	-29.4	-53.2	-41.0	-76.6	-52.9	-110.1	-64.9
WRR-III; Total	-8.2	-8.0	-20.6	-18.0	-106.8	-29.4	-205.5	-56.1	-296.0	-123.8	-444.6	-197.4
Pasig Laguna Bay	-34.9	0.0	-122.2	0.0	-247.9	-4.0	-333.6	0.0	-556.9	-0.3	-890.8	-5.4
Aurray-Patrick	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	-32.3	0.0	-114.8	0.0	-253.1	-1.6	-415.9	-33.3
WRR-IV; Total	-34.9	0.0	-122.2	0.0	-280.2	-4.0	-448.4	0.0	-810.1	-1.8	-1,306.6	-38.7
Bicol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-V; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Panay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilog-Hilabangan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jalaur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-VI; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-VII; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-91.2	0.0	-232.2	0.0
WRR-VIII; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-IX; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agusan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tagoloan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0
Cagayan De Oro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-2.0	-10.4	-13.1
WRR-X; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-2.0	-11.9	-13.1
Tagum-Libuganon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buayan-Malungun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Davao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-XI; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mindanao	0.0	0.0	0.0	0.0	0.0	-1.8	0.0	-4.3	0.0	-7.2	0.0	-10.3
Agus	0.0	0.0	0.0	0.0	0.0	-7.2	0.0	-17.3	-1.3	-50.0	-1.7	-93.2
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-XII; Total	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	-1.3	-57.2	-1.7	-103.4
Nation Total	-43.1	-8.0	-142.8	-18.0	-385.9	-42.3	-654.0	-77.7	-1,199.6	-184.8	-1,997.0	-352.7
M-I Total	-51.1		-160.8		-429.3		-731.7		-1,384.4		-2,349.7	

Table G-26 CONVERSION (L) BY MRB

(Unit : MCM/year)

MRB	2000		2005		2010		2015		2020		2025	
	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M	I-M	M-M
Abra	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laoag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-I; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cagayan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Abulug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-II; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pampanga	0.0	0.0	0.0	0.0	-50.8	0.0	-109.1	-15.1	-132.4	-70.9	-151.9	-132.5
Agno	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	-7.0	-8.0	-18.1	-18.0	-29.9	-29.4	-38.1	-41.0	-46.3	-52.9	-53.1	-64.9
WRR-III; Total	-7.0	-8.0	-18.1	-18.0	-80.8	-29.4	-147.2	-56.1	-178.7	-123.8	-205.0	-197.4
Pasig Laguna Bay	-33.5	0.0	-105.4	0.0	-231.0	-4.0	-242.8	0.0	-314.3	-0.3	-378.0	-5.4
Amnay-Patrick	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	-25.8	0.0	-80.2	0.0	-135.6	-1.6	-168.5	-33.3
WRR-IV; Total	-33.5	0.0	-105.4	0.0	-256.9	-4.0	-322.9	0.0	-450.0	-1.8	-546.5	-38.7
Bicol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-V; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Panay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilog-Hilabangan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jalaur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-VI; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-VII; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-VIII; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-IX; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agusan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tagoloan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cagayan De Oro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7	-2.0	-0.8	-13.1
WRR-X; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7	-2.0	-0.8	-13.1
Tagum-Libuganon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buayan-Malungun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Davao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-XI; Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mindanao	0.0	0.0	0.0	0.0	0.0	-1.8	0.0	-4.3	0.0	-7.2	0.0	-10.3
Agus	0.0	0.0	0.0	0.0	0.0	-7.2	0.0	-17.3	-0.8	-50.0	-0.8	-93.2
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WRR-XII; Total	0.0	0.0	0.0	0.0	0.0	-9.0	0.0	-21.6	-0.8	-57.2	-0.8	-103.4
Nation Total	-40.5	-8.0	-123.5	-18.0	-337.6	-42.3	-470.1	-77.7	-630.1	-184.8	-753.1	-352.7
M-I Total	-48.5		-141.6		-380.0		-547.9		-814.9		-1,105.8	

Table G-27 M/I (H) DEMAND WITH BALANCING & RECYCLING BY WRR

(Unit : MCM/year)

WRR	Usage	1995 GW	1995 SW	1995 Total	2000 GW	2000 SW	2000 Total	2005 GW	2005 SW	2005 Total	2010 GW	2010 SW	2010 Total	2015 GW	2015 SW	2015 Total	2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.1
	Industrial	5.3	67.7	72.9	9.4	67.7	77.1	13.0	67.7	80.7	18.4	67.7	86.0	25.8	67.7	93.5	36.5	67.7	104.1	51.9	67.7	119.6
	Sub-total	51.3	69.1	120.4	66.9	70.8	137.8	84.5	73.1	157.5	106.4	75.8	182.2	132.8	79.2	212.1	163.9	83.1	247.0	202.0	87.6	289.6
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	2.3	15.4	17.8	3.3	15.4	18.7	4.6	15.4	20.0	6.2	15.4	21.7	8.6	15.4	24.0	12.0	15.4	27.4
	Sub-total	40.0	15.4	55.4	53.0	15.4	68.4	68.1	15.4	83.5	86.1	15.4	101.5	106.5	15.4	121.9	128.0	15.4	143.5	152.2	15.4	167.7
III	Municipal	215.5	1.0	216.5	280.0	24.3	304.3	359.5	56.2	415.7	449.6	168.8	618.4	542.0	309.7	851.7	603.8	485.2	1,088.9	672.5	726.8	1,399.3
	Industrial	83.7	125.6	209.3	96.2	125.6	221.8	128.7	125.6	254.3	105.3	125.6	230.9	102.2	125.6	227.8	147.2	125.6	272.8	188.0	125.6	313.6
	Sub-total	299.2	126.6	425.8	376.2	149.9	526.1	488.2	181.8	670.0	555.0	294.4	849.3	644.3	435.3	1,079.6	751.0	610.8	1,361.8	860.5	852.4	1,712.9
IV	Municipal	255.1	956.0	1,211.1	287.1	1,275.8	1,562.9	317.2	1,551.8	1,868.9	340.3	1,921.5	2,261.8	383.1	2,209.0	2,592.1	403.8	2,538.4	2,942.1	443.4	3,073.3	3,516.7
	Industrial	202.2	423.6	625.8	171.2	383.9	555.1	189.1	344.2	533.3	161.3	304.4	465.7	221.8	264.7	486.5	190.7	225.0	415.7	198.7	185.2	383.9
	Sub-total	457.2	1,379.6	1,836.9	458.3	1,659.7	2,118.0	506.3	1,895.9	2,402.2	501.6	2,225.9	2,727.5	604.9	2,473.7	3,078.6	594.5	2,763.4	3,357.8	642.1	3,258.5	3,900.6
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.3
	Industrial	1.6	18.2	19.8	5.6	18.2	23.9	7.2	18.2	25.4	9.4	18.2	27.6	12.4	18.2	30.7	16.6	18.2	34.8	22.9	18.2	41.1
	Sub-total	76.4	21.3	97.7	102.3	23.2	125.5	125.1	24.8	150.0	154.9	27.4	182.3	188.9	30.4	219.2	225.6	33.8	259.4	264.9	37.4	302.3
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	46.6	523.6	570.2	64.4	523.6	588.1	71.6	523.6	595.2	77.5	523.6	601.2	82.2	523.6	605.8	85.7	523.6	609.3
	Sub-total	149.3	526.2	675.6	189.1	528.5	717.7	254.1	531.6	785.8	318.8	535.6	854.4	391.6	540.4	932.0	469.9	546.0	1,015.9	557.0	552.5	1,109.5
VII	Municipal	120.2	3.6	123.8	137.8	45.8	183.6	157.0	96.5	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	359.8	568.8	220.8	553.7	774.5
	Industrial	88.0	77.8	165.8	88.6	77.8	166.4	156.9	77.8	234.7	171.0	77.8	248.7	238.3	77.8	316.1	238.4	77.8	316.2	231.3	77.8	309.1
	Sub-total	208.2	81.4	289.6	226.4	123.6	350.0	313.8	174.3	488.2	347.2	232.2	579.4	432.6	294.7	727.3	447.4	437.5	885.0	452.1	631.5	1,083.5
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.6	125.9	236.5
	Industrial	20.4	11.0	31.4	38.8	11.0	49.8	51.5	11.0	62.4	69.9	11.0	80.9	95.7	11.0	106.7	132.2	11.0	143.1	184.5	11.0	195.5
	Sub-total	60.6	22.0	82.6	87.4	29.9	117.3	109.9	41.2	151.1	139.6	56.3	195.9	177.9	75.7	253.6	226.9	99.7	326.6	295.1	136.9	432.0
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	21.3	4.3	25.5	28.2	4.3	32.5	37.7	4.3	41.9	52.1	4.3	56.3	73.6	4.3	77.9
	Sub-total	65.7	13.2	78.8	87.9	29.7	117.6	116.8	52.3	169.1	143.5	82.0	225.5	174.8	118.5	293.3	211.7	162.1	373.8	254.6	203.7	458.3
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.6	49.3	198.9	191.9	65.6	257.5	239.6	83.4	323.0	288.1	124.5	412.6
	Industrial	43.3	167.1	210.4	42.0	167.1	209.1	49.6	167.1	216.7	52.4	167.1	219.5	74.0	167.1	241.1	105.1	167.1	272.2	145.6	167.1	312.8
	Sub-total	123.3	170.2	293.5	135.5	185.1	320.6	168.5	198.6	367.1	202.0	216.4	418.4	265.9	232.7	498.6	344.7	250.5	595.2	433.7	291.7	725.4
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.1	215.1	15.8	199.1	214.9	18.5	199.1	217.6	25.4	199.1	224.5	34.5	199.1	233.6	46.4	199.1	245.5	64.0	199.1	263.1
	Sub-total	93.2	210.8	304.0	101.2	223.0	324.1	110.8	240.5	351.3	124.9	261.3	386.1	141.6	284.4	425.9	159.5	310.0	469.5	183.0	338.1	521.2
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	201.1	9.0	210.1	264.6	21.6	286.2	317.9	58.5	376.4	371.5	105.2	476.7
	Industrial	6.3	85.7	92.0	6.8	85.7	92.5	8.0	85.7	93.7	10.5	85.7	96.1	13.7	85.7	99.4	17.0	85.7	102.6	23.3	85.7	108.9
	Sub-total	74.9	85.7	160.5	107.3	85.7	193.0	155.8	85.7	241.4	211.6	94.7	306.3	278.3	107.3	385.6	334.9	144.2	479.0	394.8	190.8	585.6
Nation	Municipal	1,185	1,002	2,187	1,459	1,445	2,904	1,790	1,876	3,666	2,164	2,517	4,681	2,600	3,128	5,728	2,985	3,936	6,921	3,411	5,116	8,526
	Industrial	514	1,719	2,234	533	1,679	2,212	711	1,640	2,351	728	1,600	2,328	930	1,560	2,500	1,073	1,520	2,593	1,282	1,481	2,762
	G-total	1,699	2,721	4,421	1,992	3,124	5,116	2,502	3,515	6,017	2,891	4,117	7,009	3,540	4,688	8,228	4,058	5,457	9,515	4,692	6,597	11,289

Table G-28 M/I (L) DEMAND WITH BALANCING & RECYCLING BY WRR

(Unit : MCM/year)

