

**5. EXISTING SECTOR ARRANGEMENT AND INSTITUTIONAL CAPACITY**

**5.2 Sector Reforms**

**A. IMPLEMENTATING RULES AND REGULATIONS**

**IMPLEMENTATING RULES AND REGULATIONS OF  
NEDA BOARD RESOLUTION NO.4 (SERIES OF 1994), CLAUSE (G)**

**PREFACE**

The following Implementing Rules and Regulations (IRR) of Clause (g) of NEDA Board Resolution No. 4 (series of 1994) was prepared with assistance from the World Bank, upon request of the Philippine Government, through the Department of the Interior and Local Government (DILG). It is an update of the earlier draft prepared in August 1995 and incorporates the developments that have occurred in the sector since that time. The intention is to provide a comprehensive and consistent set of IRR that reflects evolving policies in the sector to address basic service deficits. In particular, it attempts to translate the global sectoral principles of managing water as an economic good and managing services at the most appropriate level, into rules and regulations that can be understood and implemented by the local government units. This IRR reflects the following policies currently being developed by the Government:

- a. Encouraging LWUA lending rates to local water districts to be aligned to market rates;
- b. Providing national government grants for source development of Level I systems in support of a national objective of poverty alleviation;
- c. Developing a national sector plan that will provide the basis for provinces and cities/municipalities to plan and implement water and sanitation investments based on what communities want and are willing to pay for;
- d. Instituting a framework for economic regulation of the water supply and sanitation sector and defining the role of the LGU in this framework; and
- e. Instituting a system of public performance audit of public and private water utilities, so that consumers feedback on service coverage and reliability is available at the national and local levels of Government.

A major development was the creation of the Presidential Task Force on Water Resources Development and Management in October 1996, which has the objective of streamlining the regulatory environment of the sector, that is, linking resource regulation with the economic regulation aspects. A proposed bill prepared by the Task Force has been filed with Congress in July 1997 for the creation of a Water Resources Authority of the Philippines (WRAP) to undertake these regulatory functions, among others. Once this is approved by Congress and passed into law, the IRR may have to be revised to reflect the major institutional changes, particularly with regard to the roles of national government agencies in the sector.

**RULE 1**  
**PURPOSE AND OBJECTIVES**

**Article 1. Title.** These rules shall be known as the Implementing Rules and Regulations of clause (g) of NEDA Board Resolution No. 4, (series of 1994).

**Article 2. Purpose.** The purpose of these rules and regulations is to implement clause (g) of NEDA Board Resolution No. 4, (series of 1994), and is in support of NEDA Board Resolution No. 6, (series of 1996) which defines the executing agency arrangement for devolved infrastructure activities/facilities, including water supply, where national government assistance is provided. Clause (g) of NEDA Board Resolution No. 4 (series of 1994) states that:

*“Level I (point source system), Level II (command faucet) and Level III (house connections water supply projects may be implemented by the concerned LGUs within their jurisdiction. LWUA shall implement only financially viable Level III water supply projects in areas outside the MWSS jurisdiction. DILG’s participation will consist of general administration and institution building, such as assistance to LGUs in the formation of Rural and/or Barangay Waterworks and Sanitation Associations (RWSAs/BWSAs) as well as in the identification of water supply systems. MWSS will be responsible for Level III water systems in Metro Manila and adjacent areas. DPWH, together with DILG and DOH, will provide technical assistance (within a period of about two years) to LGUs in the planning, implementation, and operation and maintenance of water supply facilities.”*

Annex C presents NEDA Board Resolution No. 6, (series of 1996).

**Article 3. Objectives.** The objectives of the Implementing Rules and Regulations are as follows:

- a. To definite the role of local government units (LGUs) in the provision of water supply services and the assistance to be made available to them by national government agencies concerned;

- b. To provide guidance to the LGUs in the development and implementation of viable and sustainable water supply projects, to the extent feasible, supporting the principles espoused by the sector of managing water as an economic good, promoting a demand-oriented approach in the provision of services and management to be made at the most appropriate level, and greater private sector participation in service delivery; and
- c. To identify institutional strengthening needs of LGUs to further develop their capacity to adequately perform their agreed functions in the sector.

## **RULE 2**

### **SCOPE**

**Article 4. Scope.** These Implementing Rules and Regulations shall apply to water supply projects to be implemented and managed by LGUs where national government assistance is provided.

## **RULE 3**

### **DEFINITION OF TERMS**

**Article 5. Definition of Terms.** For purpose of these Implementing Rules and Regulations, the following terms shall be construed to mean as follows:

- a. **Levels of Service.** Based on NEDA Board Resolution No. 12 (series of 1995), approving the common definition of terms relative to water supply, sewerage and on-site sanitation, levels of service are defined as follows:

**Level I (Point Source)** – a protected well or a developed spring with an outlet but without a distribution system; generally adaptable for rural areas where the houses are thinly scattered. A Level I facility normally serves an average of 15 households.

**Level II (Communal Faucet System or Standposts)** – a system composed of a source, a reservoir, a piped distribution network, and communal faucets. Usually, one faucet serves four to six households. It is generally suited for rural and urban fringe areas where houses are clustered densely to justify a simple piped system.

**Level III (Waterworks System or Individual House Connections)** – a system with a source, a reservoir, a piped distribution network and household taps. It is generally suited for densely populated urban areas.

- b. A financially viable water supply system refers to a system wherein its revenues can cover for all costs related to capital and operation and maintenance, including providing for reasonable reserves for future expansion. For those systems managed by water districts, a financially viable system is one that is able to generate revenues directly from user payments sufficient to cover all costs<sup>1</sup>. For LGU-managed directly systems, capital and operations and maintenance costs shall be recovered through a combination of user fees, general municipal taxes and other incomes available to the LGUs.

#### RULE 4 ROLE OF LOCAL GOVERNMENT UNITS

**Article 6. General.** The Local Government Code of 1991 mandates the decentralization and devolution of authority to LGUs in providing for certain basic services, which include safe potable water. At the local level, the LGUs are responsible for providing reliable water supply to their constituents, whether these are in the form of Levels I, II or III systems, depending on the expressed demand by the community for these services. LGUs may both directly provide and finance these services, or involve the private sector to participate in both provision and financing through concession, management or service contracts.

**Article 7. Financing and Cost Recovery.** In financing water supply investments, the LGUs may tap their Internal Revenue Allotment and/or locally generated revenues, or leverage these resources to borrow from government and private financial institutions. The amount that an LGU can borrow, including the required equity, is dependent on its current and expected revenue performance, as well as the amount of user charges and equity contributions from the community. The amount shall be a local decision of the LGUs concerned.

For any national government grant that may be provided for the development of Level I systems, the LGU and beneficiaries, concerned shall be required to provide any remaining amount as equity to the

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<sup>1</sup> The Department of Finance is considering aligning the LWUA lending rates to local water districts toward market rates to allow for a more efficient use of scarce resources, as well as to provide for consistent policy on lending to LGUs by government financial institutions.

investment. No subsidies from the national government shall be provided for Levels II and III systems.<sup>2</sup>

In providing for Level III service, the LGUs may opt to form a water district or an LGU company, provide a franchise to a private party or participate in a joint venture with a private party. Except in areas with water districts, LGUs shall maintain overall responsibility for ensuring consumer satisfaction through the exercise of institutional and/or contractual regulatory powers over local water utilities<sup>3</sup>, in collaboration with other national regulatory agencies, and by instituting a system of public performance audit.

Cost recovery through user payments shall be encouraged for both capital and operation and maintenance costs. However, at the minimum, user payments shall be required to cover the operation and maintenance costs in all services levels. For LGU- owned, operated and/or guaranteed systems, any shortfall in revenues required for loan repayment shall be financed by the LGU from its Internal Revenue Allotment and/or locally-generated revenues, following a process of negotiation between the LGU and the beneficiaries concerned on the level of user payments.

For systems managed by local water districts, full cost recovery, through user charges, is required by LWUA.

In areas where there are existing local water districts, LGUs may finance rehabilitation works and/or expansion of the existing waterworks system on the following conditions:

- a. The local water district concerned is not in LWUA's current program of assistance, that is, it is not included in any loan of LWUA with a financing institution, and
- b. Endorsement by the local water district concerned should have been secured.

In the event that the local water district is servicing a loan from LWUA, the local water district shall seek clearance from LWUA prior to entering into an agreement with the LGU concerned on any program of system expansion.

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<sup>2</sup> This policy has been approved by the Investment Coordination Committee of the NEDA Board.

<sup>3</sup> As per Presidential Decree No. 198 (Provincial Water Utilities Act), LWUA regulates the technical standards and the tariffs of local water districts, based on its requirement to issue a certificate of conformance on every loan disbursed to the latter. Source regulation is done by the National Water Resources Board. At the moment, there is no recourse by the LGU in case of non-performance by the local water district. This is an issue that needs to be addressed by Government.

**Article 8. Management of Systems.** LGUs shall adopt commercial principles in the operation and management of water utilities in order to provide cost-effective and reliable services to consumers, whether management of the system is a direct responsibility of the LGU or is contracted out by the LGU to the private sector. An LGU may also consider amalgamating or consolidating its system with that of its neighboring LGUs in order to benefit from economies of scale that could expand water supply services to consumers at the lowest possible cost.

For the operation and management of Level I and II systems, the LGUs shall initiate the formation of Barangay and Rural Waterworks and Sanitation Associations (BWSAs/RWSAs), respectively, through a participatory approach involving consultation with all stakeholders (Article 20) and assist in their registration with the appropriate authorities (Article 21). Upon request, LGUs may accredit duly registered RWSAs/BWSAs in order to enable them to avail of financial assistance from local governments. LGUs shall have an overall supervision of RWSAs and BWSAs.

**Article 9. Project Planning and Development.** Provinces and cities/municipalities shall be required to prepare, and update on an annual basis, provincial and city/municipal sector plans that are consistent with a national sector plan<sup>4</sup>. These sector plans shall be integrated into the local investment programs. Water supply projects shall be identified from the local investment program, a financing program of foreign and nationally/locally-generated resources, including private sector resources, shall support the local investment program.

**Article 10. Approval and Award of Contracts.** The LGUs shall be required to conduct public bidding, in accordance with the provisions of Law, including Presidential Decree No. 1594, as amended, Executive Order No.302 and other applicable laws, and shall have the final authority to approve and award contracts for water supply and sanitation projects within their jurisdictions.

