CHAPTER 6
WATER SOURCE DEVELOPMENT

6. WATER SOURCE DEVELOPMENT

6.1 General

This chapter discusses the potential water sources and their development for domestic water supply for the province of Tawi-Tawi. More emphasis is given to the available groundwater because of its better quality and economical use as this can require minimal treatment or none at all. The potential of major rivers as possible water source were also considered.

A Groundwater Availability Map (also referred to as Hydrogeologic Map) for the province was prepared to identify areas or geologic formations with available groundwater. This was done through the correlation and evaluation of pump well and ground geology data to determine the groundwater potential of the different geologic units.

In its Rapid Assessment of Water Supply Sources, the National Water Resources Board (NWRB) classifies groundwater as shallow well, deep well or difficult areas. Instead of using this classification, this study categorized groundwater availability in terms of the potentials and hydrogeologic properties of geologic units underlying the province.

Most of the data and information used in this study were obtained from the following sources:

- Mines and Geosciences Bureau (MGB),
- National Mapping and resources Information Administration (NAMRIA),
- National Water Resources Board (NWRB),
- Local Waterworks Utilities Administration (LWUA),
- Local Government Units (LGUs),
- Provincial Planning and Development Office (PPDO), and
- Department of Public Works and Highways (DPWH).

Majority of the geologic reports and maps and some hydrogeologic reports were obtained from the MGB. Some water resources investigation reports and well data were gathered from the NWRB. These gathered data and information were supplemented by those gathered from field investigations and through questionnaires provided to the local government offices.

The Groundwater Availability Map may be used for provincial or even municipal level master plans and feasibility studies. However, certain investigations may have to be conducted prior to detailed design and implementation of the water supply work.

6.2 Geology

6.2.1 General Statement

Tawi-Tawi Island is composed of sandstone and conglomerate to the southwest and highly altered serpentinite to the northeast. The island also has a narrow band of alluvial deposits and coral rock along the shore. Some of the smaller islands have a rock core similar to that of the nearest large island with some coral along the shore, but most smaller islands are low flat islands composed entirely of coral rock and sand and gravel.

6.2.2 Groundwater in the Geologic Units

The crystalline igneous, metamorphic rocks and the hard, indurated, well-cemented sedimentary rocks do not contain pumpable groundwater unless they are sufficiently fractured and/or weathered.

Though limited, the sources of pumpable groundwater are the Late Miocene to Pliocene Clastic rocks (N_2S) and the corals (RL).

The following geologic units are present in the study area.

Basement Complex (BC). Serpentinite is the oldest rock in the province. It is exposed in northeastern Tawi-Tawi Island as a fault bounded lenticular mass trending southwest. Northwest of the serpentine body, along the coast, quartz diorite, which is partly orthogneissic is intrusive into the serpentine along a zone of major northeast shear.

Limited pumpable groundwater, if any, occurs in the fractured and/or weathered zones.

Ultramafic Complex (UC). This is made up of serpentinized peridotite and its related magmatic diffentiates which is referred to as Mindanao Ultramafics (Antonio, 1972).

Limited pumpable groundwater, if any, occurs in the fractured and/or weathered zones.

Late Miocene to Pliocene Clastic Rocks (N_2S). This unit consists of interbedded conglomerate, sandstone, fossiliferous siltstone, mudstone and light-colored reefal limestone. The clastic rocks are porous and moderately indurated with calcareous clay as cementing material. The basal conglomerate and sandstone were derived from basaltic rocks.

Groundwater occurs mainly within the sandstone and conglomerate and in some cases in the siltstone beds. Some low-yielding wells were reported. Details of the recorded wells are presented in Table 6.1.

Recent Alluvium (R). This unit consists of limited alluvium, beach deposits, residual clays and corals. Sand, gravel, mud, silt with some decayed organic matter are usually found along the river channels. Swamp deposits include organic matter, silt, fine sand and mud deposited along the shoreline. These deposits usually grade into reefs towards the shoreline.

Well depths do not exceed 6m in most localities. Near the coast, the wells, mostly dug wells, are only a few meters deep. Only shallow hand-pumped wells and/or dug wells are recommended.

Saltwater intrusion is common in most of the wells near the coastline.

Quaternary Volcanics (QV). The volcanic cone central areas are reported to consist of Pliocene to Pleistocene hornblende andesite which is generally gray, massive and hard. The dacitic phases occur as lava flows. Agglomerates and ash flows also occur.

Pumpable groundwater, if any, is likely to be surficial and may also occur in the fractured and/or weathered zones.