WRR	Usage	1995 GW	1995 SW	1995 Total	2000 GW	2000 SW	2000 Total	2005 GW	2005 SW	2005 Total	2010 GW	2010 SW	2010 Total	2015 GW	2015 SW	2015 Total	2020 GW	2020 SW	2020 Total	2025 GW	2025 SW	2025 Total
I	Municipal	46.0	1.4	47.4	57.5	3.2	60.7	71.5	5.4	76.9	88.0	8.2	96.2	107.0	11.6	118.6	127.4	15.5	142.9	150.1	19.9	170.1
	Industrial	5.3	67.7	72.9	8.5	67.7	76.1	11.8	67.7	79.4	15.0	67.7	82.7	18.5	67.7	86.2	22.0	67.7	89.7	25.2	67.7	92.8
	Sub-total	51.3	69.1	120.4	65.9	70.8	136.8	83.2	73.1	156.3	103.0	75.8	178.9	125.5	79.2	204.7	149.4	83.1	232.6	175.3	87.6	262.9
II	Municipal	39.3	0.0	39.3	50.7	0.0	50.7	64.8	0.0	64.8	81.5	0.0	81.5	100.2	0.0	100.2	119.4	0.0	119.4	140.2	0.0	140.2
	Industrial	0.7	15.4	16.1	1.9	15.4	17.3	3.0	15.4	18.4	3.7	15.4	19.1	4.5	15.4	19.9	5.2	15.4	20.6	5.8	15.4	21.3
	Sub-total	40.0	15.4	55.4	52.5	15.4	67.9	67.8	15.4	83.2	85.2	15.4	100.7	104.7	15.4	120.1	124.6	15.4	140.0	146.0	15.4	161.5
III	Municipal	215.5	1.0	216.5	280.0	25.5	305.5	359.5	58.6	418.1	449.6	142.8	592.4	542.0	251.3	793.4	603.8	367.9	971.6	672.5	487.3	1,159.7
	Industrial	83.7	125.6	209.3	87.9	125.6	213.5	112.0	125.6	237.6	92.4	125.6	218.0	73.2	125.6	198.8	88.9	125.6	214.5	102.0	125.6	227.6
	Sub-total	299.2	126.6	425.8	367.9	151.1	519.0	471.5	184.2	655.7	542.0	268.4	810.4	615.3	376.9	992.2	692.7	493.5	1,186.1	774.4	612.8	1,387.3
IV	Municipal	255.1	956.0	1,211.1	287.1	1,277.2	1,564.3	317.2	1,568.6	1,885.8	340.3	1,915.1	2,255.4	383.1	2,174.4	2,557.4	403.8	2,420.9	2,824.7	443.4	2,825.9	3,269.3
	Industrial	202.2	423.6	625.8	167.6	383.9	551.4	124.4	344.2	468.5	157.8	304.4	462.3	203.3	264.7	468.0	181.2	225.0	406.2	184.0	185.2	369.3
	Sub-total	457.2	1,379.6	1,836.9	454.6	1,661.1	2,115.7	461.5	1,912.7	2,374.3	498.2	2,219.5	2,717.7	586.4	2,439.1	3,025.5	585.0	2,645.9	3,230.9	627.4	3,011.2	3,638.6
V	Municipal	74.8	3.0	77.8	96.7	4.9	101.6	118.0	6.6	124.5	145.5	9.1	154.6	176.4	12.1	188.6	209.0	15.6	224.6	242.0	19.2	261.1
	Industrial	1.6	18.2	19.8	3.9	18.2	22.2	6.5	18.2	24.7	7.7	18.2	25.9	8.9	18.2	27.1	10.0	18.2	28.3	11.1	18.2	29.4
	Sub-total	76.4	21.3	97.7	100.6	23.2	123.8	124.4	24.8	149.3	153.2	27.4	180.5	185.3	30.4	215.7	219.0	33.8	252.9	253.1	37.4	290.5
VI	Municipal	103.7	2.6	106.3	142.6	4.9	147.5	189.7	8.0	197.7	247.2	12.0	259.2	314.1	16.8	330.9	387.7	22.4	410.1	471.3	28.9	500.2
	Industrial	45.6	523.6	569.3	44.9	523.6	568.6	45.7	523.6	569.3	45.0	523.6	568.6	44.0	523.6	567.7	42.9	523.6	566.6	41.6	523.6	565.2
	Sub-total	149.3	526.2	675.6	187.5	528.5	716.0	235.4	531.6	767.0	292.2	535.6	827.8	358.1	540.4	898.5	430.6	546.0	976.7	512.9	552.5	1,065.4
VII	Municipal	120.2	3.6	123.8	137.8	45.8	183.6	157.0	96.6	253.5	176.2	154.5	330.7	194.3	216.9	411.2	209.0	281.9	490.9	220.8	343.2	564.0
	Industrial	88.0	77.8	165.8	85.8	77.8	163.6	141.7	77.8	219.4	139.6	77.8	217.3	170.7	77.8	248.4	199.0	77.8	276.8	224.9	77.8	302.7
	Sub-total	208.2	81.4	289.6	223.6	123.6	347.2	298.6	174.3	473.0	315.8	232.2	548.0	365.0	294.7	659.7	408.0	359.7	767.7	445.7	421.0	866.7
VIII	Municipal	40.2	11.0	51.2	48.6	18.9	67.5	58.4	30.2	88.7	69.7	45.3	115.0	82.3	64.7	147.0	94.8	88.7	183.5	110.5	125.9	236.5
	Industrial	20.4	11.0	31.4	34.5	11.0	45.5	46.5	11.0	57.4	57.1	11.0	68.0	68.5	11.0	79.5	79.8	11.0	90.8	89.6	11.0	100.5
	Sub-total	60.6	22.0	82.6	83.1	29.9	112.9	104.9	41.2	146.1	126.8	56.3	183.1	150.8	75.7	226.5	174.6	99.7	274.3	200.1	136.9	337.1
IX	Municipal	64.3	8.9	73.2	78.5	25.4	103.9	95.5	48.0	143.5	115.3	77.7	193.0	137.1	114.2	251.3	159.7	157.8	317.5	181.0	199.4	380.5
	Industrial	1.4	4.3	5.7	9.5	4.3	13.7	19.2	4.3	23.5	23.0	4.3	27.3	27.0	4.3	31.2	31.4	4.3	35.7	35.7	4.3	40.0
	Sub-total	65.7	13.2	78.8	87.9	29.7	117.6	114.7	52.3	167.0	138.3	82.0	220.3	164.1	118.5	282.6	191.1	162.1	353.2	215.7	203.7	420.5
X	Municipal	80.1	3.0	83.1	93.5	18.0	111.5	118.9	31.5	150.3	149.5	49.3	198.9	191.9	65.6	257.5	239.6	82.9	322.6	288.1	113.4	401.5
	Industrial	43.3	167.1	210.4	41.8	167.1	208.9	42.6	167.1	209.7	42.7	167.1	209.9	53.0	167.1	220.1	63.4	167.1	230.6	75.7	167.1	242.8
	Sub-total	123.3	170.2	293.5	135.3	185.1	320.4	161.4	198.6	360.0	192.4	216.4	408.8	244.9	232.7	477.6	303.1	250.1	553.2	363.7	280.5	644.3
XI	Municipal	77.2	11.7	88.8	85.4	23.8	109.2	92.3	41.4	133.7	99.5	62.1	161.6	107.1	85.3	192.3	113.2	110.9	224.0	119.1	139.0	258.1
	Industrial	16.0	199.1	215.1	15.5	199.1	214.7	16.7	199.1	215.8	20.7	199.1	219.8	24.7	199.1	223.8	28.0	199.1	227.1	31.0	199.1	230.1
	Sub-total	93.2	210.8	304.0	100.9	223.0	323.8	109.0	240.5	349.5	120.2	261.3	381.5	131.7	284.4	416.1	141.2	310.0	451.1	150.1	338.1	488.2
XII	Municipal	68.5	0.0	68.5	100.5	0.0	100.5	147.8	0.0	147.8	201.1	9.0	210.1	264.6	21.6	286.2	317.9	58.0	375.9	371.5	104.3	475.8
	Industrial	6.3	85.7	92.0	6.2	85.7	91.9	7.2	85.7	92.9	8.6	85.7	94.2	9.8	85.7	95.5	10.2	85.7	95.9	11.3	85.7	97.0
	Sub-total	74.9	85.7	160.5	106.7	85.7	192.4	155.0	85.7	240.7	209.7	94.7	304.3	274.4	107.3	381.7	328.1	143.7	471.8	382.8	189.9	572.8
Nation	Municipal	1,185	1,002	2,187	1,459	1,448	2,906	1,790	1,895	3,685	2,164	2,485	4,649	2,600	3,034	5,635	2,985	3,623	6,608	3,411	4,406	7,817
	Industrial	514	1,719	2,234	508	1,679	2,187	597	1,640	2,237	613	1,600	2,213	706	1,560	2,266	762	1,520	2,283	836	1,481	2,319
	G-total	1,699	2,721	4,421	1,967	3,127	5,094	2,388	3,535	5,922	2,777	4,085	6,862	3,306	4,595	7,901	3,747	5,143	8,890	4,248	5,887	10,136

Table G-29 M/I (H) DEMAND WITH BALANCING & RECYCLING BY MRB

(Unit : MCM/Year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.3	0.0	0.5	19.4	10.7	0.0	0.7	19.4	13.7	0.0	0.9	19.4	17.0	0.0	1.3	19.4	20.8	0.0	1.8	19.4
Laoag	8.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	16.5	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.2	3.4	35.8	0.0	0.3	3.4	44.4	0.0	0.4	3.4
Others	32.4	1.4	5.1	44.8	39.0	3.2	9.0	44.8	46.7	5.4	12.4	44.8	55.4	8.2	17.6	44.8	65.0	11.6	24.7	44.8	74.5	15.5	34.9	44.8	84.9	19.9	49.7	44.8
WRR I; Total	46.0	1.4	5.3	67.7	57.5	3.2	9.4	67.7	71.5	5.4	13.0	67.7	88.0	8.2	18.4	67.7	107.0	11.6	25.8	67.7	127.4	15.5	36.5	67.7	150.1	19.9	51.9	67.7
Cagayan	35.4	0.0	0.6	1.1	46.3	0.0	2.1	1.1	59.9	0.0	2.9	1.1	76.1	0.0	4.0	1.1	94.4	0.0	5.5	1.1	113.4	0.0	7.6	1.1	134.1	0.0	10.6	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.3	5.1	2.2	0.0	0.4	5.1	2.2	0.0	0.5	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.2	9.2	3.2	0.0	0.3	9.2	3.5	0.0	0.4	9.2	3.8	0.0	0.5	9.2	3.9	0.0	0.7	9.2	3.9	0.0	0.9	9.2
WRR II; Total	39.3	0.0	0.7	15.4	50.7	0.0	2.3	15.4	64.8	0.0	3.3	15.4	81.5	0.0	4.6	15.4	100.2	0.0	6.2	15.4	119.4	0.0	8.6	15.4	140.2	0.0	12.0	15.4
Pampanga	127.2	0.0	50.1	14.1	165.0	4.2	57.6	14.1	211.6	10.4	77.1	14.1	264.3	64.0	63.4	14.1	318.3	123.4	61.2	14.1	354.3	177.3	88.2	14.1	394.3	266.2	112.6	14.1
Agno	37.3	1.0	10.3	0.7	49.9	18.2	11.8	0.7	65.7	40.3	15.8	0.7	83.9	75.1	12.9	0.7	103.0	129.4	12.6	0.7	116.3	225.5	18.1	0.7	131.3	336.9	23.1	0.7
Others	51.0	0.0	23.3	110.7	65.1	1.9	26.8	110.7	82.2	5.0	35.8	110.7	101.4	29.7	29.3	110.7	120.7	57.2	28.5	110.7	133.2	82.4	41.0	110.7	146.9	123.7	52.3	110.7
WRR III; Total	215.5	1.0	83.7	125.6	280.0	24.3	96.2	125.6	359.5	56.2	128.7	125.6	449.6	168.8	105.3	125.6	542.0	309.7	102.2	125.6	603.8	485.2	147.2	125.6	672.5	726.8	188.0	125.6
Pasig-Laguna Bay	161.2	693.1	136.2	238.4	180.1	924.9	115.3	198.6	198.1	1,325.0	127.4	158.9	211.4	1,391.3	108.6	119.2	238.1	1,595.5	140.4	79.5	250.7	1,827.2	128.5	39.7	277.8	2,206.6	133.8	0.0
Ansay-Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Others	93.9	263.0	65.9	185.1	106.9	350.9	55.8	185.1	119.0	436.8	61.7	185.1	128.9	530.2	52.6	185.1	144.9	613.5	72.3	185.1	153.0	711.1	63.2	185.1	165.6	866.5	64.8	185.1
WRR IV; Total	255.1	956.0	202.2	423.6	287.1	1,275.8	171.2	383.9	317.2	1,551.8	189.1	344.2	340.3	1,921.5	161.3	304.4	383.1	2,209.0	221.8	264.7	403.9	2,538.4	190.7	225.0	443.4	3,073.3	198.7	185.2
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	2.4	2.1	46.1	0.0	3.0	2.1	56.4	0.0	3.9	2.1	68.0	0.0	5.2	2.1	80.0	0.0	6.9	2.1	92.1	0.0	9.6	2.1
Others	45.1	3.0	0.9	16.1	58.7	4.9	3.3	16.1	71.9	6.6	4.2	16.1	89.1	9.1	5.5	16.1	108.5	12.1	7.2	16.1	129.0	15.6	9.6	16.1	149.8	19.2	13.3	16.1
WRR V; Total	74.8	3.0	1.6	18.2	96.7	4.9	5.6	18.2	118.0	6.6	7.2	18.2	145.5	9.1	9.4	18.2	176.4	12.1	12.4	18.2	209.0	15.6	16.6	18.2	242.0	19.2	22.9	18.2
Panay	0.1	2.3	0.1	1.9	0.1	4.4	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.8	0.1	1.9	0.1	15.2	0.2	1.9	0.1	20.3	0.2	1.9	0.1	26.2	0.2	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.7	140.7	23.1	0.0	16.2	140.7	26.3	0.0	18.0	140.7	29.4	0.0	19.5	140.7	32.0	0.0	20.7	140.7	34.6	0.0	21.6	140.7
Jalaur	12.6	0.0	0.3	0.2	21.3	0.0	0.3	0.2	33.0	0.0	0.4	0.2	47.9	0.0	0.5	0.2	66.0	0.0	0.5	0.2	87.0	0.0	0.5	0.2	111.3	0.0	0.6	0.2
Others	74.1	0.2	33.7	380.9	101.0	0.5	34.5	380.9	133.5	0.8	47.6	380.9	172.9	1.1	53.0	380.9	218.5	1.6	57.3	380.9	268.5	2.1	60.8	380.9	325.2	2.7	63.4	380.9
WRR VI; Total	103.7	2.6	45.6	523.6	142.6	4.9	46.6	523.6	189.7	8.0	64.4	523.6	247.2	12.0	71.6	523.6	314.1	16.8	77.5	523.6	387.7	22.4	82.2	523.6	471.3	28.9	85.7	523.6
WRR VII; Total	129.2	3.6	88.0	77.8	137.8	45.8	88.6	77.8	157.0	96.6	156.9	77.8	176.2	154.5	171.0	77.8	194.3	216.9	218.3	77.8	209.0	359.8	258.4	77.8	220.8	553.7	231.3	77.8
WRR VIII; Total	39.2	11.0	29.4	11.0	39.6	18.9	38.8	11.0	58.4	30.2	51.5	11.0	69.7	45.3	69.9	11.0	82.3	64.7	95.7	11.0	94.8	88.7	132.2	11.0	110.6	125.9	184.5	11.0
WRR IX; Total	64.3	8.9	1.4	4.3	78.5	25.4	9.5	4.3	95.5	48.0	21.3	4.3	115.3	77.7	29.2	4.3	137.1	114.2	37.7	4.3	159.7	157.8	52.1	4.3	181.0	199.4	75.6	4.3
Agusan	5.3	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.1	0.0	0.1	1.8	29.1	0.0	0.2	1.8
Tagoloan	13.0	0.8	15.9	29.7	14.6	4.7	15.4	29.7	15.8	8.2	18.2	29.7	16.5	12.9	19.3	29.7	16.6	17.2	27.2	29.7	15.8	22.0	38.6	29.7	14.7	33.9	53.6	29.7
Cagayan De Oro	54.8	1.8	22.7	39.4	64.5	10.4	22.1	39.4	84.2	18.1	26.1	39.4	108.5	28.4	27.5	39.4	142.8	37.7	36.9	39.4	182.1	47.9	55.2	39.4	222.2	71.1	76.5	39.4
Others	6.9	0.5	4.6	96.2	8.1	2.9	4.4	96.2	10.0	5.1	5.2	96.2	12.3	8.0	5.5	96.2	15.3	10.6	7.8	96.2	18.7	13.5	11.1	96.2	22.0	19.5	15.4	96.2
WRR X; Total	80.1	3.0	43.3	167.1	93.5	18.0	42.0	167.1	118.9	31.5	49.6	167.1	149.6	49.3	52.4	167.1	191.9	65.6	74.0	167.1	239.6	83.4	105.1	167.1	288.1	124.5	145.6	167.1
Tagum-Libuganon	4.3	0.0	0.3	39.1	4.6	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.5	39.1	5.6	0.0	0.6	39.1	5.9	0.0	0.8	39.1	6.3	0.0	1.2	39.1
Buayan-Malungon	8.2	1.0	4.0	129.1	9.7	2.9	3.9	129.1	10.8	3.5	4.6	129.1	11.8	5.3	6.3	129.1	12.8	7.3	8.6	129.1	13.4	9.5	11.5	129.1	13.8	11.9	15.9	129.1
Davao	60.5	7.6	10.1	10.6	66.2	15.5	10.0	10.6	71.3	27.0	11.7	10.6	76.7	40.5	16.0	10.6	82.4	55.6	21.8	10.6	87.2	72.3	29.3	10.6	92.1	90.6	40.4	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	10.9	1.9	20.3	5.8	16.3	2.6	20.3	6.3	22.4	3.5	20.3	6.6	29.1	4.7	20.3	6.9	36.5	6.5	20.3
WRR XI; Total	77.2	11.7	16.0	199.1	85.4	23.8	15.8	199.1	92.3	41.4	18.5	199.1	99.5	62.1	25.4	199.1	107.1	85.3	34.5	199.1	113.2	110.9	45.4	199.1	119.1	139.0	64.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.8	9.6	114.6	0.0	5.4	9.6	159.5	0.0	7.0	9.6	213.7	0.0	9.2	9.6	260.1	0.9	11.4	9.6	307.2	1.2	15.6	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.5	72.2	15.2	0.0	0.6	72.2	23.3	9.0	0.7	72.2	32.2	21.6	1.0	72.2	39.9	57.3	1.2	72.2	47.9	103.5	1.6	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.8	3.9	17.0	0.0	2.1	3.9	18.3	0.0	2.7	3.9	18.7	0.0	3.6	3.9	17.9	0.3	4.4	3.9	16.4	0.5	6.0	3.9
WRR XII; Total	68.5	0.0	6.3	85.7	100.5	0.0	6.8	85.7	147.8	0.0	8.0	85.7	201.1	9.0	10.5	85.7	264.6	21.6	13.7	85.7	317.9	58.5	17.0	85.7	371.5	105.2	23.3	85.7
Nation Total	1,185	1,002	514	1,719	1,459	1,445	533	1,679	1,799	1,876	711	1,640	2,164	2,517	728	1,600	2,600	3,128	940	1,560	2,985	3,936	1,073	1,520	3,411	5,116	1,242	1,481
M/I Total	2,187		2,234		2,904		2,212		3,666		2,351		4,681		2,328		5,728		2,500		6,921		2,593		8,526		2,762	