**Article 11. Application for Water Rights.** LGUs or the concerned water utility shall apply for water rights from the National Water Resources Board prior to implementing a project that would require extraction of water.

**Article 12. Public Performance Audit.** The LGUs shall establish a system of public performance audit for public and private water utilities focusing on critical performance indicators. Upon request of the LGUs, DILG may provide technical assistance for this purpose, in coordination with appropriate national government agencies.<sup>5</sup>

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<sup>4</sup> ADB is assisting the preparation of a National Sector Plan for Water Supply, Sewerage and Sanitation for 1999-2004

<sup>5</sup> This system shall be pilot-tested in Metro Manila by the MWSS with World Bank financing.

**RULE 5**  
**ROLES OF NATIONAL GOVERNMENT AGENCIES**

**Article 13. Department of the Interior and Local Government (DILG).** The DILG shall have the following responsibilities in the sector:

- a. Raise awareness of LGUs on opportunities relating to the sector, within the framework of relevant government policies, such as financing schemes and available assistance from local and foreign financing institutions, technological breakthroughs, management and institutional arrangements, etc.;
- b. Facilitate transactions between LGUs and communities and lending institutions by preparing water supply investment packages, assisting in the financial, economic and institutional and environmental data collection and analysis, etc., in coordination with appropriate national government agencies;
- c. Build capacity of LGUs and BWSAs/RWSAs in the general areas of planning, implementation, management, monitoring and evaluation, and regulation, upon agreement with the LGUs, and as required by financing institutions, in coordination with national government agencies such as DPWH in the case of the engineering aspects;
- d. Develop and maintain a national data management system of LGU-managed water systems to include data on extent of service coverage, cost recovery, collection efficiency, size of water systems, nature of water resources, among others, in coordination with appropriate national government agencies;
- e. Establish a system for monitoring strategic performance of LGUs in relation to the sector, including compliance with technical standards established by LWUA and DPWH;
- f. Upon agreement with the LGU, provide technical assistance in the establishment of a system of public performance audit, in collaboration with appropriate national government agencies;
- g. Coordinate sector activities of LGUs vis-a-vis other national government documents and issue regular bulletins;

- h. Monitor the implementation of this IRR, including the formulation of monitoring and evaluation parameters and reporting requirements; and
- i. Act as the coordinator for projects funded by the National Government per NEDA Board Resolution No. 6 (series of 1996).

**Article 14. Local Water Utilities Administration (LWUA).** The LWUA shall have the following responsibilities in the sector:

- a. Act as a specialized lending institution for local water districts;
- b. Provide technical assistance to local water districts in the areas of operation, maintenance, personnel training and fiscal practices;
- c. Upon agreement with the LGU, provide technical and financial assistance in the conduct of engineering studies;
- d. Approve tariffs of local water districts;
- e. Establish and update, as and when necessary, the technical standards for local water utilities, including LGU-managed systems;
- f. Monitor and evaluate the performance of local water districts; and
- g. Registered RWSAs and furnish all registration documents to DILG.

**Article 15. Department of Public Works and Highways (DPWH).** The DPWH shall have the following responsibilities in the sector:

- a. Set and/or update, as and when necessary, technical standards for engineering surveys, design, construction and operation and maintenance of Level I systems;
- b. Upon agreement with the LGUs, assist in the conduct of engineering surveys and in the preparation of plans, specifications and programs of work, through its District Offices;
- c. Upon agreement with the LGUs, assist in construction management, through its District Offices; and



- d. Conduct technical researches in coordination with the LGUs.

**Article 16. Department of Health (DOH).** The DOH shall have the following responsibilities in the sector:

- a. Set and/or update, as and when necessary, standards on water quality testing, treatment and surveillance, and sanitary practices;
- b. Provide technical assistance to the LGUs in the conduct of periodic water quality control and surveillance-related activities; and
- c. Monitor and evaluate, on a regular basis, health and hygiene education programs implemented by local health offices, particularly in areas where waterworks systems are expected to be constructed.

**Article 17. National Water Resources Board (NWRB).** The NWRB shall have the following responsibilities in the sector:

- a. Regulate the use of water resources through the issuance of water rights;
- b. Regulate tariffs of privately-run water system; and
- c. Establish and manage a user-friendly water resources data management system.

**Article 18. Metropolitan Waterworks and Sewerage System (MWSS).** The MWSS shall be responsible for water systems in Metro Manila and its adjacent areas.

## **RULE 6**

### **RURAL/BARANGAY WATERWORKS AND SANITATION ASSOCIATIONS**

**Article 19. General Provision.** A Rural/Barangay Waterworks and Sanitation Association shall be formed to manage public water systems and sanitation facilities: RWSAs for Level II systems and BWSAs for Level I systems. RWSAs/BWSAs shall initiate/assist in site identification, planning, implementation and evaluation of water supply projects as well as guide the construction and/or maintenance of household and community latrines (toilets).

**Article 20. Organization of RWSAs/BWSAs.** RWSAs and BWSAs shall be organized upon initiation of the LGU. A participatory approach shall be adopted in the formation of RWSAs/BWSAs with the LGU concerned taking the lead and non-government organizations (NGOs) providing technical assistance, as necessary. Prior to the formation of RWSAs/BWSAs, dialogues shall be conducted with and among all stakeholders such as women's groups, civic and religious organization, health practitioners, NGOs and other people's organizations.

**Article 21. Registration Requirements.** RWSAs/BWSAs shall register with DILG. BWSAs shall be encouraged to associate with other BWSAs or the RWSAs prior to registration. DILG shall keep a record of all registration documents.

**Article 22. Powers.** Every duly registered RWSAs/BWSA shall be autonomous and shall have the power and capacity to:

- a. Award and enter into a contract(s) with private contractors for the delivery of necessary services or the supply of materials, in the course of managing a public water and sanitation facility, subject to existing laws, rules and regulations;
- b. Oversee the implementation of project undertaken by private contractors;
- c. Own and manage the operation of the water facility in a sustainable manner, including providing for adequate reserves for maintenance and repair, setting appropriate levels of user fees, and implementing billing and collection schemes;
- d. Handle the activities required of any lawful business transaction entered into by the Association;
- e. Enter into agreement with other RWSAs/BWSAs for any merger or consolidation as may be proven advantageous to their operations;
- f. Convene meetings of water users for the purpose of information dissemination, consultation, public hearing on water rates and other activities deemed important;
- g. Initiate improvements in operations found to be advantageous and favorable to the communities concerned;
- h. Decide on matters found to be advantageous and favorable to the communities concerned; and

- i. Prepare an annual report on its operations.

**Article 23. Capability Building of RWSAs/BWSAs.** RWSAs and BWSAs may request assistance for capability building from LGUs and/or DILG, DPWH and other concerned agencies, through the LGUs.

## RULE 7

### PROJECT DEVELOPMENT AND IMPLEMENTATION

**Article 24. Sector Planning.** Planning and development of water supply investment shall be made within the framework of national policies, and shall implement specific targets in the provincial and city/municipal sector plans. These plans shall define the strategies, policies and approaches in sector development at different levels of government. A National Sector Plan for Water Supply, Sewerage and Sanitation shall be prepared, and updated, on a regular basis, by the National Economic and Development Authority (NEDA), in coordination with the concerned oversight water agencies, and shall provide the national policy framework. At the provincial level, the LGUs, through their respective Provincial Planning and Development Offices, shall prepare, and update, on an annual basis, the Provincial Water Supply, Sewerage and Sanitation Sector Plans. At the city/municipal level, a similar sector plan shall be prepared and updated, on an annual basis, by the LGUs, through their City/Municipal Planning and Development Offices. The respective Local Councils shall approve the provincial and city/municipal sector plans.

**Article 25. Project Identification.** On the basis of the provincial and city/municipal sector plans, water supply investments shall be identified and developed into a local investment program that includes an appropriate financing plan. The Local Council concerned shall approve the local investment program. The proposed investments shall then be developed according to a demand-driven approach that would allow beneficiaries to select from among cost-effective technical options and from among financing options. The LGUs may avail of technical assistance from the DILG in the preparation of these project packages (Rule 5).

Water supply investment shall be developed to the principles of managing water services at the most appropriate level and providing services based on what local consumers want and are willing to pay for. This means that LGU systems shall be constructed on the basis of choosing among technical options that are affordable through the financial resources made available by users, communities and LGUs. The process of determining demand for a particular service delivery shall be concluded through a negotiated agreement between the LGU, water utility and the users, on how the costs will be shared at the town, barangay and household levels.

**Article 26. Technical Aspects.** Technically feasible options shall be developed, particularly for a Level II service level. These options may include varying levels of operation (in terms of operating hours), which may have substantial implications on capital and operating and maintenance costs. In addition, the operation and management (O&M) cost of a technical option is strongly influenced by the management mode chosen by an LGU, economies of scale factors and the size of the service area. Thus, for any Level III service, at least two technical options shall be explored; those of an inter-LGU service delivery organization involving amalgamation of service areas and of singled LGU management systems. The former option shall be explored and developed further only upon agreement with the LGU concerned.

In the conduct of the engineering work (i.e., feasibility studies and detailed design), the LGUs may tap the services of the private sector, using their internal resources or may request the DILG, DPWH and/or LWUA for financial and/or technical assistance.

**Article 27. Financing and Management Options.** A range of options is available to the LGUs on financing and management of Level III systems. They include, but are not limited to, the following options:

Options 1: The LGU may finance the system from its internal resources or may borrow from a financial institution. It may then create a **profit center within the LGU office** with a separate cost accounting system. Under this arrangement, the LGU may directly manage the system or may enter into a **management contract** with a private party or a **service contract** with a private party to handle billing and collection and/or repair and maintenance. In these types of management arrangements, the LGU retains the responsibility for providing the service and assumes the commercial risks. Institutions such as neighboring water districts, cooperatives and other private institutions may be tapped by the LGU for these types of contracts.

Option 2: The LGU may enter into a **lease contract** with private party to operate and manage the system. Under this arrangement, the LGU finances the capital expenditures from its internal resources or from borrowings. The LGU then leases the facility to a private party, which assumes the commercial risks and the responsibility for operation and maintenance. the private of the LGU, any other charges contributing to the repayment of a loan which the LGU may have taken on behalf of the users.