Table G-30 M/I (H) DEMAND WITH BALANCING & RECYCLING BY MRB

(Unit : MCM/Year)

MRB	1995				2000				2005				2010				2015				2020				2025			
	Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial		Municipal		Industrial	
	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW
Abra	4.7	0.0	0.2	19.4	6.3	0.0	0.3	19.4	8.3	0.0	0.4	19.4	10.7	0.0	0.5	19.4	13.7	0.0	0.7	19.4	17.0	0.0	0.8	19.4	20.8	0.0	0.9	19.4
Laoag	8.9	0.0	0.0	3.4	12.2	0.0	0.1	3.4	16.5	0.0	0.1	3.4	21.9	0.0	0.1	3.4	28.3	0.0	0.1	3.4	35.8	0.0	0.2	3.4	44.4	0.0	0.2	3.4
Others	32.4	1.4	5.1	44.8	39.0	3.2	8.1	44.8	46.7	5.4	11.2	44.8	55.4	8.2	14.4	44.8	65.0	11.6	17.7	44.8	74.5	15.5	21.1	44.8	84.9	19.9	24.1	44.8
WRR I; Total	46.0	1.4	5.3	67.7	57.5	3.2	8.5	67.7	71.5	5.4	11.8	67.7	88.0	8.2	15.0	67.7	107.0	11.6	18.5	67.7	127.4	15.5	22.0	67.7	150.1	19.9	25.2	67.7
Cagayan	35.4	0.0	0.6	1.1	46.3	0.0	1.6	1.1	59.9	0.0	2.6	1.1	76.1	0.0	3.3	1.1	94.4	0.0	3.9	1.1	113.4	0.0	4.6	1.1	134.1	0.0	5.1	1.1
Abulug	1.4	0.0	0.0	5.1	1.6	0.0	0.1	5.1	1.8	0.0	0.1	5.1	1.9	0.0	0.2	5.1	2.1	0.0	0.2	5.1	2.2	0.0	0.2	5.1	2.2	0.0	0.2	5.1
Others	2.5	0.0	0.1	9.2	2.8	0.0	0.1	9.2	3.2	0.0	0.2	9.2	3.5	0.0	0.3	9.2	3.8	0.0	0.3	9.2	3.9	0.0	0.4	9.2	3.9	0.0	0.5	9.2
WRR II; Total	39.3	0.0	0.7	15.4	50.7	0.0	1.9	15.4	64.8	0.0	3.0	15.4	81.5	0.0	3.7	15.4	100.2	0.0	4.5	15.4	119.4	0.0	5.2	15.4	140.2	0.0	5.8	15.4
Pampanga	127.2	0.0	50.1	14.1	165.0	4.9	52.6	14.1	211.6	12.3	67.1	14.1	264.3	48.4	55.3	14.1	318.3	88.1	43.8	14.1	354.3	107.0	53.2	14.1	394.3	122.8	61.1	14.1
Agno	37.3	1.0	10.3	0.7	49.9	18.3	10.8	0.7	65.7	40.6	13.8	0.7	83.9	71.9	11.4	0.7	103.0	122.2	9.0	0.7	116.3	211.1	10.9	0.7	131.3	307.4	12.5	0.7
Others	51.0	0.5	23.3	110.7	65.1	2.3	24.5	110.7	82.2	5.7	31.2	110.7	101.4	22.5	25.7	110.7	120.7	41.0	20.4	110.7	133.2	49.7	24.7	110.7	146.9	57.1	28.4	110.7
WRR III; Total	215.5	1.0	83.7	125.6	280.0	25.5	87.9	125.6	359.5	58.6	112.0	125.6	449.6	142.8	92.4	125.6	542.0	251.3	73.2	125.6	603.8	367.9	88.9	125.6	672.5	487.3	102.0	125.6
Pasig-Laguna Bay	161.2	693.1	136.2	238.4	180.1	925.8	112.9	198.6	198.1	1,136.3	97.3	158.9	211.4	1,387.0	106.3	119.2	238.1	1,572.2	137.0	79.5	250.7	1,748.1	122.1	39.7	277.8	2,040.0	124.0	0.0
Ansay-Patrick	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Others	93.9	263.0	65.9	185.1	106.9	351.4	54.6	185.1	119.0	432.3	47.1	185.1	128.9	528.1	51.5	185.1	144.9	602.1	66.3	185.1	153.0	672.8	59.1	185.1	165.6	785.9	60.0	185.1
WRR IV; Total	255.1	956.0	202.2	423.6	287.1	1,277.2	167.6	383.9	317.2	1,568.6	144.4	344.2	340.3	1,915.1	157.8	304.4	383.1	2,174.4	203.3	264.7	403.8	2,420.9	181.2	225.0	443.4	2,825.9	184.0	185.2
Bicol	29.7	0.0	0.7	2.1	37.9	0.0	1.6	2.1	46.1	0.0	2.7	2.1	56.4	0.0	3.2	2.1	68.0	0.0	3.7	2.1	80.0	0.0	4.2	2.1	92.1	0.0	4.7	2.1
Others	45.1	3.0	0.9	16.1	58.7	4.9	2.3	16.1	71.9	6.6	3.8	16.1	89.1	9.1	4.5	16.1	108.5	12.1	5.2	16.1	129.0	15.6	5.8	16.1	149.8	19.2	6.5	16.1
WRR V; Total	74.8	3.0	1.6	18.2	96.7	4.9	3.9	18.2	118.0	6.6	6.5	18.2	145.5	9.1	7.7	18.2	176.4	12.1	8.9	18.2	209.0	15.6	10.0	18.2	242.0	19.2	11.1	18.2
Panay	0.1	2.3	0.1	1.9	0.1	4.4	0.1	1.9	0.1	7.2	0.1	1.9	0.1	10.8	0.1	1.9	0.1	15.2	0.1	1.9	0.1	20.3	0.1	1.9	0.1	26.2	0.1	1.9
Ilog-Hilabangan	16.9	0.0	11.5	140.7	20.0	0.0	11.3	140.7	23.1	0.0	11.5	140.7	26.3	0.0	11.3	140.7	29.4	0.0	11.1	140.7	32.0	0.0	10.8	140.7	34.6	0.0	10.5	140.7
Jalaur	12.6	0.0	0.3	0.2	21.3	0.0	0.3	0.2	33.0	0.0	0.3	0.2	47.9	0.0	0.3	0.2	66.0	0.0	0.3	0.2	87.0	0.0	0.3	0.2	111.3	0.0	0.3	0.2
Others	74.1	0.2	33.7	380.9	101.0	0.5	33.2	380.9	133.5	0.8	33.8	380.9	172.9	1.1	33.3	380.9	218.5	1.6	32.6	380.9	268.5	2.1	31.7	380.9	325.2	2.7	30.8	380.9
WRR VI; Total	103.7	2.6	45.6	523.6	142.6	4.9	44.9	523.6	189.7	8.0	45.7	523.6	247.2	12.0	45.0	523.6	314.1	16.8	44.0	523.6	387.7	22.4	42.9	523.6	471.3	28.9	41.6	523.6
WRR VII; Total	129.2	3.6	88.0	77.8	137.8	45.8	85.8	77.8	157.0	96.6	131.7	77.8	176.2	154.5	139.6	77.8	194.3	216.9	170.7	77.8	209.0	359.8	199.0	77.8	220.8	553.7	224.9	77.8
WRR VIII; Total	40.2	11.0	29.4	11.0	48.6	18.9	34.5	11.0	58.4	30.2	46.5	11.0	69.7	45.3	57.1	11.0	82.3	64.7	68.5	11.0	94.8	88.7	79.8	11.0	110.6	125.9	89.6	11.0
WRR IX; Total	64.3	8.9	1.4	4.3	78.5	25.4	9.5	4.3	95.5	48.0	19.2	4.3	115.3	77.7	23.0	4.3	137.1	114.2	27.0	4.3	159.7	157.8	31.4	4.3	181.0	199.4	35.7	4.3
Agusan	5.3	0.0	0.1	1.8	6.4	0.0	0.1	1.8	9.0	0.0	0.1	1.8	12.3	0.0	0.1	1.8	17.3	0.0	0.1	1.8	23.1	0.0	0.1	1.8	29.1	0.0	0.1	1.8
Tagoloan	13.0	0.8	15.9	29.7	14.6	4.7	15.4	29.7	15.8	8.2	15.6	29.7	16.5	12.9	15.7	29.7	16.6	17.2	19.5	29.7	15.8	21.8	23.3	29.7	14.7	29.8	27.8	29.7
Cagayan De Oro	54.8	1.8	22.7	39.4	64.5	10.4	22.0	39.4	84.2	18.1	22.4	39.4	108.5	28.4	22.5	39.4	142.8	37.7	27.8	39.4	182.1	47.7	33.3	39.4	222.2	65.3	39.8	39.4
Others	6.9	0.5	4.6	96.2	8.1	2.9	4.4	96.2	10.0	5.1	4.5	96.2	12.3	8.0	4.5	96.2	15.3	10.6	5.6	96.2	18.7	13.4	6.7	96.2	22.0	18.4	8.0	96.2
WRR X; Total	80.1	3.0	43.3	167.1	93.5	18.0	41.8	167.1	118.9	31.5	42.6	167.1	149.6	49.3	42.7	167.1	191.9	65.6	53.0	167.1	239.6	82.9	63.4	167.1	288.1	113.4	75.7	167.1
Tagum-Libuganon	4.3	0.0	0.3	39.1	4.6	0.0	0.3	39.1	4.9	0.0	0.3	39.1	5.2	0.0	0.4	39.1	5.6	0.0	0.4	39.1	5.9	0.0	0.5	39.1	6.3	0.0	0.5	39.1
Buayan-Malungon	8.2	1.0	4.0	129.1	9.7	2.0	3.9	129.1	10.8	3.5	4.2	129.1	11.8	5.3	5.1	129.1	12.8	7.3	6.1	129.1	13.4	9.5	7.0	129.1	13.8	11.9	7.7	129.1
Davao	60.5	7.6	10.1	10.6	66.2	15.5	9.8	10.6	71.3	27.0	10.6	10.6	76.7	40.5	13.1	10.6	82.4	55.6	15.6	10.6	87.2	72.3	17.7	10.6	92.1	90.6	19.6	10.6
Others	4.2	3.1	1.6	20.3	4.9	6.3	1.6	20.3	5.4	10.9	1.7	20.3	5.8	16.3	2.1	20.3	6.3	22.4	2.5	20.3	6.6	29.1	2.9	20.3	6.9	36.5	3.2	20.3
WRR XI; Total	77.2	11.7	16.0	199.1	85.4	23.8	15.5	199.1	92.3	41.4	16.7	199.1	99.5	62.1	20.7	199.1	107.1	85.3	24.7	199.1	113.2	119.9	28.0	199.1	119.1	139.0	31.0	199.1
Mindanao	49.0	0.0	4.3	9.6	75.3	0.0	4.2	9.6	114.6	0.0	4.9	9.6	159.5	0.0	5.7	9.6	213.7	0.0	6.6	9.6	260.1	0.5	6.9	9.6	307.2	0.6	7.6	9.6
Agus	5.9	0.0	0.4	72.2	10.0	0.0	0.4	72.2	15.2	0.0	0.5	72.2	23.3	9.0	0.6	72.2	32.2	21.6	0.7	72.2	39.9	57.3	0.7	72.2	47.9	103.5	0.8	72.2
Others	13.6	0.0	1.6	3.9	15.2	0.0	1.6	3.9	17.0	0.0	1.9	3.9	18.3	0.0	2.2	3.9	18.7	0.0	2.5	3.9	17.9	0.2	2.7	3.9	16.4	0.2	2.9	3.9
WRR XII; Total	68.5	0.0	6.3	85.7	100.5	0.0	6.2	85.7	147.8	0.0	7.2	85.7	201.1	9.0	8.6	85.7	264.6	21.6	9.8	85.7	317.9	58.0	10.2	85.7	371.5	104.3	14.3	85.7
Nation Total	1,185	1,002	514	1,719	1,459	1,448	508	1,679	1,799	1,895	597	1,640	2,164	2,483	613	1,600	2,600	3,034	706	1,560	2,985	3,700	762	1,520	3,461	4,617	838	1,481
M/I Total	2,187		2,234		2,966		2,187		3,685		2,237		4,649		2,213		5,635		2,266		6,685		2,283		8,078		2,319	

Table G-31 TYPE OF DEEPWELL CHARACTERISTICS

			Ratio of Well Facility				
			Case 1	*Case 2*	*Case 3*	*Reduction*	*Final Q*
Average Life	(year)		*20*	*25*	*35*	*per year*	*%*
Deviation Year	(year)		*10*	*10*	*10*		
Life of Facilities	5	year	0.153	0.020	0.000	0.120	53%
	10	year	0.175	0.098	0.009	0.060	54%
	15	year	0.193	0.180	0.050	0.040	54%
	20	year	0.186	0.265	0.145	0.030	56%
	30	year	0.157	0.254	0.318	0.020	55%
	40	year	0.100	0.134	0.348	0.015	55%
	60	year	0.036	0.049	0.130	0.010	55%
Type of Water Supply	L-III			U	A		
	L-I & II		U	A			
<remarks>	L-I Private		U	A			
U; until 2005 year	Commercial		U	A			
A; after 2010	Industrial			U	A		
	Irrigation		U	A			

Table G-32 DEEPWELL PRODUCTION FORECASTING

	Basic Condition			Year after Well Construction					
	Life	*Reduction*	*Ratio*	*5*	*10*	*15*	*20*	*25*	*30*
Case 1	5	0.120	0.153	0.081					
25-10	10	0.060	0.175	0.128	0.094				
	15	0.040	0.193	0.157	0.128	0.105			
	20	0.030	0.186	0.160	0.137	0.118	0.101		
	30	0.020	0.157	0.142	0.128	0.116	0.105	0.095	0.086
	40	0.015	0.100	0.093	0.086	0.080	0.074	0.069	0.064
	60	0.010	0.036	0.034	0.033	0.031	0.029	0.028	0.027
	Q-Reduction		1.000	0.795	0.607	0.449	0.309	0.191	0.176
Case 2	5	0.120	0.020	0.011					
35-10	10	0.060	0.098	0.072	0.053				
	15	0.040	0.180	0.147	0.120	0.098			
	20	0.030	0.265	0.228	0.195	0.168	0.144		
	30	0.020	0.254	0.230	0.208	0.188	0.170	0.153	0.139
	40	0.015	0.134	0.124	0.115	0.107	0.099	0.092	0.085
	60	0.010	0.049	0.047	0.044	0.042	0.040	0.038	0.036
	Q-Reduction		1.000	0.857	0.735	0.602	0.453	0.283	0.260
Case 3	5	0.120	-	-					
40-10	10	0.060	0.009	0.007	0.005				
	15	0.040	0.050	0.041	0.033	0.027			
	20	0.030	0.145	0.125	0.107	0.092	0.079		
	30	0.020	0.318	0.287	0.260	0.235	0.212	0.192	0.173
	40	0.015	0.348	0.323	0.299	0.277	0.257	0.238	0.221
	60	0.010	0.130	0.124	0.118	0.112	0.106	0.101	0.096
	Q-Reduction		1.000	0.906	0.822	0.743	0.655	0.532	0.491

Table G-33 DEEPWELL STRUCTURE (DEPTH & DIAMETER)

(Unit : diameter in mm & depth in m)

	GW Avalability		Municipal					Indus.	Irriga.
WRR	*GIS ave. depth*		*L-III*	*L-II*	*L-I*	*P/L-I*	*Comm'l*		
	S/D-dep	*Dp-dep*	*250 dia.*	*150 dia.*	*100 dia.*	*100 dia.*	*150 dia.*	*250 dia.*	*200 dia.*
	m	*m*	*Ave. x 3*	*Dp x 1.5*	*Dp*	*Dp / 2*	*S/D / 2*	*S/D x 3*	*S/D / 2*
I	33.0	35.9	103.3	53.8	35.9	17.9	16.5	99.1	16.5
II	43.3	61.1	156.6	91.6	61.1	30.5	21.7	129.9	21.7
III	85.1	60.6	218.6	91.0	60.6	30.3	42.5	255.2	42.5
IV	63.0	67.4	195.7	101.1	67.4	33.7	31.5	189.1	31.5
V	59.1	61.0	180.2	91.5	61.0	30.5	29.6	177.3	29.6
VI	56.9	57.4	171.5	86.1	57.4	28.7	28.5	170.8	28.5
VII	59.7	56.1	173.6	84.1	56.1	28.0	29.8	179.0	29.8
VIII	76.8	64.0	211.2	96.0	64.0	32.0	38.4	230.4	38.4
IX	50.7	43.7	141.6	65.5	43.7	21.8	25.4	152.2	25.4
X	62.0	54.1	174.1	81.2	54.1	27.1	31.0	185.9	31.0
XI	58.6	65.5	186.1	98.2	65.5	32.7	29.3	175.8	29.3
XII	78.1	53.3	197.1	79.9	53.3	26.6	39.1	234.4	39.1

Note :The above structures dimensions of deepwell are referred to Figure G-32.

Table G-34 DEEPWELL PRODUCTION CAPACITY

(Unit : MCM/year)

	Municipal					Ind.	Irr.
WRR	*L-III*	*L-II*	*L-I*	*P/L-I*	*Comm'l*		
	WDs	*30lpcd*	*30lpcd*	*30lpcd*	*WRs*	*WRs*	*WRs*
	average	*300 cpf*	*150 cpf*	*50 cpf*	*average*	*average*	*average*
I	0.178275	0.003285	0.001643	0.000548	-	0.26674	0.07623
II	0.129520	0.003285	0.001643	0.000548	-	0.17676	0.18281
III	0.386890	0.003285	0.001643	0.000548	0.06412	0.68616	0.41476
IV	0.178284	0.003285	0.001643	0.000548	0.13840	0.42086	0.36175
V	0.273269	0.003285	0.001643	0.000548	-	0.13560	0.22708
VI	0.440256	0.003285	0.001643	0.000548	0.08326	0.57561	0.91242
VII	1.558245	0.003285	0.001643	0.000548	0.06307	1.53296	0.26141
VIII	0.155649	0.003285	0.001643	0.000548	0.17881	0.83697	0.24535
IX	0.783404	0.003285	0.001643	0.000548	-	0.08801	0.38198
X	0.736215	0.003285	0.001643	0.000548	-	0.27229	0.37339
XI	0.883611	0.003285	0.001643	0.000548	-	0.66649	0.55377
XII	0.293954	0.003285	0.001643	0.000548	-	0.24480	0.27382

Table G-35 DW DEVELOPMENT NEEDS TO MEET THE MUNICIPAL DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	57.5	8.5	49.0	31.0	18.0	71.5	8.5	63.0	40.2	22.7	88.0	8.5	79.5	51.3	28.2	107.0	8.5	98.5	65.3	33.2	127.4	8.5	118.9	81.2	37.7	150.1	8.5	141.6	102.7	38.9
II	50.7	6.1	44.5	26.7	17.8	64.8	6.1	58.7	35.5	23.1	81.5	6.1	75.4	46.7	28.7	100.2	6.1	94.1	61.2	32.9	119.4	6.1	113.3	77.3	36.0	140.2	6.1	134.1	90.6	37.5
III	280.0	12.5	267.5	169.6	98.0	359.5	12.5	347.0	222.6	124.4	449.6	12.5	437.2	285.8	151.4	542.0	12.5	529.6	362.1	167.5	603.8	12.5	591.3	437.3	154.0	672.5	12.5	660.0	509.2	150.8
IV	287.1	51.7	235.4	167.2	68.2	317.2	51.7	265.5	191.5	73.9	340.3	51.7	288.6	213.2	75.5	383.1	51.7	331.4	225.9	105.5	403.8	51.7	352.1	267.1	85.0	443.4	51.7	391.7	299.5	92.2
V	96.7	24.4	72.3	41.1	31.2	118.0	24.4	93.6	58.8	34.8	145.5	24.4	121.1	75.6	45.5	176.4	24.4	152.0	99.3	52.8	209.0	24.4	184.6	125.7	58.9	242.0	24.4	217.6	158.4	59.1
VI	142.6	21.3	121.2	67.9	53.3	189.7	21.3	168.4	99.7	68.7	247.2	21.3	225.9	138.1	87.8	314.1	21.3	292.8	188.1	104.6	387.7	21.3	366.4	245.3	121.1	471.3	21.3	450.0	317.7	132.3
VII	137.8	21.4	116.4	82.2	34.2	157.0	21.4	135.6	96.1	39.5	176.2	21.4	154.8	110.0	44.8	194.3	21.4	172.9	125.1	47.9	209.0	21.4	187.6	138.4	49.2	220.8	21.4	199.4	161.0	38.4
VIII	48.6	14.1	34.5	21.0	13.5	58.4	14.1	44.4	27.3	17.1	69.7	14.1	55.6	35.0	20.7	82.3	14.1	68.2	44.7	23.6	94.8	14.1	80.7	55.6	25.1	110.6	14.1	96.5	68.6	27.9
IX	78.5	17.9	60.6	38.2	22.3	95.5	17.9	77.6	49.5	28.1	115.3	17.9	97.4	62.9	34.5	137.1	17.9	119.2	79.7	39.4	159.7	17.9	141.8	98.0	43.8	181.0	17.9	163.1	122.4	40.8
X	93.5	19.9	73.7	36.8	36.9	118.9	19.9	99.0	47.8	51.3	149.6	19.9	129.8	62.7	67.0	191.9	19.9	172.1	89.8	82.2	239.6	19.9	219.8	127.3	92.4	288.1	19.9	268.2	179.7	88.5
XI	85.4	9.5	75.9	56.6	19.2	92.3	9.5	82.9	62.7	20.2	99.5	9.5	90.0	66.7	23.3	107.1	9.5	97.6	71.4	26.2	113.2	9.5	103.7	76.1	27.6	119.1	9.5	109.6	88.4	21.2
XII	100.5	20.9	79.6	38.4	41.2	147.8	20.9	126.8	64.4	62.4	201.1	20.9	180.2	103.6	76.6	264.6	20.9	243.6	150.8	92.8	317.9	20.9	297.0	206.3	90.7	371.5	20.9	350.6	256.4	94.2
Nation	1,458.7	228.2	1,230.6	776.7	453.9	1,790.5	228.2	1,562.3	996.1	566.2	2,163.6	228.2	1,935.5	1,251.5	683.9	2,600.1	228.2	2,372.0	1,563.4	808.6	2,985.3	228.2	2,757.1	1,935.6	821.5	3,410.5	228.2	3,182.4	2,360.6	821.8