Option 3: The LGU may enter into **concession contract** with a private party. Under this arrangement, the private party assumes the operations and management of the assets of the LGU, and

undertakes to expand and finance the services according to the terms and conditions of the contract. The private party is then allowed to operate the system, and recover its costs and earn a reasonable return on its investment from user fees. The private party also assumes the commercial risk. After the concession contract expires, the system reverts to the LGU, or may be contracted out again by the LGU.

Option 4: The LGU may create a **local water district**, in accordance with Presidential Decree No. 198, as amended.

Option 5: The LGU may form a **water company** to handle the provision of the service.

The LGU appoints the Board of Directors to be tapped from the private sector who would manage the company along commercial principles.

Options 6: The LGU may enter into contract with a private party under the **Build-Operate-Transfer scheme or any of its variants**, per Republic Act No. 6970, as amended, for the whole water system or a component of it (i.e., source development or distribution).

Option 7: The LGU may enter into a **joint venture agreement** with a private party in providing the service. Under this arrangement, both parties share in the risks of the project, as well as operate the water supply system through a shared management and organization structure.

In the contracts of LGUs with private parties, performance standards shall be stipulated including remedies for non-performance that are consistent with national regulatory laws.

The DILG, in its role of raising awareness of LGUs on opportunities in the sector, shall be responsible for informing the LGUs of these schemes, and in facilitating the implementation of the preferred option. **Annex D** provides a matrix of these various schemes.

## **RULE 8**

### **COORDINATION AND COLLABORATION MECHANISMS**

**Article 28. Inter-LGU Collaboration.** Provinces, cities, municipalities and barangays may assist, coordinate and collaborate with each other, as far as practicable, in the effort of improving the delivery of services to the Filipino people. The DILG shall take the lead in coordinating among the LGUs.

**Article 29. Coordination Between Local and National Governments.** LGUs may avail of the technical, financial and institutional expertise of national agencies like LWUA, DPWH, DILG, NWRB, DOH and DENR. DILG, as appropriate, shall coordinate with other national agencies on behalf of the LGUs.

#### **RULE 9**

#### **TRANSITION ARRANGEMENTS**

**Article 30. Ongoing Projects.** The DPWH, DOH and DILG shall continue to implement ongoing foreign-assisted Level I projects until the completion of such projects.

**Article 31. Pipeline Projects.** Projects in the pipeline shall conform to the provisions of this IRR to the extent possible.

#### **RULE 10**

#### **MISCELLANEOUS PROVISIONS**

**Article 32. Applicability Clause.** The application of this IRR shall be without prejudice to existing and future laws, rules, regulations, and/or international agreements entered into by the Philippine Government.

**Article 33. Effectivity of the IRR.** These Implementing Rules and Regulations shall take effect upon its approval by the NEDA Board, on recommendation by the Infrastructure Committee. It shall then be published in at least two national newspapers of general circulation.

Annex A

**NEDA Board Resolution No. 5 (series of 1998)**

**APPROVING THE IRR ON THE DELINEATION OF  
RESPONSIBILITIES IN THE DEVELOPMENT AND  
IMPLEMENTATION OF WATER  
SUPPLY PROJECTS**

On motion duly seconded,

**BE IT RESOLVED**, as it is hereby resolved, to approve as it is hereby approved, the Implementing Rules and Regulations (IRR) on the Delineation of Responsibilities in the Development and Implementation of Water Supply Projects.

**UNANIMOUSLY APPROVED, 17 March 1998.**

**NEDA Board Resolution No. 4 (series of 1994)**

**APPROVING THE RECOMMENDATION OF THE  
INFRASTRUCTURE  
COMMITTEE (INFRACOM) ON THE REFORMS IN THE WATER  
SUPPLY SECTOR**

On motion duly seconded,

**BE ITS RESOLVED**, as it is hereby resolved, to approve and confirm, as the same is hereby approved and confirmed the following recommendations of the INFRACOM:

- a. Registration with the National Water Resources board (NWRB) of all drilling and the extraction of water therefrom, irrespective of the use of extracted water and ownership of the land where the well is to be drilled. Amendment to Article 6 of the Water Code (PD No. 1067) shall be initiated by NWRB to this effect. Subsequently, NWRB shall formulate rules and regulations for the effective enforcement of this requirements within sixty (60) days after approval of the proposed amendment.
- b. Strengthening of the NWRB staff in order to effectively cope with the planning, monitoring and implementation activities of the water resources sector. NWRB shall submit an action plan to this effect to INFRACOM for review and endorsement to the President of the NEDA Board.
- c. Reorientation of the Local Water Utilities Administration (LWUA) to its original corporate mission as a "specialized lending institution" financing only viable water supply projects with tariff levels formulated towards full cost recovery. LWUA shall therefore upgrade its banking and finance expertise and immediately complete its financial restructuring. Further, it should radically improve its collection efficiency as well as its database and accounting systems.
- d. Privatization of all existing Water Districts (WDs) should be vigorously pursued whenever feasible and large commercially viable water services areas like Metro Manila, Cebu, Zamboanga, Davao should be formed or converted into SEC-style private water corporations, independent of LWUA and other government funding institutions by subject to regulation by NWRB.



- e. Procurement needs of WDs should be provided based on a competitive basis and not centrally imposed.
- f. LWUA shall submit an action plan to INFRACOM to effect the recommended reforms for review and endorsement.
- g. With respect to the delineation of responsibilities in the sector, NEDA Board Resolution No. 5 (series of 1998) is proposed to be amended to allow local government units (LGUs) to implement all levels of water supply projects consistent with government's decentralization and devolution process, mandating LWUA to implement only financially viable projects and further defining the roles of the agencies in the sector. The proposed amendment is as follows:

"Level I (point source system), Level II (communal faucet) and Level III (house connections?) water supply projects may be implemented by the concerned LGUs within their jurisdiction. LWUA shall implement only financially viable Level III water supply projects in areas outside the MWSS jurisdiction. DILG's participation will consist of general administration and institution building, such as assistance to the LGUs in the formation of Rural and/or Barangay Waterworks and Sanitation Associations (RWSAs/BWSAs) as well as in the identification of water supply systems. MWSS will be responsible for Level II water systems in Metro Manila and adjacent areas. DPWH, together with DILG and DOH, will provide technical assistance (within a period of about 2 years) to LGUs in the planning, implementation and operation and maintenance of water supply facilities".

**UNANIMOUSLY APPROVED, 15 March 1994.**

**NEDA Board Resolution No. 6 (series of 1996)**

**APPROVING THE RECOMMENDATIONS OF THE  
INFRASTRUCTURE COMMITTEE (INFRACOM) ON THE  
EXECUTING AGENCY ARRANGEMENT FOR THE DEVOLVED  
INFRASTRUCTURE ACTIVITIES/FACILITIES**

On motion duly seconded,

BE IT RESOLVED as it is hereby resolved, to approve and confirm as the same is hereby approved and confirmed, the following recommendations of INFRACOM on national government (NG) assistance to Local Government Units (LGUs) in the implementation of devolved infrastructure activities/facilities under the Local Government Code in support of national priority programs in order to ensure efficiency, effectivity and more focused implementation consistent with the Government's decentralization and devolution objectives:

- a. DILG, which has administrative supervision over LGUs, shall be the lead national government agency (NGA) to oversee/administer NG assistance to LGUs in the implementation of devolved infrastructure programs/projects with the collaboration/participation of other concerned agencies. The identification and formulation of infrastructure programs/projects devolved to LGUs proposed for NG assistance shall therefore be coordinated with DILG to rationalize their development;
- b. The implementation of identified devolved infrastructure programs/projects shall be undertaken by the LGUs with DILG providing assistance in institution, capacity and capability building of the LGUs and with DPWH and other technical agencies providing and transferring technical expertise to the LGUs as necessary. The levels of capacities and capabilities of LGUs shall be determined by the DILG in coordination and collaboration with DPWH and other concerned agencies to determine, among others, the extent of support and assistance that these national agencies should provide in order to effect the successful implementation of devolved NG-assisted infrastructure programs/projects;
- c. DILG, as the lead agency, shall include in its annual budget the financial requirements necessary for the implementation of the identified and approved devolved infrastructure programs/projects. This shall be without prejudice to any future funds arrangement that the national government may

adopt with regard to NG assistance to LGUs for devolved projects particularly funds source from foreign loans and grants;

- d. For on-going and already committed devolved infrastructure programs/projects with NG assistance, the same shall be implemented with the previously identified NGA as lead in order not to disrupt is prosecution. However, there shall be phasing in at DILG and LGUs in the implementation arrangements for these devolved infrastructure projects in accordance with the provisions of this Resolution for purposes of policy and operational consistency and thus, effect a smooth transition;
- e. To efficiency and effectively implement the provisions of this Resolution, the INFRACOM shall formulate and periodically review the guidelines, rules and regulations that will already define the specific roles of the various concerned agencies in the implementation of NG assistance to LGUs for devolved infrastructure activities/utilities as well as the appropriate implementing mechanisms. In addition, INFRACOM shall likewise formulate the criteria and program for phasing out NG assistance to LGUs for devolved infrastructure activities/facilities;
- f. To carry out its tasks, the INFRACOM may request for financial and technical assistance form participating government agencies as well as from multilateral and bilateral sources; and
- g. The provisions of this Resolution shall apply to all NG assistance for devolved infrastructure activities/utilities unless otherwise explicitly provided for under the existing and future laws, such as the General Appropriations Act (GAA).

**UNANIMOUSLY APPROVED, 12 March 1996.**

MATRIX OF FINANCING AND MANAGEMENT OPTIONS

<u>Option</u>	<u>Description</u>
LGU-Financed and Managed	The LGU finances the investment from its income and other resources available to it (e.g., URA, locally-generated taxes, grants) or borrows from a financial institution. It then establishes a profit center within the LGU office with a separate cost accounting system. Under this arrangement, the LGU directly manages the operations of the system. The LGU assumes the commercial risk.
Service Contract	The LGU finances the investment and directly operates and manages the system. It enters into contract with a private party to undertake billing and collection and/or repair and maintenance activities for a fee. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Management Contract	The LGU finances the investment and enters into contract with a private party to manage the system. The private party collects the water tariffs set by the LGU, operates and manages the system and in turn, is paid a management fee by the LGU. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Lease Contract	The LGU finances the capital expenditures and leases the facility to the private sector. The private sector assumes the commercial risks and the responsibility for operation and maintenance. To recover its costs, the private party is allowed to collect user fees as well as any other charges on behalf of the LGU.
Concession Contract	The LGU enters into contract with a private party to undertake the investment. The private party assumes the assets of the LGU and undertakes to expand the services according to the terms and conditions of the contract. The private party is allowed to operate the system and to collect user fees to recover its costs and earn a reasonable return on its investment. After the contract expires, the system reverts to the LGU or may be contracted out again by the LGU.
Creation of a Local Water District	The LGU may create a local water district. The local water district finances the investment from a loan from the Local Water Utilities Administration (LWUA) and operates and manages the system. The local water district is then supervised by LWUA.
LGU Company	The LGU may form a water company to handle the provision of the service. The water company shall be duly

registered with the Securities and Exchange Commission (SEC) and shall have share holdings which can be sold to the private sector in the future. The LGU appoints the board members to be selected from the private sector who would then manage the company along commercial principles.

**Build-Operate-Transfer or any of its variants (per RA 6970 as amended)**

Under the BOT scheme, the private sector finances the investment, operates it for a certain period of time after which the asset is transferred to the LGU. The private party is allowed to collect user fees to recover its costs and earn a reasonable rate of return on its investment. The LGU and the BOT proponent negotiate on the risk sharing.

**Joint Venture Agreement**

Under a joint venture agreement, the LGU and the private party share in the risks of the project and operate the system through a shared management and organizational structure.

**NEDA BOARD RESOLUTION**

**No. 5 (s. 1994)**

**APPROVING THE RECOMMENDATION  
OF THE INFRASTRUCTURE COMMITTEE  
(INFRACOM) ON THE NATIONAL POLICY,  
STRATEGY AND ACTION PLAN FOR  
URBAN SEWERAGE (LIQUID WASTE)  
AND SANITATION**

On motion duly seconded,

**BE IT RESOLVED**, as it hereby resolved to approve as the same is hereby approved and confirmed the following recommendations of the INFRACOM:

**A. NATIONAL POLICY**

1. Provision of improved sewerage/sanitation services in urban areas shall be considered a high priority.
2. On-site sanitation facilities for all urban households/establishments readily adaptable to further sewerage systems shall be required.
3. All new subdivisions/housing developments shall provide simplified or conventional sewerage system/sanitation facilities.
4. Conventional or low-cost sewerage for central business districts and for potentially high-income residential areas where economically and financially viable shall be provided.
5. Treatment of industrial as well as collected city/municipality wastewater to established standards set forth by the DENR prior to disposal into the drainage system shall be required.
6. Provision of services shall be based on consumer demand and willingness to pay.

**B. NATIONAL STRATEGY**

1. A sanitation/sewerage program and a Central Sanitation/Sewerage program Support Office (CPSO) to coordinate subsector activities at the national level and to assist LGUs to plan and manage sanitation/sewerage programs at the community level shall be established.

2. External sources of assistance shall be explored provided as may be appropriate to enable Municipal Development Fund (MDF) facility or other financing sources to extend loans to LGUs for sanitation and sewerage projects.
3. LGUs shall primarily be the implementors of the sanitation/sewerage programs with the national government providing assistance to develop their capacities in the following areas: community participation, sub-sector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, O&M, monitoring and reporting.

**C. ACTION PLAN**

1. A CPSO shall be created and housed at LWUA with the LWUA Board exercising over-all jurisdiction over its operations. An Inter-departmental Advisory Committee (IAC) composed of representatives from DPWH, DOH, DILG, DOF, DBM, LWUA, DENR, MWSS and NEDA shall likewise be created and act as the coordination body in the implementation and monitoring of urban sewerage and sanitation programs particularly the five (5) pilot areas (Davao City, Calamba, Dagupan City, Roxas City and Cotabato City). The representatives to the IAC shall preferably be Asst. Sec. or Dir. level. The Chairman of the IAC and the Dir. of the CPSO shall be appointed by the LWUA Board.
2. LWUA shall fully staff the CPSO from within its existing manpower as soon as possible. An international institutional development consultant shall be engaged to assist the CPSO to design and implement the activities. The CPSO shall exist for a period of about 3 to 5 years or until after its functions have been fully devolved to the LGUs.

**UNANIMOUSLY APPROVED, 15 March 1994.**

**Certified true copy:**

**FORTUNATO R. ABRENILLA**  
Acting Board Secretary  
and Director, Legal Staff





7. WATER SOURCE DEVELOPMENT

7.1 GENERAL

Table 7.1.1  
Water Source Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)			Page: 1 of 1		
Content: Water Source - General Information			Date:		
Data Collection Level: Provincial		Province No.: 1367		Filename: Water Source.xls	
Region Number: XIII		Province Name: Surigao Del Norte		Form Number: P.4.1	
	Type of Water Source		Shallow Well	Deep Well	Spring
	Total number of water sources	Number	990	235	233
Implementor	Government Agency	Number	599	157	223
	Private	Number	391	78	10
Level	Level I	Number	990	233	110
	Level II	Number			66
	Level III	Number		2	37
Ownership	Water District	Number			
	MEO/CEO	Number			
	RWSA	Number			
	BWSA	Number	8		3
	Institution	Number			
	Commercial Establishment	Number			
	Industrial/Agricultural Undertakin	Number			
	Public (Domestic)	Number	591	155	202
Private (Domestic)	Number	391	75	10	
Abstraction	Submersible/Turbine	Number		2	
	Centrifugal	Number	6	2	
	Handpump	Number	983	202	
	Bucket & Rope	Number			
	Free Flowing	Number	1		212
Usage	Drinking	Number	744	182	228
	Washing/Bathing	Number	525	177	200
	Gardening/Irrigation	Number	373	175	
	Big-Scale Irrigation	Number			
	Production	Number			
Water Quality	No Quality Problem	Number	716	180	227
	High Iron/Mag. Content	Number			
	High Chloride Content	Number	40	20	
	Turbidity/Colored/Smell	Number	53	20	
	Polluted/Contaminated	Number			
	Chlorinated	Number			
	Treated	Number			
Production	Seasonal Production	Number			
	Average Capacity < 100 m <sup>3</sup> /day	Number	69	32	196
	Average Capacity >= 100 m <sup>3</sup> /day	Number	4		37
	Number of Household < 5	Number	9		
	Number of Household >= 5	Number	3,594	544	2,999

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial			Province No.: 1367			Filename: Water Source.xls		
Region Number: XIII			Province Name: Surigao Del Norte			Form Number: P.4.1		
	Name of Municipalities	Character	Alegría			San Francisco (Anao-aon)		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	188	2	8	5		8
Implementor	Government Agency	Number	42	2	8	4		8
	Private	Number	146			1		
Level	Level I	Number	188	2	1	5		
	Level II	Number			6			4
	Level III	Number			1			4
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number			3			
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	42	2	8	4		8
Private (Domestic)	Number	146			1			
Abstraction	Submersible/Turbine	Number		2				
	Centrifugal	Number		2				
	Handpump	Number	188	2		5		
	Bucket & Rope	Number						
	Free Flowing	Number			8			8
Usage	Drinking	Number	188	2	8			8
	Washing/Bathing	Number	188		8	5		8
	Gardening/Irrigation	Number	188		8			
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number	188		8	1		8
	High Iron/Manganese Content	Number				4		
	High Chloride Content	Number						
	Turbidity/Color & Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			1	5		8
	Average Capacity >= 100 m <sup>3</sup> /day	Number			7			
	Number of Household < 5	Number				1		
	Number of Household >= 5	Number	1,375	130	2,999	30		

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 1 of 1		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1367			Filename: Water Source.xls		
Region Number: XIII			Province Name: Surigao Del Norte			Form Number: P.4.1		
	Name of Municipalities	Character	Bacuag			Del Carmen		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	46	6	1	14	5	16
Implic- mentor	Government Agency	Number	9	6		10		16
	Private	Number	37		1	4		
Level	Level I	Number	46			14	5	14
	Level II	Number						1
	Level III	Number			1			1
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	9	6		10		
Private (Domestic)	Number	37		1	4			
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number		6		7		
	Bucket & Rope	Number				6		
	Free Flowing	Number			1	1		
Usage	Drinking	Number		6	1	6		16
	Washing/Bathing	Number		6	1	11		
	Gardening/Irrigation	Number		6	1			
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number		6	1	13		16
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number				1(smell)		
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number		6		8		16
	Average Capacity >= 100 m <sup>3</sup> /day	Number			1	4		
	Number of Household < 5	Number						
	Number of Household >= 5	Number		414		1,954		

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1	
	Name of Municipalities		Gen. Luna			Mainit		
	Type of Water Source	Character	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	207	2		11	43	29
Implic- mentor	Government Agency	Number	59	2		5	17	29
	Private	Number	148			6	26	
Level	Level I	Number	207	2		11	43	4
	Level II	Number						19
	Level III	Number						6
Ownership	Water District	Number						
	MEQ/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	59	2		5	17	29
Private (Domestic)	Number	148			6	26		
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number	6					
	Handpump	Number	201	2		11	43	
	Bucket & Rope	Number						
	Free Flowing	Number						29
Usage	Drinking	Number	167	2		11	23	29
	Washing/Bathing	Number	40	2		11	20	29
	Gardening/Irrigation	Number					20	
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number	167	2		11	23	29
	High Iron/Manganese Content	Number						
	High Chloride Content	Number	40				20	
	Turbidity/Colored/Smell	Number					20	
	Polluted/Contaminated	Number						
	Chlorinated	Number						
Production	Treated	Number						
	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number						23
	Average Capacity >= 100 m <sup>3</sup> /day	Number						6
	Number of Household < 5	Number						
Number of Household >= 5	Number							