Table G-36 DW DEVELOPMENT NEEDS TO MEET THE L-III DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	34.1	5.8	28.3	16.2	12.1	46.1	5.8	40.3	24.2	16.1	61.3	5.8	55.5	34.1	21.4	79.6	5.8	73.8	47.1	26.7	100.8	5.8	95.0	62.3	32.7	124.9	5.8	119.1	83.1	36.0
II	14.1	1.0	13.1	5.3	7.8	23.7	1.0	22.7	11.3	11.4	36.2	1.0	35.2	19.3	15.9	51.4	1.0	50.4	30.3	20.1	69.2	1.0	68.2	43.4	24.8	89.3	1.0	88.3	59.8	28.5
III	194.4	5.4	189.0	111.8	77.2	270.4	5.4	265.0	162.0	103.0	359.8	5.4	354.3	223.5	130.8	456.3	5.4	450.9	299.7	151.2	528.1	5.4	522.7	378.3	144.4	610.1	5.4	604.7	454.6	150.1
IV	157.1	38.6	118.5	75.2	43.3	183.6	38.6	145.1	101.6	43.5	211.8	38.6	173.2	121.9	51.3	235.9	38.6	197.3	144.2	53.1	252.2	38.6	213.6	160.8	52.8	247.6	38.6	209.0	184.3	24.7
V	50.5	15.9	34.7	14.5	20.1	66.0	15.9	50.2	29.7	20.4	89.5	15.9	73.6	42.5	31.1	117.3	15.9	101.4	63.0	38.4	149.4	15.9	133.6	86.6	47.0	182.5	15.9	166.7	116.6	50.1
VI	78.2	7.4	70.8	32.8	38.0	121.6	7.4	114.2	60.7	53.5	177.4	7.4	170.0	96.9	73.2	245.0	7.4	237.6	145.8	91.8	323.7	7.4	316.3	203.5	112.8	414.8	7.4	407.4	276.9	130.5
VII	83.7	11.2	72.5	50.8	21.8	99.7	11.2	88.5	62.2	26.4	118.0	11.2	106.8	74.2	32.6	137.7	11.2	126.5	88.8	37.7	158.2	11.2	147.0	103.4	43.6	177.5	11.2	166.3	128.2	38.2
VIII	10.3	3.5	6.8	2.4	4.4	16.1	3.5	12.6	5.8	6.7	23.8	3.5	20.3	10.7	9.5	33.6	3.5	30.1	17.5	12.6	45.8	3.5	42.3	26.1	16.2	64.8	3.5	61.3	37.2	24.1
IX	40.5	8.5	32.0	18.8	13.2	54.3	8.5	45.8	27.4	18.4	72.4	8.5	64.0	38.7	25.3	94.7	8.5	86.3	54.3	32.0	121.3	8.5	112.9	73.0	39.9	146.8	8.5	138.3	99.0	39.4
X	54.0	9.3	44.7	17.0	27.7	76.0	9.3	66.7	25.4	41.3	104.7	9.3	95.4	38.1	57.4	146.8	9.3	137.5	63.7	73.8	196.8	9.3	187.5	101.0	86.5	248.1	9.3	238.8	153.4	85.4
XI	48.9	1.9	47.0	38.6	8.4	51.7	1.9	49.8	40.3	9.5	55.1	1.9	53.1	41.4	11.7	58.8	1.9	56.8	43.0	13.8	62.8	1.9	60.9	44.4	16.5	67.3	1.9	65.4	53.4	12.0
XII	41.7	6.7	35.0	7.8	27.2	82.0	6.7	75.3	30.0	45.3	130.4	6.7	123.7	64.3	59.4	192.2	6.7	185.5	107.6	77.9	248.8	6.7	242.2	161.5	80.6	308.2	6.7	301.5	211.8	89.8
Nation	807.5	115.1	692.4	391.3	301.2	1,091.3	115.1	976.2	580.7	395.6	1,440.2	115.1	1,325.1	805.5	519.6	1,849.2	115.1	1,734.1	1,105.0	629.1	2,257.3	115.1	2,142.2	1,444.3	697.8	2,681.9	115.1	2,566.8	1,858.0	708.7

Table G-37 DW DEVELOPMENT NEEDS TO MEET THE L-I & II DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	17.2	2.5	14.7	9.5	5.2	19.8	2.5	17.3	11.4	5.9	22.3	2.5	19.8	13.2	6.5	23.8	2.5	21.3	15.2	6.0	23.6	2.5	21.2	16.5	4.6	22.4	2.5	19.9	17.3	2.7
II	26.4	5.1	21.3	12.5	8.8	32.1	5.1	27.0	16.5	10.4	37.9	5.1	32.8	20.7	12.1	42.8	5.1	37.7	25.5	12.2	45.4	5.1	40.3	29.8	10.6	47.1	5.1	41.9	33.0	9.0
III	58.6	7.1	51.6	34.7	16.9	65.5	7.1	58.5	39.9	18.6	69.4	7.1	62.4	44.6	17.8	68.5	7.1	61.4	47.6	13.8	62.1	7.1	55.0	46.8	8.2	50.3	7.1	43.2	43.2	0.0
IV	58.7	12.5	46.2	28.5	17.6	68.6	12.5	56.0	35.8	20.3	76.9	12.5	64.4	42.9	21.4	112.6	12.5	100.1	49.7	50.4	118.6	12.5	106.1	80.4	25.7	120.8	12.5	108.2	87.9	20.3
V	34.9	8.5	26.4	17.4	9.0	42.7	8.5	34.2	20.4	13.8	48.3	8.5	39.8	26.2	13.6	52.9	8.5	44.3	30.8	13.5	54.3	8.5	45.7	34.7	11.0	54.5	8.5	46.0	37.4	8.6
VI	46.5	11.9	34.6	22.6	12.1	52.2	11.9	40.3	26.8	13.5	56.1	11.9	44.2	30.8	13.4	57.6	11.9	45.8	33.9	11.9	54.2	11.9	42.3	35.3	7.1	47.7	11.9	35.8	34.3	1.5
VII	39.7	9.8	30.0	19.7	10.3	44.5	9.8	34.7	23.2	11.5	47.5	9.8	37.7	26.5	11.2	48.0	9.8	38.2	28.8	9.4	43.8	9.8	34.0	29.3	4.6	37.1	9.8	27.3	27.3	0.0
VIII	29.6	10.3	19.3	11.4	7.9	34.5	10.3	24.2	15.0	9.2	39.4	10.3	29.1	18.6	10.6	42.9	10.3	32.6	22.6	10.0	44.0	10.3	33.8	25.7	8.1	41.1	10.3	30.8	27.5	3.3
IX	27.6	9.4	18.1	11.1	7.0	31.7	9.4	22.3	14.1	8.2	35.1	9.4	25.7	17.1	8.6	35.9	9.4	26.5	19.8	6.7	33.3	9.4	23.8	20.6	3.3	29.8	9.4	20.4	19.2	1.2
X	28.2	10.6	17.6	10.8	6.8	32.7	10.6	22.1	13.7	8.4	36.3	10.6	25.7	16.9	8.8	38.2	10.6	27.6	19.9	7.7	37.3	10.6	26.7	21.5	5.2	35.1	10.6	24.5	21.6	2.8
XI	27.5	7.3	20.2	11.4	8.8	32.7	7.3	25.4	15.7	9.8	36.2	7.3	30.9	19.5	11.4	42.8	7.3	35.5	24.1	11.5	45.7	7.3	38.4	28.0	10.4	47.1	7.3	39.9	31.4	8.5
XII	42.7	12.5	30.1	18.6	11.5	50.8	12.5	38.3	23.4	14.9	58.3	12.5	45.7	29.4	16.3	61.7	12.5	49.2	35.5	13.7	60.2	12.5	47.7	38.5	9.2	55.2	12.5	42.7	38.7	3.9
Nation	437.7	107.5	330.1	208.2	122.0	507.9	107.5	400.3	255.8	144.5	565.6	107.5	458.1	306.5	151.6	627.7	107.5	520.1	353.4	166.7	622.5	107.5	515.0	407.1	107.9	588.1	107.5	480.6	418.9	61.7

Table G-38 DW DEVELOPMENT NEEDS TO MEET THE P/L-I DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	6.0	0.0	6.0	5.3	0.7	5.3	0.0	5.3	4.6	0.7	4.2	0.0	4.2	4.0	0.3	3.4	0.0	3.4	3.0	0.4	2.8	0.0	2.8	2.4	0.4	2.6	0.0	2.6	2.3	0.2
II	10.1	0.0	10.1	8.9	1.2	9.0	0.0	9.0	7.7	1.3	7.4	0.0	7.4	6.8	0.6	6.0	0.0	6.0	5.3	0.6	4.8	0.0	4.8	4.1	0.7	3.9	0.0	3.9	3.9	0.0
III	26.6	0.0	26.6	22.8	3.8	23.1	0.0	23.1	20.4	2.8	20.1	0.0	20.1	17.4	2.7	16.9	0.0	16.9	14.6	2.3	13.2	0.0	13.2	11.9	1.3	11.7	0.0	11.7	11.1	0.6
IV	62.4	0.0	62.4	56.8	5.6	56.1	0.0	56.1	47.8	8.3	42.8	0.0	42.8	42.1	0.7	25.7	0.0	25.7	25.7	0.0	24.0	0.0	24.0	19.6	4.4	66.2	0.0	66.2	20.4	45.8
V	11.3	0.0	11.3	9.2	2.0	9.2	0.0	9.2	8.7	0.6	7.7	0.0	7.7	6.9	0.8	6.3	0.0	6.3	5.5	0.8	5.3	0.0	5.3	4.4	0.9	4.9	0.0	4.9	4.5	0.4
VI	15.4	0.0	15.4	12.2	3.2	13.5	0.0	13.5	11.9	1.6	11.3	0.0	11.3	10.1	1.2	9.0	0.0	9.0	8.2	0.8	7.4	0.0	7.4	6.3	1.1	6.5	0.0	6.5	6.1	0.3
VII	13.8	0.0	13.8	11.7	2.2	12.2	0.0	12.2	10.6	1.6	10.2	0.0	10.2	9.2	1.1	8.1	0.0	8.1	7.4	0.7	6.5	0.0	6.5	5.6	1.0	5.6	0.0	5.6	5.5	0.2
VIII	8.0	0.0	8.0	6.9	1.1	7.2	0.0	7.2	6.2	1.1	5.9	0.0	5.9	5.4	0.4	5.1	0.0	5.1	4.2	0.9	4.3	0.0	4.3	3.6	0.7	4.0	0.0	4.0	3.6	0.4
IX	10.4	0.0	10.4	8.3	2.1	9.5	0.0	9.5	8.0	1.5	7.8	0.0	7.8	7.1	0.6	6.4	0.0	6.4	5.6	0.8	5.1	0.0	5.1	4.5	0.6	4.4	0.0	4.4	4.2	0.2
X	11.3	0.0	11.3	9.0	2.4	10.2	0.0	10.2	8.7	1.5	8.6	0.0	8.6	7.7	0.9	7.0	0.0	7.0	6.2	0.8	5.6	0.0	5.6	4.9	0.8	4.9	0.0	4.9	4.6	0.3
XI	8.7	0.0	8.7	6.6	2.1	7.6	0.0	7.6	6.7	0.9	6.0	0.0	6.0	5.7	0.2	5.2	0.0	5.2	4.3	1.0	4.4	0.0	4.4	3.7	0.7	4.3	0.0	4.3	3.6	0.7
XII	14.4	0.0	14.4	12.0	2.4	13.2	0.0	13.2	11.1	2.2	10.8	0.0	10.8	10.0	0.8	9.0	0.0	9.0	7.8	1.2	7.1	0.0	7.1	6.2	0.8	6.4	0.0	6.4	5.9	0.5
Nation	198.5	0.0	198.5	169.7	28.8	176.3	0.0	176.3	152.3	23.9	142.8	0.0	142.8	132.3	10.4	108.3	0.0	108.3	97.9	10.4	90.5	0.0	90.5	77.0	13.4	125.5	0.0	125.5	75.7	49.8

Table G-39 DW DEVELOPMENT NEEDS TO MEET THE COMM'L DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW		
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	0.4	0.0	0.4	0.3	0.1	0.4	0.0	0.4	0.3	0.1	0.4	0.0	0.4	0.3	0.1	0.4	0.0	0.4	0.3	0.1	0.4	0.0	0.4	0.3	0.1	0.4	0.0	0.4	0.3	0.1
IV	8.9	0.6	8.3	6.6	1.7	8.9	0.6	8.3	6.4	1.9	8.9	0.6	8.3	6.3	2.0	8.9	0.6	8.3	6.2	2.1	8.9	0.6	8.3	6.2	2.1	8.9	0.6	8.3	6.9	1.4
V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VI	2.4	2.0	0.3	0.3	0.1	2.4	2.0	0.3	0.3	0.1	2.4	2.0	0.3	0.3	0.1	2.4	2.0	0.3	0.2	0.1	2.4	2.0	0.3	0.3	0.1	2.4	2.0	0.3	0.3	0.1
VII	0.5	0.4	0.1	0.1	0.0	0.5	0.4	0.1	0.1	0.0	0.5	0.4	0.1	0.1	0.0	0.5	0.4	0.1	0.1	0.0	0.5	0.4	0.1	0.1	0.0	0.5	0.4	0.1	0.1	0.0
VIII	0.6	0.3	0.4	0.3	0.1	0.6	0.3	0.4	0.3	0.1	0.6	0.3	0.4	0.3	0.1	0.6	0.3	0.4	0.3	0.1	0.6	0.3	0.4	0.3	0.1	0.6	0.3	0.4	0.3	0.1
IX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XI	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0
XII	1.7	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0
Nation	15.0	5.5	9.5	7.6	1.9	15.0	5.5	9.5	7.3	2.2	15.0	5.5	9.5	7.2	2.3	15.0	5.5	9.5	7.1	2.4	15.0	5.5	9.5	7.1	2.4	15.0	5.5	9.5	7.9	1.6