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No : 1367		Filename: Water Source.xls		
Region Number: XIII				Province Name: Surigao Del Norte		Form Number: P.4.1		
	Name of Municipalities	Character	Malimono			Socorro		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	7		2	1		10
Implementor	Government Agency	Number	4		2			10
	Private	Number	3			1		
Level	Level I	Number	7		2	1		10
	Level II	Number						
	Level III	Number						
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertakings	Number						
	Public (Domestic)	Number	4		2			10
Private (Domestic)	Number	3				1		
Abstraction	Submersible/Turbine	Number			2			
	Centrifugal	Number						
	Handpump	Number	7				1	
	Bucket & Rope	Number						
	Free Flowing	Number			2			10
Usage	Drinking	Number	2		2			10
	Washing/Bathing	Number	5					
	Gardening/Irrigation	Number	3					
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number			10	1		10
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Color&Smell	Number	4					
	Polluted/Contaminated	Number						
	Chlorinated	Number						
Production	Treated	Number						
	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /da	Number	7		2	1		10
	Average Capacity >= 100 m <sup>3</sup> /da	Number						
	Number of Household < 5	Number	7				1	
Number of Household >= 5	Number	93						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1	
	Name of Municipalities	Character	Basilisa			San Jose		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Imple- mentor	Total number of water sources	Number	35		36	48		5
	Government Agency	Number	35		35	28		5
Level	Private	Number			1	20		
	Level I	Number	35		36	48		
	Level II	Number						5
	Level III	Number						
Ownership	Water District	Number						
	MFO/CEO	Number						
	RWSA	Number						
	BWSA	Number				8		
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	35		35	28		
	Private (Domestic)	Number			1	20		
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	35			48		
	Bucket & Rope	Number						
	Free Flowing	Number			36			
Usage	Drinking	Number	35		36			
	Washing/Bathing	Number	35		36	48		
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number			36			
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number				48		
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			36	48		5
	Average Capacity >= 100 m <sup>3</sup> /day	Number						
	Number of Household < 5	Number						
	Number of Household >= 5	Number				137		

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PWSSP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P-4.1	
	Name of Municipalities	Character	Burgos			Cagdianao		
			Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well
	Total number of water sources		21	26	3			6
Implementor	Government Agency	Number	17	4	3			6
	Private	Number	4	22				
Level	Level I	Number	21	26				
	Level II	Number						5
	Level III	Number			3			1
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertakin	Number						
	Public (Domestic)	Number	17	4	3			6
Private (Domestic)	Number	4	22					
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	21					
	Bucket & Rope	Number						
	Free Flowing	Number	1		3			6
Usage	Drinking	Number			3			6
	Washing/Bathing	Number			3			6
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number			3			
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Folluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number		26	3			5
	Average Capacity >= 100 m <sup>3</sup> /day	Number						1
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1		
Content: Water Source - General Information							Date:		
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls		
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1		
	Name of Municipalities	Character	Daps			Claver			
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring	
	Total number of water sources	Number	22		12	153		2	
Imple- mentor	Government Agency	Number	17		4	153		2	
	Private	Number	5		8				
Level	Level I	Number	22		4	153		2	
	Level II	Number			7				
	Level III	Number			1				
Ownership	Water District	Number							
	MEO/CEO	Number							
	RWSA	Number							
	BWSA	Number							
	Institution	Number							
	Commercial Establishment	Number							
	Industrial/Agricultural Undertaki	Number							
	Public (Domestic)	Number	17		4	153		2	
Private (Domestic)	Number	5		8					
Abstraction	Submersible/Turbine	Number							
	Centrifugal	Number							
	Handpump	Number	22			153			
	Bucket & Rope	Number							
	Free Flowing	Number			12			2	
Usage	Drinking	Number			12	153		2	
	Washing/Bathing	Number			12			2	
	Gardening/Irrigation	Number							
	Big-Scale Irrigation	Number							
	Production	Number							
Water Quality	No Quality Problem	Number			12	153		2	
	High Iron/Manganese Content	Number							
	High Chloride Content	Number							
	Turbidity/Colored/Smell	Number							
	Polluted/Contaminated	Number							
	Chlorinated	Number							
Production	Treated	Number							
	Seasonal Production	Number							
	Average Capacity < 100 m <sup>3</sup> /day	Number			11			2	
	Average Capacity >= 100 m <sup>3</sup> /day	Number			1				
	Number of Household < 5	Number							
Number of Household >= 5	Number								



Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No. 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1	
	Name of Municipalities	Character	Gigaquit			Libjo		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Implementor	Total number of water sources		8		3	6		7
	Government Agency	Number	4		3	5		7
	Private	Number	4			1		
Level	Level I	Number	8			6		
	Level II	Number						7
	Level III	Number			3			
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaki	Number						
	Public (Domestic)	Number	4		3	5		7
Private (Domestic)	Number	4			1			
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	4			6		
	Bucket & Rope	Number						
	Free Flowing	Number			3			7
Usage	Drinking	Number			3			7
	Washing/Bathing	Number			3			7
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number			3			7
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number						7
	Average Capacity >= 100 m <sup>3</sup> /day	Number			3			
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PWASP)						Page: 1 of 1		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial				Province No.: 1367		Filename: Water Source.xls		
Region Number: XIII				Province Name: Surigao Del Norte		Form Number: P.4.1		
	Name of Municipalities	Character	Loreto			Pilar		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Implementor	Total number of water sources	Number	3	6	15		11	10
	Government Agency	Number	2	4	15		11	10
Level	Private	Number	1	2				
	Level I	Number	3	6	5		11	7
	Level II	Number			9			3
Ownership	Level III	Number			1			
	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	2	4	15		11	10
Abstraction	Private (Domestic)	Number	1	2				
	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	3	6			11	
	Bucket & Rope	Number						
Usage	Free Flowing	Number			15			10
	Drinking	Number		6	15		11	10
	Washing/Bathing	Number		6	15		11	10
	Gardening/Irrigation	Number		6			11	
	Big-Scale Irrigation	Number						
Water Quality	Production	Number						
	No Quality Problem	Number		6	15		11	10
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
Treated	Number							
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			14			9
	Average Capacity >= 100 m <sup>3</sup> /day	Number			1			1
	Number of Household < 5	Number						
Number of Household >= 5	Number							

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PWASP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1	
	Name of Municipalities	Character	Placer			San Benito		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources			7	16		2	1
	Government Agency	Number		7	16		2	1
Imple- mentor	Private	Number						
	Level I	Number		7	9		2	
	Level II	Number			5			
	Level III	Number			2			1
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertakin	Number						
	Public (Domestic)	Number		7	16		2	1
Abstraction	Private (Domestic)	Number						
	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number		7			2	
	Bucket & Rope	Number						
Usage	Free Flowing	Number			16			1
	Drinking	Number		7	16		2	1
	Washing/Bathing	Number		7	16		2	1
	Gardening/Irrigation	Number		7			2	
	Big-Scale Irrigation	Number						
Water Quality	Production	Number						
	No Quality Problem	Number		7	16		2	1
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted&Contaminated	Number						
	Chlorinated	Number						
Treated	Number							
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			9			1
	Average Capacity >= 100 m <sup>3</sup> /day	Number			7			
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No.: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P.4.1	
	Name of Municipalities		San Isidro			Santa Monica		
	Type of Water Source	Character	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Imple- mentor	Total number of water sources	Number		11	7	34	22	8
	Government Agency	Number		11	7	27	10	8
Level	Private	Number				7	12	
	Level I	Number		11	6	34	22	3
	Level II	Number			1			2
	Level III	Number						3
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number		11	7	27	10	8
Private (Domestic)	Number				7	12		
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number		11		24	22	
	Bucket & Rope	Number						
	Free Flowing	Number			7			8
Usage	Drinking	Number		11	7		22	8
	Washing/Bathing	Number		11	7		22	8
	Gardening/Irrigation	Number		11			22	
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number		11	7		22	8
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity Colored/Snell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			7			3
	Average Capacity >= 100 m <sup>3</sup> /day	Number						5
	Number of Household < 5	Number						
Number of Household >= 5	Number							

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PWASP)							Page: 1 of 1	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial				Province No: 1367			Filename: Water Source.xls	
Region Number: XIII				Province Name: Surigao Del Norte			Form Number: P-4.1	
	Name of Municipalities	Character	Sison			Surigao City		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Implementor	Total number of water sources	Character		8	12	177	56	2
	Government Agency	Number		8	12	177	56	2
	Private	Number						
Level	Level I	Number		8	1	177	54	
	Level II	Number			7			
	Level III	Number			4		2	2
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number		8	12	177	54	2
Private (Domestic)	Number							
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number		8		177	54	
	Bucket & Rope	Number						
	Free Flowing	Number			12			2
Usage	Drinking	Number		8	12	177	54	2
	Washing/Bathing	Number		8	12	177	54	2
	Gardening/Irrigation	Number		8		177	54	
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number		8	12	177	54	2
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			11			
	Average Capacity >= 100 m <sup>3</sup> /day	Number			1			2
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 1 of 1		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial				Province No.: 1367		Filename: Water Source.xls		
Region Number: XIII				Province Name: Surigao Del Norte		Form Number: P.4.1		
	Name of Municipalities		Tagana-an			Tubjan		
	Type of Water Source	Character	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Imple- mentor	Total number of water sources	Character	5	26	2			1
	Government Agency	Number	1	15	2			1
	Private	Number	4	11				
Level	Level I	Number	5	26	2			
	Level II	Number						1
	Level III	Number						
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaki	Number						
	Public (Domestic)	Number	4	15	2			1
Private (Domestic)	Number	1	11					
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	5	26				
	Bucket & Rope	Number						
	Free Flowing	Number			2			1
Usage	Drinking	Number	5	26	2			1
	Washing/Bathing	Number	5	26	2			1
	Gardening/Irrigation	Number	5	26				
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number	5	26	2			1
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			2			1
	Average Capacity >= 100 m <sup>3</sup> /day	Number						
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 1 of 1		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No. 1367			Filename: Water Source.xls		
Region Number: XIII			Province Name: Surigao Del Norte			Form Number: P.4.1		
	Name of Municipalities	Character	Tubod			Dinagat		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
Imple- mentor	Total number of water sources	Character			4		2	7
	Government Agency	Number			4		2	7
	Private	Number					2	
Level	Level I	Number					2	6
	Level II	Number			3			1
	Level III	Number			1			
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number						
	Commercial Establishment	Number						
	Industrial/Agricultural Undertakin	Number						
	Public (Domestic)	Number			4		2	7
Private (Domestic)	Number					2		
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number					2	
	Bucket & Rope	Number						
	Free Flowing	Number			4			7
Usage	Drinking	Number			4		2	7
	Washing/Bathing	Number			4		2	7
	Gardening/Irrigation	Number					2	
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number			4		2	7
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m <sup>3</sup> /day	Number			3			7
	Average Capacity >= 100 m <sup>3</sup> /day	Number			1			
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Table 7.3.1 Major References

No.	REPORT/INFORMATION	AGENCY/AUTHOR	CONTENTS	REFERENCE DATA/DESCRIPTION	OUTPUT
1.	Topographic Map (1:250,000)	NAMRIA	topographic contours, natural waterways, road, etc.	highest peak, major river basins	river networks, base maps, river basins of province
2.	Rapid Assessment of Water Supply Sources	NWRB	groundwater availability, well data and inventory	well description, specific capacity, static water levels, well depths	groundwater potential area map
3.	Individual Well Information Database	NWRB	well location, well information	well depths, water levels, well location	individual well location map
4.	Groundwater Resources Investigation	NWRB	groundwater availability area, salt water intrusion, resistivity results	resistivity survey results, potential area for high yielding wells, salt water intrusion	potential area for high yielding wells, salt water intrusion areas
5.	Geological Map of the Philippines	BMGS	lithologic distribution and structural features of the Philippines	geologic formations of the province	provincial geologic maps
6.	Philippine Water Resources Summary Data	NWRB	stream flow and lake and river stage	flow rate measurements and drainage areas of major rivers of the province	river discharges in the province
7.	Road Network Map of the province	DPWH-DEO, PEO, PPDO	municipal boundaries	municipal boundaries, location of barangays	base maps, municipal boundaries
8.	Feasibility Study of Surigao Metro Water District(SMWD)	SMWD/LWUA	recommended water sources for MSWD	well data information, water level	groundwater potential area map
9.	Water Quality Analysis Result	SMWD	water quality results	water quality	water quality map
10.	Assessment of the impact of Mat-I gold mining workings on surface waters and nearshore environment of Surigao City	SMWD Surigao City 1996	extent of mercury pollution of Surigao River and its environment	environmental pollution caused by small scale gold mining in the area	water quality report of Surigao City
11.	Individual Well Inventory	DPWH-DEO,	well location, well information	well depths, water levels	individual well location map
12.	Water Quality Analysis Result	Agusan del Norte	water quality results	water quality evaluation	water quality map
13.	Individual Well Inventory	DPWH-DEO,	well location, well information	well depth, water levels	individual well location map
14.	Spring Inventory	Agusan del Sur.	location of springs, discharge	spring data analysis	spring inventory report

continue next page



Table 7.3.1 Major References (Cont. d)

No.	REPORT/INFORMATION	AGENCY/AUTHOR	CONTENTS	REFERENCE DATA/DESCRIPTION	OUTPUT
15.	Individual Well Inventory	DPWH-DEO, Davao del Sur	well location, well information	well depths, water levels	individual well location map
16.	Spring Inventory		location of springs, discharge	spring discharge, location	spring inventory report
17.	Well Log Records		geologic information	geologic formations of the province	groundwater potential
18.	Water Quality Analysis Result		water quality results	water quality	water quality map
19.	Well Drilling Log Records	DPWH-DEO, Davao Oriental	geologic information	geologic formations of the province	groundwater potential
20.	Individual Well Inventory		well location, well information	well location, well depths	individual well location map
21.	Pumping Test Data		pumping test results	pumping test data	potential area for high yielding
22.	Water Quality Analysis Result		water quality results	water quality	water quality maps
23.	Assessment of the Domestic Water Supply and Sanitation Facilities in Southern Mindanao Vol. III Water and Sanitation, Davao Oriental	NEDA Regional Office November 1997	general information of water resources	surface water, groundwater resources, water quality and quantity	surface water source, groundwater source, water quality reports

concluded page

Table 7.3.2 Well Inventory by Municipality

MUNICIPAL	LOCATION	WELL NO. (mbsgs)	DATE	DEPTH (m)	SWL (mbsgs)	DISCHARGE (lps)	DRAWDOWN (m)	SPCCP (lps/m)	USAGE	REMARKS
Alegria	Alegria	NWS51631		37.2	3.66					
Alegria	Alegria	NWSA6671	06/25/54	17.37	4.88	1.25	1.22	1.020		
Alegria	Alipao	BP506012	07/27/60	10.97	3.05	0.51	0.61	0.830		
Alegria	Pongrud	NW#15279		18.29		0.31				
Alegria	San Pedro	BFW	05/08/56	11.58	3.65	0.63	1.22	0.517		
Bacuag	Cabugao	NWSS06113		11.59	1.83					
Bacuag	Cabugao	NWS-4713		46.65	2.13	0.95	0.91	1.040		
Bacuag	Campo	BP505915	11/09/59	7.92	3.05	0.32				
Bacuag	Campo	NWS-4620								
Bacuag	Dugsangor	NWS06111		12.2	4.57					
Bacuag	Pagao	NWS06014		8.84	3.66					
Bacuag	Pautao	MGS84668	08/18/48	45.73	3.66	0.95	1.53	0.620		
Bacuag	Payapag	NWS06114		6.1	4.27					
Bacuag	Siwata	NWS06112		3.81	1.83					
Basilisa (Rizal)	Puerto Princesa	NWSA6676	11/05/54	5.18	2.44	0.63	0.61	1.030		
Claver	Cabugo	NW#50608		10.37	1.20	0.44	0.3	1.450		
Claver	Poblacion	NWS06016		18.6	4.57					
Claver	Poblacion	NWS06017		12.5	4.57					
Dapa	Guiwan	NWS19473	04/27/49	8.23	4.27	0.44	0.91	0.484		
Dapa	Paterno St.	BPW-5008	03/10/49	4.27	1.83	0.44	0.91	1.040		
Dapa	Poblacion	BPW-4930		5.9	2.74	0.32				
Dapa	Poblacion	NWS-4952		7.32	2.44	0.32	2.13	0.150		
Del Carmen/Numancia	Antipolo	NWS06017		12.50	3.66	0.31	1.00	0.310		
Del Carmen/Numancia	Concohey Esperanza	BP505921	10/15/59	12.50	3.65	0.32	3.11	0.103		
Del Carmen/Numancia	Esperanza	NWS-5407	04/15/52	5.49	1.83					
Del Carmen/Numancia	Esperanza	NWS06017		7.01	3.96	0.44	0.31	1.420		
Del Carmen/Numancia	Jamoyan	BPS060023	06/06/60	12.20	2.13	0.32	2.46	0.130		
Del Carmen/Numancia	Jamoyan	NWS06022		12.20	2.13	0.31	2.38	0.130		
Del Carmen/Numancia	Kanpunan School	BPW50616	09/17/61	7.62	4.26	0.44	0.30	1.450		
Del Carmen/Numancia	Taas	BPW-4829	01/12/49	5.06	1.83	1.26				
Del Carmen/Numancia	Taas	BPW-4895	01/11/49	5.18	5.18	0.95				
Del Carmen/Numancia	Tuboran	NWS06018		7.32	2.44	0.44	0.61	0.720		
Dinagat	Osmena	BPW-6675	08/27/54	8.23	1.27	0.76	0.38	2.010		

MUNICIPAL	LOCATION	WELL NO. (mbgs)	DATE	DEPTH (m)	SWL (mbgs)	DISCHARGE (lps)	DRAWDOWN (m)	SFCCP (lps/m)	USAGE	REMARKS
Dinagat	Poblacion	NWSA5445	05/21/52	8.54	1.52	0.95				
General Luna	A. Bonifacio St.	BPW-5070	06/22/49	6.40	1.52	0.32				
General Luna	Consuelo	BPW19472	11/15/57	11.28	5.79	0.38	0.62	0.520		
General Luna	La Jagoza	BP505922	11/16/59	10.67	4.27	0.63	2.38	0.160		
General Luna	La Janoza	NWS-5635		9.15	1.83	0.38				
General Luna	Libertad	BP506023	06/15/60	5.79	0.91		0.60	0.637		
General Luna	Libertad	NWS06024		5.79	0.91					
General Luna	Malinao	NWS20174		9.76	2.13					
General Luna	Poblacion	BPW-5041	05/23/49	10.37	1.22	0.76	0.61	1.240		
General Luna	Sio. Tomas	BPW-5058	06/08/49	4.87	1.52	0.63	0.61	1.040		
Gigaguit	Bonot	RPW50612	07/05/61	8.84	2.13	0.44	0.91	0.483		
Gigaguit	Ipil Mabua	BPW12571	04/11/56	9.76	1.83	0.63	2.42	0.260		
Gigaguit	Mahanub	BPW50603	05/29/60	14.94	1.84	0.44	7.33	0.060		
Gigaguit	Mahanub	BPW50603	07/14/61	18.29	3.65	0.44	1.83	0.240		
Gigaguit	Nuevo Camp Inferior	BPW50606	09/21/60	7.80	3.05	0.44	0.30	1.470		
Gigaguit	Poblacion	BPW-5543	19/18/52	10.37	0.61	0.16	0.13	0.243		
Gigaguit	Poblacion, Arellano St.	BPW50607	11/09/60	8.53	1.22	0.44	1.83	0.240		
Gigaguit	Poblacion, Legaspi St.	BPW50605	08/09/60	12.20	1.83	0.38	0.31	1.240		
Gigaguit	Poniente	BPW50604	07/06/60	59.45	1.83	0.44	2.75	0.160		
Gigaguit	San Isidro	BPW50614	07/24/61	7.62	2.13	0.44	0.91	0.483		
Gigaguit	San Isidro Public Market	BPW50602	06/06/60	7.01	1.83	0.44	0.62	0.713		
Gigaguit	Sta. Teresita	NWS-6672	07/09/54	12.20	1.83	0.63	3.00	0.210		
Gigaguit	Tawagan	NWS12110		9.15	3.65	0.32	2.46	0.130		
Gigaguit	Tuya-tuya	BPW50611	03/02/61	13.41	1.83	0.44	0.30	1.450		
Gigaguit	Villafranca	NWS#51632		8.23	2.13	0.32				
Libjo (Albor)	Arellano	NWSA6677	11/29/54	11.28	0.91	1.26	0.91	1.380		
Loreto	Poblacion	NWS-5470	06/19/52	8.23						
Loreto	Rizal St.	NWS-5479		8.23	0.91	0.63	0.91	0.690		
Mainit	Crossing	NWS12580		76.22	3.66	0.44				
Mainit	Daan Lungso	BP505912	09/14/59	11.05	4.87	0.63	0.61	1.034		
Mainit	Magpayang	NW#15278		42.60	1.83	0.31				
Mainit	Matinao	BP50591	09/02/59	7.92	3.04	0.63	0.61	1.030		
Mainit	Motor Pool	NWS18936		11.89	3.04					
Mainit	San Francisco	BP506013	09/21/60	7.92	5.48	0.44	3.67	0.120		
Mainit	Siana So. Crossing	NW#12580		76.22	3.66	0.44				
Mahimono	Bunyasao	BPW12577	10/01/56	7.62	4.88	0.44	0.30	1.450		
Mahimono	Cantapoy	BPW12576	09/08/56	6.10	2.44	0.44				