Table G-40 DW DEVELOPMENT NEEDS TO MEET THE IND. (H) DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW			GW	SP	DW		
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	9.4	2.1	7.4	2.7	4.6	13.0	2.1	10.9	6.3	4.6	18.4	2.1	16.3	9.3	7.0	25.8	2.1	23.8	14.0	9.8	36.5	2.1	34.4	20.4	14.0	51.9	2.1	49.8	30.1	19.7
II	2.3	0.0	2.3	0.6	1.7	3.3	0.0	3.3	2.0	1.3	4.6	0.0	4.6	2.8	1.7	6.2	0.0	6.2	3.9	2.3	8.6	0.0	8.6	5.3	3.3	12.0	0.0	12.0	7.5	4.6
III	96.2	0.0	96.2	73.0	23.2	126.7	0.0	126.7	83.9	44.8	105.3	0.0	105.3	105.3	0.0	102.2	0.0	102.2	84.8	17.4	147.2	0.0	147.2	77.0	70.3	188.0	0.0	188.0	126.6	61.5
IV	171.2	0.1	171.1	171.1	0.0	189.1	0.1	189.0	165.3	23.7	161.3	0.1	161.1	141.9	19.2	221.8	0.1	221.7	126.3	95.4	190.7	0.1	190.6	173.6	16.9	198.7	0.1	198.5	171.2	27.3
V	5.6	0.8	4.9	0.7	4.2	7.2	0.8	6.4	4.2	2.2	9.4	0.8	8.6	5.5	3.2	12.4	0.8	11.6	7.4	4.3	16.6	0.8	15.8	9.9	5.9	22.9	0.8	22.1	13.6	8.5
VI	46.6	9.9	36.7	30.6	6.1	64.4	9.9	54.5	31.4	23.0	71.6	9.9	61.7	45.7	16.0	77.5	9.9	67.6	51.2	16.4	82.2	9.9	72.2	54.7	17.6	85.7	9.9	75.8	62.6	13.1
VII	88.6	2.1	86.5	73.6	12.9	156.9	2.1	154.8	74.1	80.6	171.0	2.1	168.8	130.3	38.6	238.3	2.1	236.2	140.8	95.4	238.4	2.1	236.3	196.7	39.5	231.3	2.1	229.2	205.3	23.9
VIII	38.8	3.7	35.1	14.3	20.8	51.5	3.7	47.8	30.1	17.7	69.9	3.7	66.2	40.5	25.7	95.7	3.7	92.0	56.4	35.6	132.2	3.7	128.5	78.2	50.3	184.5	3.7	180.9	112.2	68.7
IX	9.5	0.0	9.5	1.2	8.2	21.3	0.0	21.3	8.1	13.2	26.2	0.0	28.2	18.2	10.0	37.7	0.0	37.7	24.4	13.3	52.1	0.0	52.1	32.4	19.7	73.6	0.0	73.6	44.9	28.7
X	42.0	29.6	12.4	11.7	0.7	49.6	29.6	19.9	10.6	9.4	52.4	29.6	22.7	16.7	6.0	74.0	29.6	44.3	18.9	25.4	105.1	29.6	75.4	37.8	37.7	145.6	29.6	116.0	67.4	48.6
XI	15.8	0.0	15.8	13.7	2.0	18.5	0.0	18.5	13.5	5.0	25.4	0.0	25.4	15.4	10.0	34.5	0.0	34.5	21.2	13.3	46.4	0.0	46.4	28.7	17.7	64.0	0.0	64.0	41.3	22.6
XII	6.8	0.5	6.3	5.0	1.3	8.0	0.5	7.5	5.4	2.1	10.5	0.5	10.0	6.3	3.7	13.7	0.5	13.3	8.4	4.9	17.0	0.5	16.5	11.0	5.5	23.3	0.5	22.8	14.6	8.2
Nation	532.8	48.8	484.0	398.3	85.7	711.5	48.8	662.6	435.0	227.7	727.8	48.8	679.0	537.9	141.1	939.9	48.8	891.1	557.5	333.5	1,072.8	48.8	1,024.0	725.7	298.3	1,281.5	48.8	1,232.7	897.4	335.3

Table G-41 DW DEVELOPMENT NEEDS TO MEET THE IND. (L) DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	8.5	2.1	6.4	2.7	3.6	11.8	2.1	9.7	5.5	4.2	15.0	2.1	12.9	8.2	4.7	18.5	2.1	16.4	11.0	5.4	22.0	2.1	19.9	13.9	6.1	25.2	2.1	23.1	17.2	5.9
II	1.9	0.0	1.9	0.6	1.2	3.0	0.0	3.0	1.6	1.4	3.7	0.0	3.7	2.5	1.2	4.5	0.0	4.5	3.2	1.3	5.2	0.0	5.2	3.8	1.4	5.8	0.0	5.8	4.4	1.4
III	87.9	0.0	87.9	70.5	17.4	112.0	0.0	112.0	74.0	38.0	92.4	0.0	92.4	92.4	0.0	73.2	0.0	73.2	73.2	0.0	88.9	0.0	88.9	54.5	34.4	102.0	0.0	102.0	75.1	26.9
IV	167.6	0.1	167.4	167.4	0.0	144.4	0.1	144.2	131.7	12.6	157.8	0.1	157.7	132.4	25.3	203.3	0.1	203.2	123.6	79.5	181.2	0.1	181.1	157.6	23.5	184.0	0.1	183.9	163.6	20.2
V	3.9	0.8	3.1	0.7	2.5	6.5	0.8	5.7	2.7	3.0	7.7	0.8	6.9	4.9	2.0	8.9	0.8	8.1	5.9	2.2	10.0	0.8	9.2	6.8	2.4	11.1	0.8	10.3	7.8	2.5
VI	44.9	9.9	35.0	30.6	4.4	45.7	9.9	35.7	30.0	5.7	45.0	9.9	35.0	29.6	5.4	44.0	9.9	34.1	27.9	6.2	42.9	9.9	33.0	25.6	7.4	41.6	9.9	31.7	28.9	2.7
VII	85.8	2.1	83.7	73.6	10.1	141.7	2.1	139.5	71.7	67.8	139.6	2.1	137.4	117.2	20.2	170.7	2.1	168.5	113.1	55.5	199.0	2.1	196.9	136.5	60.3	224.9	2.1	222.8	171.1	51.7
VIII	34.5	3.7	30.8	14.3	16.5	46.5	3.7	42.8	26.4	16.4	57.1	3.7	53.4	36.2	17.2	68.5	3.7	64.9	45.1	19.8	79.8	3.7	76.1	54.1	22.0	89.6	3.7	85.9	65.4	20.5
IX	9.5	0.0	9.5	1.2	8.2	19.2	0.0	19.2	8.1	11.1	23.0	0.0	23.0	16.4	6.6	27.0	0.0	27.0	19.7	7.2	31.4	0.0	31.4	22.8	8.6	35.7	0.0	35.7	26.4	9.3
X	41.8	29.6	12.2	11.7	0.5	42.6	29.6	12.9	10.4	2.5	42.7	29.6	13.1	10.7	2.4	53.0	29.6	23.3	10.5	12.9	63.4	29.6	33.8	19.2	14.6	75.7	29.6	46.0	30.4	15.6
XI	15.5	0.0	15.5	13.7	1.8	16.7	0.0	16.7	13.3	3.4	20.7	0.0	20.7	13.9	6.8	24.7	0.0	24.7	17.0	7.6	28.0	0.0	28.0	19.9	8.1	31.0	0.0	31.0	24.9	6.2
XII	6.2	0.5	5.7	5.0	0.7	7.2	0.5	6.8	4.9	1.8	8.6	0.5	8.1	5.6	2.5	9.8	0.5	9.4	6.7	2.7	10.2	0.5	9.8	7.6	2.2	11.3	0.5	10.8	8.6	2.2
Nation	507.9	48.8	459.1	392.2	66.9	597.1	48.8	548.2	380.3	168.0	613.2	48.8	564.4	470.0	94.4	706.1	48.8	657.3	456.9	200.4	762.2	48.8	713.3	522.3	191.1	837.9	48.8	789.1	623.8	165.2

Table G-42 DW DEVELOPMENT NEEDS TO MEET THE IRR. DEMAND

(Unit : MCM/year)

WRR	2000					2005					2010					2015					2020					2025				
	GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW		GW	SP		DW	
	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.	Demand	Product.	Demand	Product.	Develop.
I	149.6	57.6	92.0	5.1	86.9	235.2	57.6	177.6	73.0	104.6	235.2	57.6	177.6	138.7	38.8	235.2	57.6	177.6	137.7	39.8	235.2	57.6	177.6	137.8	39.8	235.2	57.6	177.6	136.9	40.7
II	442.5	11.8	430.7	13.8	416.9	855.9	11.8	844.1	342.0	502.0	855.9	11.8	844.1	659.9	184.2	855.9	11.8	844.1	655.0	189.1	855.9	11.8	844.1	655.2	188.9	855.9	11.8	844.1	649.9	194.2
III	419.3	15.6	403.7	83.1	320.7	718.6	15.6	703.0	318.3	384.7	718.6	15.6	703.0	547.3	155.7	718.6	15.6	703.0	543.1	159.9	718.6	15.6	703.0	543.4	159.6	718.6	15.6	703.0	546.7	156.3
IV	130.0	26.6	103.4	15.5	87.8	213.8	26.6	187.2	81.7	105.5	213.8	26.6	187.2	145.9	41.3	213.8	26.6	187.2	144.8	42.3	213.8	26.6	187.2	144.9	42.3	213.8	26.6	187.2	145.1	42.1
V	117.5	12.0	105.5	10.8	94.7	209.4	12.0	197.4	83.5	113.9	209.4	12.0	197.4	154.1	43.3	209.4	12.0	197.4	152.9	44.5	209.4	12.0	197.4	153.0	44.4	209.4	12.0	197.4	152.6	44.8
VI	201.6	19.3	182.3	72.6	109.7	292.5	19.3	273.2	142.6	130.7	292.5	19.3	273.2	211.4	61.8	292.5	19.3	273.2	209.7	63.5	292.5	19.3	273.2	209.9	63.3	292.5	19.3	273.2	215.6	57.6
VII	73.8	59.3	14.5	3.7	10.7	83.5	59.3	24.2	11.4	12.8	83.5	59.3	24.2	18.8	5.4	83.5	59.3	24.2	18.7	5.5	83.5	59.3	24.2	18.7	5.5	83.5	59.3	24.2	18.9	5.3
VIII	27.5	7.7	19.8	1.4	18.4	45.6	7.7	37.9	15.7	22.2	45.6	7.7	37.9	29.6	8.3	45.6	7.7	37.9	29.4	8.5	45.6	7.7	37.9	29.4	8.5	45.6	7.7	37.9	29.2	8.7
IX	42.4	5.1	37.3	11.8	25.5	64.8	5.1	59.7	29.3	30.5	64.8	5.1	59.7	46.3	13.4	64.8	5.1	59.7	46.0	13.7	64.8	5.1	59.7	46.0	13.7	64.8	5.1	59.7	46.8	12.9
X	124.6	19.8	104.8	16.5	88.3	208.7	19.8	188.9	82.8	106.1	208.7	19.8	188.9	147.2	41.7	208.7	19.8	188.9	146.1	42.8	208.7	19.8	188.9	146.2	42.7	208.7	19.8	188.9	146.4	42.4
XI	63.6	35.6	28.0	4.4	23.6	86.1	35.6	50.5	22.1	28.4	86.1	35.6	50.5	39.3	11.1	86.1	35.6	50.5	39.0	11.4	86.1	35.6	50.5	39.1	11.4	86.1	35.6	50.5	39.1	11.3
XII	390.1	74.2	315.9	40.4	275.4	655.0	74.2	580.8	249.8	331.0	655.0	74.2	580.8	453.1	127.8	655.0	74.2	580.8	449.7	131.1	655.0	74.2	580.8	449.9	131.0	655.0	74.2	580.8	449.6	131.3
Nation	2,182.3	344.6	1,837.7	279.1	1,558.6	3,669.1	344.6	3,324.5	1,452.2	1,872.2	3,669.1	344.6	3,324.5	2,591.7	732.8	3,669.1	344.6	3,324.5	2,572.2	752.2	3,669.1	344.6	3,324.5	2,573.4	751.1	3,669.1	344.6	3,324.5	2,576.8	747.7

Table G-43 DW CONSTRUCTION NEEDS TO MEET THE L-III DEMAND

unit: well-5 year

WRR	2000	2005	2010	2015	2020	2025
I	68	90	120	150	183	202
II	60	88	123	155	191	220
III	200	266	338	391	373	388
IV	243	244	288	298	296	139
V	74	75	114	141	172	183
VI	86	122	166	209	256	296
VII	14	17	21	24	28	24
VIII	28	43	61	81	104	155
IX	17	23	32	41	51	50
X	38	56	78	100	118	116
XI	9	11	13	16	19	14
XII	93	154	202	265	274	305
Nation	*930*	*1,189*	*1,556*	*1,871*	*2,065*	*2,092*

Table G-44 DW CONSTRUCTION NEEDS TO MEET THE L-II DEMAND

unit: well-5 year

WRR	2000	2005	2010	2015	2020	2025
I	95	108	119	110	84	49
II	161	190	221	223	193	164
III	308	339	324	253	149	0
IV	322	370	392	920	470	371
V	164	252	248	247	201	157
VI	221	247	245	217	130	26
VII	188	211	204	171	85	0
VIII	145	168	193	183	148	60
IX	128	150	157	122	60	21
X	125	154	160	140	94	52
XI	161	179	208	209	189	155
XII	211	272	299	250	169	72
Nation	*2,229*	*2,640*	*2,770*	*3,045*	*1,972*	*1,127*