MUNICIPAL	LOCATION	WELL NO. (mbgs)	DATE	DEPTH (m)	SWL (mbgs)	DISCHARGE (lps)	DRAWDOWN (m)	SPCCP (lps/m)	USAGE	REMARKS
Malimono	Cayanan	NW#12578		8.54	5.49	0.62	0.30	2.060		
Malimono	Poblacion	NWSS2611		7.62	1.83	1.31	0.30	4.360		
Malimono	Purisima St., Tinago	NWS-5581		76.81						
Pilar	Maasin	NW506026		8.54	3.05	0.44	1.52	0.290		
Pilar	Mabini	NW50625		13.72	2.13	0.44	2.44	0.180		
Pilar	San Rafael	NW50628		13.11	6.10	0.44	1.52	0.290		
Pilar	San Roque	NW50625		13.72	2.13	0.44	2.44	0.180		
Placer	Panahunagan	BPW-5514	08/02/52	6.70	1.22			0.760		
Placer	Panahunagan	NWS-5543		10.37	0.61	0.75	0.61	1.230		
San Francisco (Anao-oan)	Banbanon	BPW12575	08/18/52	10.21	6.09	0.44	0.62	0.710		
San Francisco (Anao-oan)	Bonifacio St., Anao-oan	NWSA6670	05/28/54	34.76	0.91	1.12	1.83	0.610		
San Francisco (Anao-oan)	Lower Macopa	NW505913	10/06/59	12.95	10.06	0.32	0.62	0.520		
Sison	Sison	BPW-6055	04/22/54	17.10		0.76	3.62	0.210		
Sison	Sison	NW#15280		20.12	5.49	0.31				
Sison	Sison	NW#15281		9.76	4.77	0.44				
Sison	Sison	NW#18934		46.95	3.05					
Sison	Tagbayani	BP505914	10/19/59	8.84	3.05	0.44	0.61	0.720		
Sison	Tungpahan	NWS15282		10.37	4.27	0.44				
Sta. Monica	Libertad	NWS06172		12.20	3.05					
Sta. Monica	Mabini	NW506121		15.24	2.13	0.49	1.53	0.320		
Sta. Monica	Magsaysay	NW506029		10.37	3.66	0.44	0.91	0.480		
Sta. Monica	Rizal	BP506021	13/31/60	8.84	1.22	0.44	0.92	0.480		
Sta. Monica	Rizal Sapao	NW50622		8.84	1.22	0.44	0.31	1.420		
Surigao City	Legaspi St.	BPW-5791	06/17/53	21.72	1.83	0.95				
Surigao City	Poctoy	NW#12579		17.10	4.88	0.44	0.31	1.420		
Surigao City	San Jose	BPW12574	07/21/56	8.54	3.96	0.32	2.13	0.150		
Surigao City	San Roque	NWS12574	07/21/56	8.41	3.91					
Tagana-an	Cawilan	BPW12573	09/42/56	7.90	3.96	0.32	1.83	0.175		
Tagana-an	Opong	NWS-5762		22.87	7.62	1.12	3.03	0.370		
Tagana-an	Talavera	BPW-5669	02/24/53	9.20	1.52	0.76	1.52	0.500		
Tubod	Poblacion	BPW12580	02/09/57	48.78	5.48	0.63	0.30	2.070		
	Timana	BPW19469	07/11/57	14.63	6.10	0.32	0.62	0.520		

Table 7.3.3 Water Quality Analysis Data

Sampling Water Sources: Springs										Provincial Number:			
Region Number: XIII										Provincial Name: Surigao del Norte			
No.	Sampling Site	Sampling Date	pH	Color (PCU)	Turbidity (FTU)	Fe (mg/liter)	Mn (mg/liter)	Coliform Bacteria (count number x100)	Total Bacteria (count number)				
1	Aliporo, Alegria	May 7, 1998	7.5	1	1.0	0.4	0.07	No detected	30				
2	Songkoy, Tubod	May 7, 1998	7.4	2	0.0	0.9	0.25	No detected	30				
3	Magsaysay, Mainit	May 7, 1998	7.0	0	0.2	0.9	0.21	1,000	300				
4	Biyabid, Sison	May 7, 1998	6.4	7	0.3	0.2	0.00	No detected	100				
5	Tagbongon, Surigao City	May 8, 1998	7.9	38	0.3	0.1	0.01	1,000	30				
6	Mahanub, Gigaquit	May 9, 1998	7.0	90	0.9	0.2	0.01	700	300				
7	Binocaran, Malimono	May 13, 1998	7.0	0	0.1	0.2	0.01	No detected	300				
8	Diaz, San Francisco	May 14, 1998	8.1	0	0.0	0.0	0.00	400	10				
9	Maatas, Dinagat	May 16, 1998	7.5	19	0.7	0.6	0.10	1,000	10				
10	Imie, Basilisa-I	May 17, 1998	8.0	0	2.0	0.3	0.02	No detected	50				
11	Rizal, Basilisa-II	May 17, 1998	7.9	8	0.2	0.5	0.05	No detected	100				
12	Imie, Basilisa-II	May 17, 1998	8.1	7	4.9	0.4	0.02	No detected	100				

Table 7.3.3 Water Quality Analysis Data

Sampling Water Sources: Deep Wells		Provincial Number: Surigao del Norte									
Region Number: XIII		Sampling Date	pH	Color (PCU)	Turbidity (FTU)	Fe (mg/liter)	Mn (mg/liter)	Coliform Bacteria (count number x100)	Total Bacteria (count number)		
No.	Sampling Site										
1	Gamuton, Alegria	May 7, 1998	6.5	82	5.3	0.4	0.31	No detected	100		
2	Poblacion, Alegria	May 7, 1998	6.5	15	2.7	0.2	0.01	300	Numerous		
3	Ladaron, Claver	May 8, 1998	8.1	19	1.1	0.1	0.05	1,000	30		
4	Bagalay, Claver	May 9, 1998	7.2	0	1.0	0.1	0.03	No detected	30		
5	Cogfong, Bacuag	May 9, 1998	7.8	45	2.7	0.4	0.22	1,000	100		
6	Tagana-an	May 9, 1998	7.2	66	24.6	0.4	0.11	1,000	Numerous		
7	Campo, Bacuag	May 9, 1998	6.5	84	5.5	0.4	0.22	No detected	300		
8	Sampaquita, Tagana-an	May 9, 1998	6.8	139	14.5	0.4	0.33	No detected	50		
9	Escolta, Dinagat	May 15, 1998	6.3	6	1.6	0.3	0.02	No detected	100		
10	Poblacion I, Burgos	May 21, 1998	7.5	0	0.2	0.2	0.01	No detected	Numerous		
11	Alegria, Sta. Monica	May 21, 1998	7.5	12	0.5	0.1	0.02	No detected	Numerous		
12	Poblacion II, Burgos	May 21, 1998	7.2	0	0.8	0.1	0.01	No detected	Numerous		
13	Rizal, Sta. Monica	May 21, 1998	7.4	4	0.7	0.1	0.02	No detected	Numerous		
14	Pelaez, San Isidro	May 21, 1998	7.3	39	2.3	0.3	0.04	No detected	Numerous		
15	Pacifico, San Isidro	May 21, 1998	7.9	0	0.5	0.2	0.04	No detected	Numerous		
16	Tangbo, Sta. Monica	May 21, 1998	7.4	5	0.4	0.2	0.03	No detected	Numerous		
17	Garcia, Sta. Monica	May 21, 1998	7.6	0	0.3	0.2	0.04	No detected	Numerous		
18	Union, Dapa	May 21, 1998	7.4	32	0.7	0.2	0.04	No detected	Numerous		
19	Baybay, Burgos	May 21, 1998	8.0	0	0.3	0.2	0.03	No detected	Numerous		
20	Caridad, Pilar	May 21, 1998	7.7	0	0.0	0.2	0.02	No detected	Numerous		
21	Buning Kalipay, Pilar	May 21, 1998	7.3	34	4.3	0.3	0.04	No detected	Numerous		
22	Sta. Cruz, San Benito	May 21, 1998	7.2	33	2.1	0.3	0.03	No detected	Numerous		
23	Brgy. 8, Dapa	May 19, 1998	6.9	No data	0.1	0.0	0.03	1,000	300		
24	Brgy. 3, Dapa	May 19, 1998	7.3	No data	1.3	0.2	0.08	No detected	300		
25	Brgy. 2, Dapa	May 19, 1998	7.3	No data	3.4	0.1	0.06	No detected	Numerous		
26	Sabang II, Surigao City	May 22, 1998	8.5	52	0.0	0.2	0.02	No detected	Numerous		
27	Sabang III-A, Surigao City	May 22, 1998	8.5	46	0.0	0.2	0.12	No detected	Numerous		
28	Sabang III-B, Surigao City	May 22, 1998	8.4	74	1.3	0.3	0.11	No detected	Numerous		
29	Lipata I, Surigao City	May 22, 1998	8.5	0	0.0	0.2	0.05	1,000	Numerous		
30	Lipata II, Surigao City	May 22, 1998	7.5	249	30.2	0.4	0.33	No detected	Numerous		
31	Sabang I, Surigao City	May 22, 1998	8.2	0	0.0	0.3	0.20	No detected	Numerous		
32	San Juan, Surigao City	May 22, 1998	8.2	0	0.7	0.3	0.16	No detected	50		
33	Tumanday Rizal, S. City	May 22, 1998	7.0	0	0.0	0.4	0.03	No detected	Numerous		
34	Rizal, Surigao City	May 22, 1998	8.0	0	1.1	0.4	0.08	No detected	Numerous		
35	Terminal, Surigao City	May 22, 1998	7.6	0	7.7	0.1	0.01	No detected	Numerous		
36	Mat-i, Surigao City	May 22, 1998	7.9	0	0.0	0.4	0.33	No detected	Numerous		

Table 7.5.1 Surface Water Quality

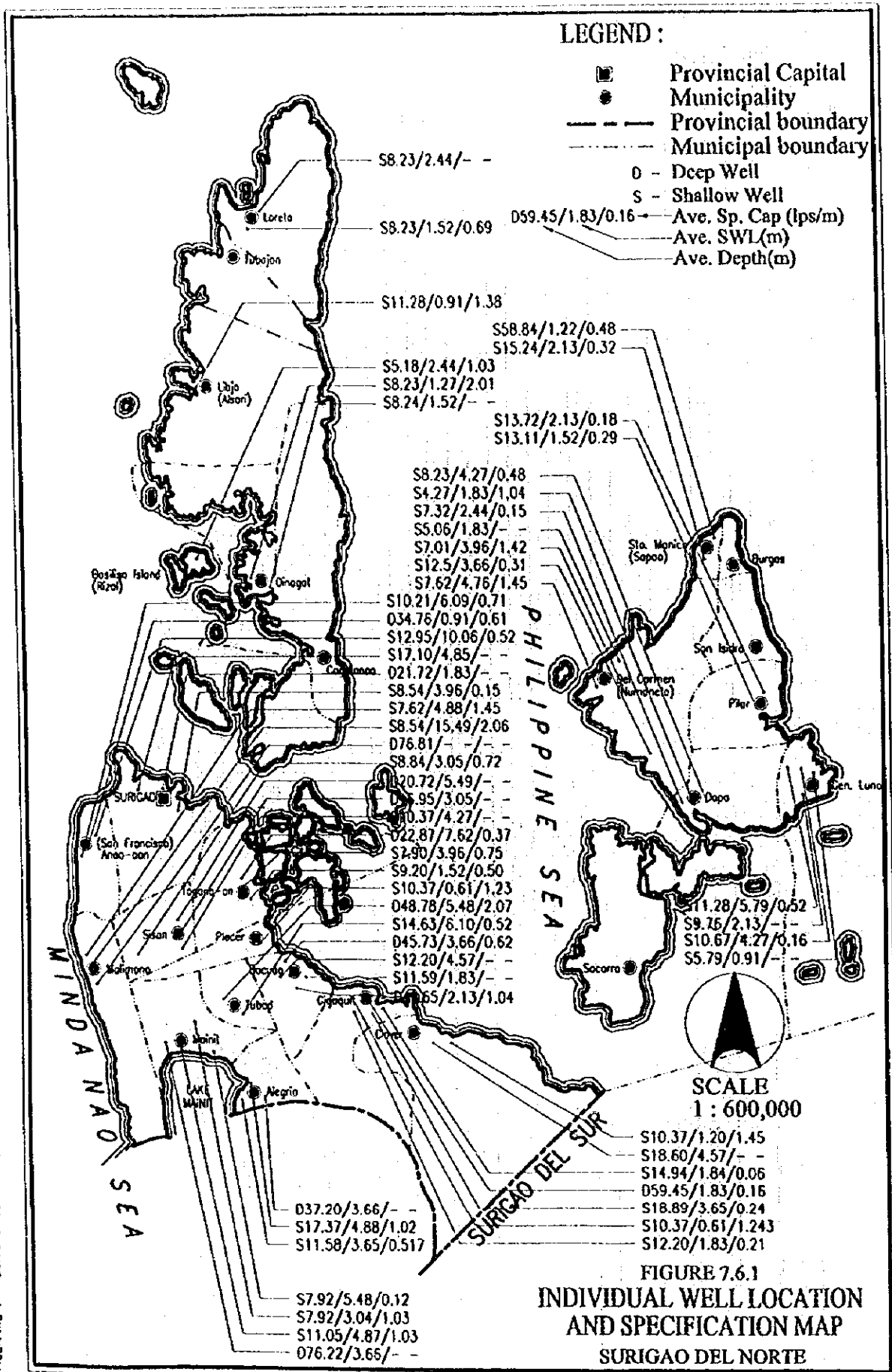
Major Surface Water	Surface Water Information		Parameter																	SW Pollutant in upstream
	Stream & Main System	Location	Sampling Date (m/d/y)	Color tcu	pH	D.Oxy. mg/l	BOD mg/l	SS mg/l	TDS mg/l	MBAS mg/l	O/G mg/l	N mg/l	P mg/l	Coli. MPN/100ml	Cl mg/l	Cu mg/l	Tur. NTU	Fe mg/l	Mn mg/l	
DENR Water Quality Criteria for Fresh Water																				
Valencia		Dinagat																		
		Libjo																		
Sungao	Stream-A	Tagana-an																		
		Sungao City																		
		Mainit																		
		Placer																		
		Sison																		
		Sungao City	22-May-98	11	8.5												4.6	270.0	58.0	Mining
Mayac		Mainit																		
Sonkoy		Tubod																		
		Mainit																		
		Alegria																		
Bacuaq	Stream-B	Alegria																		
		Bacuaq																		
		Bacuaq																		
Gigaquit	Stream-C	Bacuaq																		
		Calver																		
		Ginagaquit-A																		
	Stream-D	Calver																		
	Gigaquit Main	Ginagaquit-A																		
		Calver																		
		Ginagaquit-B																		

Source: Water quality results were collected from respective Water Districts or analyzed by PSPT on site in the field survey using procured instruments.

Notes: Sampling point is located at upstream boundary of each river in respective municipalities. If several streams are present in an area, the stream nearest from populated area shall be selected. If there is no upstream, sampling point shall be selected near populated area.

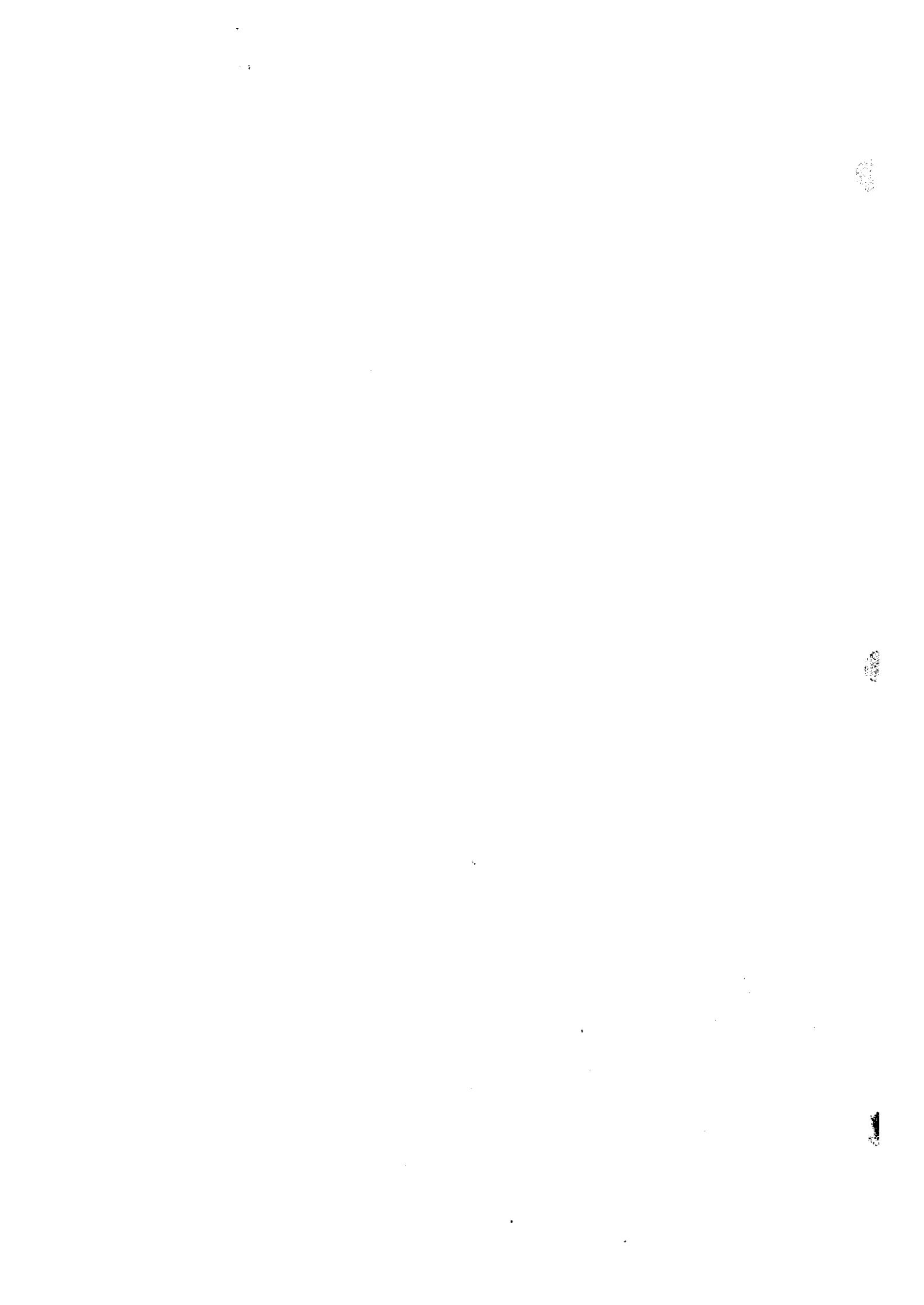
Remarks: Class AA - Public Water Supply Class-I. Intended for waters having watersheds which are uninhabited and otherwise protected and which require only approved disinfection in order to meet the PNSDW. Class A - Public Water Supply Class-II. Sources of water supply that will require complete treatment (coagulation, sedimentation, filtration & disinfection) in order to meet the PNSDW.

DISK NAME : SURIGAO DEL NORTE(DISK2)  
 FILENAME : SURIGAO-DELNORTE(IWLSM)











JICA