Table G-45 DW CONSTRUCTION NEEDS TO MEET THE L-I DEMAND

unit: well-5-year

WRR	2000	2005	2010	2015	2020	2025
I	2,984	3,398	3,738	3,460	2,636	1,521
II	5,057	5,962	6,920	6,986	6,039	5,132
III	9,660	10,624	10,159	7,925	4,684	0
IV	10,088	11,599	12,271	28,837	14,712	11,623
V	5,145	7,884	7,769	7,745	6,300	4,921
VI	6,917	7,731	7,662	6,801	4,059	830
VII	5,875	6,597	6,399	5,360	2,653	0
VIII	4,532	5,266	6,058	5,724	4,622	1,891
IX	4,007	4,711	4,905	3,811	1,883	673
X	3,902	4,823	5,024	4,386	2,948	1,620
XI	5,033	5,596	6,519	6,554	5,936	4,850
XII	6,607	8,535	9,355	7,829	5,280	2,243
Nation	*69,807*	*82,726*	*86,779*	*95,418*	*61,752*	*35,304*

Table G-46 DW CONSTRUCTION NEEDS TO MEET THE P/L-I DEMAND

unit: well/5 year

WRR	2000	2005	2010	2015	2020	2025
I	1,365	1,264	481	744	764	453
II	2,128	2,376	1,149	1,179	1,193	0
III	6,935	5,046	5,000	4,240	2,422	1,117
IV	10,148	15,121	1,300	0	8,044	83,585
V	3,692	1,017	1,489	1,425	1,724	804
VI	5,803	2,981	2,198	1,530	2,046	630
VII	3,929	2,865	1,955	1,335	1,736	289
VIII	2,082	1,972	800	1,592	1,334	804
IX	3,857	2,722	1,125	1,480	1,090	430
X	4,371	2,752	1,615	1,385	1,375	562
XI	3,793	1,650	444	1,795	1,277	1,318
XII	4,435	3,961	1,488	2,222	1,536	944
Nation	*52,538*	*43,727*	*19,044*	*18,927*	*24,541*	*90,936*

Table G-47 DW CONSTRUCTION NEEDS TO MEET THE COMM'L DEMAND

unit: well/5 year

WRR	2000	2005	2010	2015	2020	2025
I	0	0	0	0	0	0
II	0	0	0	0	0	0
III	1	1	1	2	1	1
IV	12	14	15	15	15	10
V	0	0	0	0	0	0
VI	1	1	1	1	1	1
VII	0	0	0	1	0	0
VIII	0	0	0	1	0	0
IX	0	0	0	0	0	0
X	0	0	0	0	0	0
XI	0	0	0	0	0	0
XII	0	0	0	0	0	0
Nation	*14*	*16*	*17*	*20*	*17*	*12*

Table G-48 DW CONSTRUCTION NEEDS TO MEET THE IND.(H) DEMAND

unit: well-5 year

WRR	2000	2005	2010	2015	2020	2025
I	17	17	26	37	52	74
II	10	7	10	13	19	26
III	34	65	0	25	102	90
IV	0	56	46	227	40	65
V	31	17	23	31	44	63
VI	11	40	28	28	31	23
VII	8	53	25	62	26	16
VIII	25	21	31	43	60	82
IX	94	150	114	152	224	326
X	2	34	22	93	138	178
XI	3	7	15	20	27	34
XII	5	9	15	20	22	33
Nation	*240*	*476*	*355*	*751*	*785*	*1,010*

Table G-49 DW CONSTRUCTION NEEDS TO MEET THE IND.(L) DEMAND

unit: well-5 year

WRR	2000	2005	2010	2015	2020	2025
I	14	16	18	20	23	22
II	7	8	7	7	8	8
III	25	55	0	0	50	39
IV	0	30	60	189	56	48
V	18	22	15	16	18	19
VI	8	10	9	11	13	5
VII	7	44	13	36	39	34
VIII	20	20	21	24	26	24
IX	94	126	75	82	98	106
X	2	9	9	47	54	57
XI	3	5	10	11	12	9
XII	3	8	10	11	9	9
Nation	*201*	*353*	*247*	*454*	*406*	*380*

Table G-50 DW CONSTRUCTION NEEDS TO MEET THE IRR. DEMAND

unit: well-5-year

WRR	2000	2005	2010	2015	2020	2025
I	1,140	1,372	509	523	522	534
II	2,281	2,746	1,008	1,034	1,033	1,062
III	773	927	375	385	385	377
IV	243	292	114	117	117	116
V	417	501	191	196	196	197
VI	120	143	68	70	69	63
VII	41	49	21	21	21	20
VIII	75	90	34	35	35	35
IX	67	80	35	36	36	34
X	236	284	112	115	114	114
XI	43	51	20	21	21	20
XII	1,006	1,209	467	479	478	479
Nation	*6,442*	*7,744*	*2,954*	*3,032*	*3,027*	*3,051*

Table G-51 SCOPE OF THE CONSTRUCTION COST ESTIMATION FOR GW DEVELOPMENT PROGRAM

Water Usage			Intake		Transmission		Treatment				Distribution		O/M
Category & Classification			*DW*	*Pump*	*BPS*	*PL*	*TP*	*CHL*	*Pump*	*PL*	*G/E-R*	*PL*	
Municipal	*Public*	Level-III	O	O		O		O			O	O	WDs
		Level-II	O	O		O		O			O	O	RWSA
		Level-I	O	O									BWSA
	Private	Level-I	O	O									-
		Comm'l	O	O									-
Industrial			O	O		O					O	O	-
Irrigation			O	O									-

Intake ; Water Source Intake Facility
Transmission ; Water Transmission Facility from Intake until Treatment Plant
Treatment ; Water Treatment Facility until Reservoir
Distribution ; Water Storage Facility until Distribution Main Pipeline
(Typical water supply systems are referred to Figure G-43)

Intake *DW* ; Deepwell, Pumping Test & Water Quality Analysis
Pump ; Pump House, Various Pump with Installation, Platform, Control Panel & Delivery Plumbing
Transmission *BPS* ; Collecting Reservoir, Pump House, Booster Pump & Control Panel **(to be required in necessary case of SW development)**
PL ; Transmission Pipeline with Control Valves **(to be required for water supplu systems & industry use)**
Treatment *TP* ; Coagulation, Sedimentation & Filtration **(to be required in case of SW development)**
CHL ; Chlorinator **(to be required for domestic use only, for Level-I well disinfection should be done by DOH)**
Pump ; Various Pumps with Control Panel **(to be required with TP)**
PL ; Pipeline (until Reservoir) with Control Valves **(to be required with TP)**
Distribution *G/E-R* ; Grand or Elevated Reservoir, Delivery Plumbing **(for well source, Elevated Reservoir will be required in most of case)**
PL ; Distribution Main only **(to be required for water supply systems & industrial use)**

O/M ; Operation & Maintenance
WD ; Water District
RWSA ; Rural Waterworks & Sanitation Association
BWSA ; Barangay Waterworks & Sanitation Association

Table G-52 DENR WATER QUALITY CRITERIA/WATER USAGE & CLASSIFICATION FOR FRESH WATER

Parameter	unit	*Class AA*	*Class A*	*Class B*	*Class C*	*Class D*
Color	PCU	15	50	-	-	-
Temp. (max. rise in deg. Celsisus)	C	-	3	3	3	3
pH (range)	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.0-9.0
Dissolved Oxygen	% satn	70	70	70	60	40
(minimum)	mg/L	5.0	5.0	5.0	5.0	3.0
5-day 20-C BOD	mg/L	1	5	5	7(10)	10(15)
Total Suspended Solids	mg/L	25	50	-	-	-
Total Dissolved Solids	mg/L	500	1,000	-	-	1,000
Surfactants (MBAS)	mg/L	nil	0.2(0.5)	0.3(0.5)	0.5	-
Oil/Grease (petroleum ether extract)	mg/L	nil	1	1	2	5
Nitrate as Nitrogen	mg/L	1	10	NR	10	-
Phosphate as Phosporous	mg/L	nil	0.10	0.20	0.40	-
Phenolic Substances as Phenols	mg/L	nil	0.002	0.005	0.020	-
Total Coliforms	MPN/100ml	50	1,000	1,000	5,000	-
or Fecal Coliforms	MPN/100ml	20	100	200	-	-
Chloride as Cl	mg/L	250	250	-	350	-
Copper	mg/L	1	1	-	0.05	-

Notes:

Class AA- Public Water Supply Class I. Intended for waters having watersheds which are uninhabited and otherwise protected and which require only approved disinfection in order to meet the national standards for drinking water.

Class A- Public Water Supply Class II. Sources of water supply that will require complete treatment (coagulation, sedimentation, filtration & disinfection) in order to meet the national drinking standards.

Class B- Recreational Water Class I. For primary contect recreation such as bathing, awiming, skin diving, etc. (particularly for tourism purposes).

Class C- Fishery Water for the propagation and growth of fish and other agnatic reasons; recreational (for boating, etc.); industrial water supply class I for manufacturing prosesses after treatment.

Class D- For aguriculture, irrigation, livestock watering, etc.; for industrial water supply class II (cooling, etc.); other inland waters by their quality, belong to this specification.

Table G-53 DEEPWELL CONSTRUCTION COST

unit; M.Peso/deepwell

WRR	Deepwell Depth in meter								Municipal					Indus.	Irriga.
	Municipal					*Indus.*	*Irriga.*		*L-III*	*L-II*	*L-I*	*P/L-I*	*Comm'l*		
	L-III	L-II	L-I	P/L-I	Comm'l			Cost A	0.005	0.003	0.002	0.002	0.002	0.005	0.004
ave.Dep	175.8	85.0	56.7	28.3	30.3	181.6	30.3	Cost B	1.000	0.200	0.150	0.100	0.100	1.000	0.150
I	103.3	53.8	35.9	17.9	16.5	99.1	16.5		1.896	0.506	0.257	0.156	0.152	1.682	0.250
II	156.6	91.6	61.1	30.5	21.7	129.9	21.7		2.229	0.665	0.316	0.184	0.164	1.856	0.273
III	218.6	91.0	60.6	30.3	42.5	255.2	42.5		2.616	0.662	0.315	0.184	0.212	2.561	0.370
IV	195.7	101.1	67.4	33.7	31.5	189.1	31.5		2.473	0.705	0.330	0.192	0.187	2.189	0.319
V	180.2	91.5	61.0	30.5	29.6	177.3	29.6		2.376	0.664	0.316	0.184	0.182	2.123	0.310
VI	171.5	86.1	57.4	28.7	28.5	170.8	28.5		2.322	0.642	0.307	0.180	0.180	2.086	0.305
VII	173.6	84.1	56.1	28.0	29.8	179.0	29.8		2.335	0.633	0.304	0.179	0.183	2.132	0.311
VIII	211.2	96.0	64.0	32.0	38.4	230.4	38.4		2.570	0.683	0.323	0.188	0.202	2.421	0.351
IX	141.6	65.5	43.7	21.8	25.4	152.2	25.4		2.135	0.555	0.275	0.165	0.173	1.981	0.290
X	174.1	81.2	54.1	27.1	31.0	185.9	31.0		2.338	0.621	0.300	0.176	0.185	2.170	0.316
XI	186.1	98.2	65.5	32.7	29.3	175.8	29.3		2.413	0.693	0.326	0.189	0.182	2.114	0.309
XII	197.1	79.9	53.3	26.6	39.1	234.4	39.1		2.482	0.616	0.298	0.176	0.204	2.443	0.354

Notes *Cost A* ; Well Drilling, Casing Installation, Well Materials & Labor, etc. (to be estimated by depth)

Cost B ; Mobilization, Well Development, Pumping Test, Water Quality Analysis & Demobilization, etc. (to be estimated by site)

Source ; DPWH standard price in 1995 for L-I, II, P/L-I, Comm'l & Irrigation

; LWUA standard price in 1995 for L-III & Industrial

Remarks 1) Indirect cost for water supply system was added into above cost, which was estimated by below ratios of total Direct Cost (Cost A+B).

L-III ; 25% (reference; 200 m of L-III deepwell depth)

L-II ; 40% (average; 40 m, 80 m & 120 m of L-II deepwell depth)

2) Indirect cost for well facility was added into above cost, which was estimated by Profit (10% of Cost A+B) & VAT (10% of Profit & Labor).

Labor: L-I ; 50% (average; 40 m & 80 m of L-I deepwell depth)

P/L-I ; 35% (reference; 40 m of L-I deepwell depth)

Comm'l ; 35% (reference; 40 m of L-I deepwell depth)

Indus. ; 15% (reference; 200 m of L-III deepwell depth)

Irriga. ; 45% (reference; 40 m of L-II deepwell depth)

Table G-54 INTAKE PUMP CONSTRUCTION COST

WRR	Standard Deepwell Characteristics											
	L-III		*L-II*		*L-I*	*P/L-I*	*Comm'l*		*Indus.*		*Irriga.*	
	Q(m3/d)	*Dep.(m)*	*Q(m3/d)*	*Dep.(m)*	*Q(m3/d)*	*Q(m3/d)*	*Q(m3/d)*	*Dep.(m)*	*Q(m3/d)*	*Dep.(m)*	*Q(m3/d)*	*Dep.(m)*
I	488	103.3	9	53.8	5	2	-	16.5	731	99.1	209	16.5
II	355	156.6	9	91.6	5	2	-	21.7	484	129.9	501	21.7
III	1,060	218.6	9	91.0	5	2	176	42.5	1,880	255.2	1,136	42.5
IV	488	195.7	9	101.1	5	2	379	31.5	1,153	189.1	991	31.5
V	749	180.2	9	91.5	5	2	-	29.6	372	177.3	622	29.6
VI	1,206	171.5	9	86.1	5	2	228	28.5	1,577	170.8	2,500	28.5
VII	4,269	173.6	9	84.1	5	2	173	29.8	4,200	179.0	716	29.8
VIII	426	211.2	9	96.0	5	2	490	38.4	2,293	230.4	672	38.4
IX	2,146	141.6	9	65.5	5	2	-	25.4	241	152.2	1,047	25.4
X	2,017	174.1	9	81.2	5	2	-	31.0	746	185.9	1,023	31.0
XI	2,421	186.1	9	98.2	5	2	-	29.3	1,826	175.8	1,517	29.3
XII	805	197.1	9	79.9	5	2	-	39.1	671	234.4	750	39.1

Direct Cost	*L-III*	*L-II*	*L-I*	*P/L-I*	*Comm'l*	*Indus.*	*Irriga.*
pump house	L.S.	L.S.	-	-	-	L.S.	-
	300,000	250,000	0	0	0	250,000	0
pump	sub.	sub.	HP	HP	self.	sub.	self.
level (PWL)	25%	15%	21,000	21,000	15%	25%	10%
power (18hr/d	=(PWL(m)/10.32+5)*Q(cum/d)/18hrs./60min.*3^0.5						
by kW	=PWL(m)*1,100+((75,000 or 35,000)+kW*9,500)+3,500						
platform	-	-	L.S.	L.S.	-	-	L.S.
	-	-	2,100	2,100	-	-	2,100
control panel	kW	kW	-	-	-	kW	-
by kW	=5,000+kW*1,500		0	0	0	-ditto-	0
delivery plumbing	L.S.	L.S.	-	-	L.S.	L.S.	-
	15,000	15,000	0	0	15,000	15,000	0
Indirect Cost	25%	35%	40%	40%	35%	25%	35%

Total (Peso/well)	**L-III**	**L-II**	**L-I**	**P/L-I**	**Comm'l**	**Indus.**	**Irriga.**
I	614,000	484,000	32,000	32,000	-	586,000	89,000
II	621,000	492,000	32,000	32,000	-	563,000	127,000
III	814,000	492,000	32,000	32,000	101,000	979,000	214,000
IV	670,000	494,000	32,000	32,000	121,000	738,000	191,000
V	715,000	492,000	32,000	32,000	-	567,000	144,000
VI	801,000	491,000	32,000	32,000	103,000	807,000	379,000
VII	1,424,000	491,000	32,000	32,000	98,000	1,356,000	156,000
VIII	666,000	493,000	32,000	32,000	136,000	1,043,000	153,000
IX	946,000	486,000	32,000	32,000	-	529,000	196,000
X	968,000	490,000	32,000	32,000	-	650,000	195,000
XI	1,070,000	494,000	32,000	32,000	-	863,000	256,000
XII	739,000	490,000	32,000	32,000	-	667,000	163,000

Source ; DPWH standard price in 1995 for L-I, II, P/L-I, Comm'l & Irrigation
; LWUA standard price in 1995 for L-III & Industrial

Remarks sub. ; submersible pump
self. ; self-priming pump
HP ; handpump
PWL ; production water level

Table G-55 TRANSMISSION PIPELINE CONSTRUCTION COST

unit, Thousand Peso-Deepwell

Water Supply Systems	Municipal								Industrial			
	L-III				*L-II*							
	Length		Diameter		Length		Diameter		Length		Diameter	
	P/S	L	GI	Cost	S/A	L	50VP	Cost	area	L	GI	Cost
	capita	m	mm	P(T)	sq.km	m	P	P(T)	ha.	m	mm	P(T)
I	3,002	730	53	477	1.79	378	117	44	13.3	664	40	380
II	2,310	1,111	50	707	3.73	545	117	64	8.8	440	48	275
III	5,349	978	88	823	0.78	248	117	29	31.2	1,709	68	1,268
IV	1,391	353	58	242	0.73	242	117	28	21.0	1,048	62	746
V	3,785	984	69	734	1.22	312	117	37	6.8	338	52	219
VI	6,346	1,166	88	985	1.05	289	117	34	28.7	1,434	103	1,312
VII	11,463	1,303	224	1,756	0.89	267	117	31	76.4	3,818	55	2,542
VIII	2,955	1,043	56	701	1.92	391	117	46	41.7	2,085	54	1,381
IX	9,730	1,596	422	1,587	1.57	354	117	41	4.4	219	63	157
X	11,072	1,953	124	1,961	2.13	411	117	48	13.6	678	63	486
XI	15,489	2,171	146	2,359	1.93	392	117	46	33.2	1,660	77	1,308
XII	4,679	1,248	73	959	1.83	382	117	45	12.2	610	56	412

Reference Statistics

	L-III		*L-II*
	UWC (lpcd)	Pop Density (c/sq.km)	Pop Density (c/sq.km)
I	162.70	448.58	167.49
II	153.62	149.11	80.40
III	198.48	444.94	386.95
IV	351.10	888.66	408.53
V	197.83	311.03	245.33
VI	190.06	371.89	285.66
VII	372.43	537.21	335.39
VIII	144.30	216.47	156.37
IX	220.60	304.27	191.12
X	182.18	231.02	141.15
XI	156.29	261.68	155.22
XII	172.12	239.17	163.85

Source ; DPWH standard price in 1995 for L-II
; LWUA standard price in 1995 for L-III & Industrial

Remarks
P/S ; Population served for L-III was estimated by Q & unit consumption.
L ; Pipeline length was estimated by width of expansion service area.
(sqkm/3.14)^0.5*500 or ha.*50
GI ; Pipeline diameter (L-II; 50VP) was estimated by pump power.
3kw+35=3*((PWL/10.32+5)*Q'18/60)*3^0.5+35
UWC ; Unit Water Consumption
lpcd ; liter per capita day
Pop-D ; Population Density was estimated by nation for L-II & by service municipality for L-III

Condition
L-III ; Unit water consumption was regional average of WDs.
; Population density of service area was regional average of WDs.
; GI pipeline cost was adopted.
=90*D^0.5
L-II ; Population served for L-II was 300 capita per deepwell source.
; Population density of service area was regional average of '95 census.
; PVC pipeline cost (P90/m with 30% of Labor) was adopted.
Indus. ; Service area was estimated by 55 cum/day per hector.
; GI pipeline cost was adopted.

Table G-56 CONSTRUCTION COST SUMMARY FOR GW DEVELOPMENT

unit: Peso

WRR	Municipal						Industrial	Irrigation
	L-III		*L-II*	*L-I*	*P/L-I*	*Comm'l*		
	Reservoir	Others	Total	Total	Total	Total	Total	Total
unit type	A	B	B	B	B	B	B	B
I	1,100,000	3,578,000	1,464,000	289,000	188,000	-	3,900,000	339,000
II	1,100,000	4,240,000	1,687,000	348,000	216,000	-	3,904,000	400,000
III	1,100,000	4,982,000	1,586,000	347,000	216,000	313,000	6,415,000	584,000
IV	1,100,000	3,882,000	1,628,000	362,000	224,000	308,000	5,071,000	510,000
V	1,100,000	4,519,000	1,611,000	348,000	216,000	-	4,097,000	454,000
VI	1,100,000	4,902,000	1,579,000	339,000	212,000	283,000	5,830,000	684,000
VII	1,100,000	6,617,000	1,562,000	336,000	211,000	281,000	8,147,000	467,000
VIII	1,100,000	4,617,000	1,656,000	355,000	220,000	338,000	6,497,000	504,000
IX	1,100,000	5,703,000	1,507,000	307,000	197,000	-	3,830,000	486,000
X	1,100,000	6,451,000	1,596,000	332,000	208,000	-	4,600,000	511,000
XI	1,100,000	7,186,000	1,667,000	358,000	221,000	-	5,908,000	565,000
XII	1,100,000	4,964,000	1,583,000	330,000	208,000	-	4,787,000	517,000

Notes: unit for A : Estimation per development value is 1,750 cum/day or 0.63875 M.cum/y.
B : Estimation unit is per Deepwell construction.
Estimation contents are addressed in Table G-51. Each cost is referred to Table G-53, G-54 and G-55, respectively.

Chlorinator cost was estimated P40,000 for L-III & P1,000 for L-II.
For L-III; chemical plunger pump with cylinder & switch box
For L-II; drip chlorinator with plastic tank for bleaching liquid

Elevated Reservoir cost was estimated P1,100,000 for L-III, industry & P350,000 for L-II.
For L-III; one reservoir will be constructed per every 1,750 cum/day development value
For L-II; one reservoir will be constructed per deepwell
For industry; one reservoir will be constructed per deepwell

Distribution pipeline was estimated under condition of below;
For L-III; pipeline will be connected to existing line, it will be 40% of Transmission cost
For L-II; pipeline will be newly constructed, it will be 180% of Transmission cost
For industry; pipeline will be newly constructed, it will be 40% of Transmission cost

Table G-57 MEDIUM-TERM PROGRAM COST FOR MUNICIPAL GWRDP

unit; Million Peso

WRR	2000	2005	2010	2015	2020	2025
I	1,522.3	1,727.3	1,811.7	1,883.8	1,739.3	1,380.8
II	2,758.7	3,301.4	3,578.2	3,753.3	3,537.6	3,044.9
III	6,468.3	6,816.7	7,028.8	6,276.4	4,492.0	2,433.1
IV	7,471.0	9,214.6	6,582.1	13,189.5	9,137.8	24,120.1
V	3,221.7	3,743.4	3,993.8	4,104.2	3,747.3	3,051.9
VI	4,411.9	4,333.5	4,390.8	4,155.7	3,464.9	2,131.7
VII	3,226.7	3,308.3	3,076.3	2,573.7	1,650.6	285.8
VIII	2,444.0	2,792.1	2,944.3	3,081.6	2,687.0	1,705.0
IX	2,302.9	2,371.6	2,190.6	1,934.2	1,242.3	676.3
X	2,696.6	2,852.2	2,861.4	2,740.4	2,324.5	1,633.4
XI	2,987.4	2,762.0	2,891.9	3,230.6	2,887.5	2,407.5
XII	3,945.8	4,913.6	4,975.0	4,891.2	3,828.2	2,719.6
Nation	43,457.3	48,136.8	46,324.8	51,814.5	40,738.8	45,590.1

Table G-58 MEDIUM-TERM PROGRAM COST FOR L-III GWRDP

unit; Million Peso

WRR	2000	2005	2010	2015	2020	2025
I	264.2	349.5	466.8	582.9	710.9	784.4
II	267.6	392.9	549.0	691.3	852.7	982.3
III	1,129.5	1,502.3	1,909.4	2,208.7	2,106.9	2,191.5
IV	1,018.1	1,022.0	1,206.0	1,248.1	1,240.4	582.5
V	369.6	374.1	569.1	703.2	858.7	912.8
VI	487.6	690.4	940.2	1,182.9	1,449.6	1,675.4
VII	130.0	157.6	195.1	223.7	260.1	224.8
VIII	137.0	210.6	298.1	396.0	507.7	757.4
IX	120.1	163.1	226.5	288.8	359.1	353.4
X	292.4	432.8	602.2	772.7	909.7	895.7
XI	79.0	95.5	113.2	139.2	165.1	121.5
XII	509.0	842.6	1,105.0	1,449.7	1,498.7	1,669.1
Nation	4,804.0	6,233.5	8,180.6	9,887.1	10,919.5	11,150.8

Table G-59 MEDIUM-TERM PROGRAM COST FOR L-I & II GWRDP

unit; Million Peso

WRR	2000	2005	2010	2015	2020	2025
I	1,001.5	1,140.1	1,254.5	1,161.0	884.8	511.3
II	2,031.4	2,395.3	2,781.0	2,807.3	2,427.2	2,062.6
III	3,840.5	4,224.2	4,039.0	3,151.2	1,861.7	-
IV	4,176.1	4,801.2	5,080.3	11,936.8	6,090.9	4,811.5
V	2,054.7	3,149.6	3,103.1	3,093.2	2,516.2	1,965.4
VI	2,693.8	3,010.8	2,984.3	2,648.2	1,581.3	322.4
VII	2,267.7	2,546.2	2,468.7	2,068.1	1,024.2	-
VIII	1,849.0	2,147.6	2,470.2	2,335.1	1,885.9	770.7
IX	1,423.0	1,672.3	1,742.4	1,353.8	668.5	238.3
X	1,495.0	1,847.0	1,923.3	1,679.6	1,128.8	620.8
XI	2,070.2	2,301.8	2,680.5	2,694.7	2,440.2	1,994.7
XII	2,514.3	3,247.1	3,560.5	2,979.3	2,009.9	854.2
Nation	27,417.1	32,483.3	34,087.9	37,908.3	24,519.4	14,151.9

Table G-60 MEDIUM-TERM PROGRAM COST FOR P/L-I & COMM'L GWRDP

unit; Million Peso

WRR	2000	2005	2010	2015	2020	2025
I	256.6	237.6	90.4	139.9	143.6	85.2
II	459.6	513.2	248.2	254.7	257.7	-
III	1,498.3	1,090.2	1,080.3	916.5	523.5	241.6
IV	2,276.8	3,391.4	295.8	4.6	1,806.5	18,726.1
V	797.5	219.7	321.6	307.8	372.4	173.7
VI	1,230.5	632.3	466.3	324.6	434.0	133.8
VII	829.0	604.5	412.5	282.0	366.3	61.0
VIII	458.0	433.8	176.0	350.6	293.5	176.9
IX	759.8	536.2	221.6	291.6	214.7	84.7
X	909.2	572.4	335.9	288.1	286.0	116.9
XI	838.3	364.7	98.1	396.7	282.2	291.3
XII	922.5	823.9	309.5	462.2	319.5	196.4
Nation	11,236.2	9,420.0	4,056.3	4,019.1	5,299.9	20,287.5