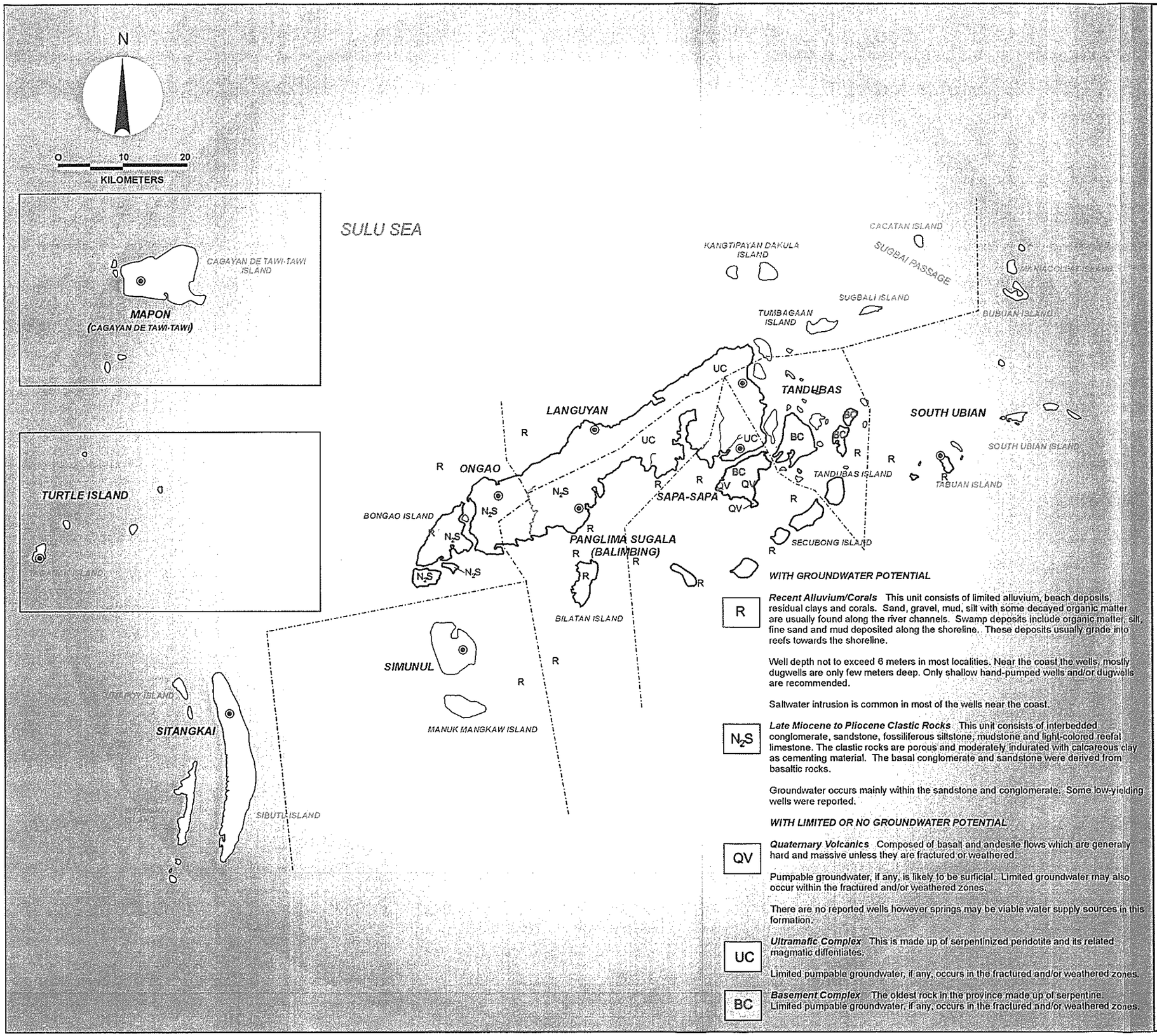
There are no reported wells in this formation but springs may be present.

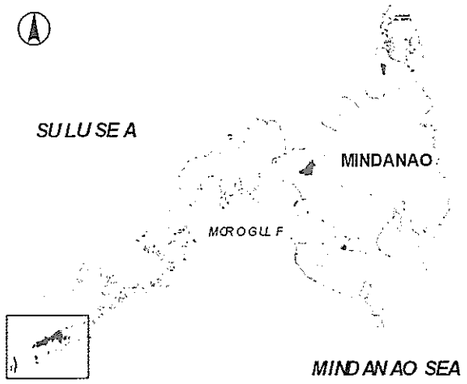
6.3 Groundwater Availability in the Province

The Groundwater Availability Map of the province is presented in Figure 6-1. Majority of the data used in the preparation of the map were obtained from the MGB and NWRB.

The available well data by barangay are presented in Table 6-1 while the summary of water well data in some of the municipalities is presented in Table 6-2 and the located wells are shown in Figure 6-2.

On the map, each geologic unit is described separately in terms of lithologic composition and groundwater holding capability. The hydrogeologic properties are also included.





KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- City Center
- Town Center

WITH GROUNDWATER POTENTIAL

R — ***Recent Alluvium/Corals*** This unit consists of limited alluvium, beach deposits, residual clays and corals. Sand, gravel, mud, silt with some decayed organic matter are usually found along the river channels. Swamp deposits include organic matter, silt, fine sand and mud deposited along the shoreline. These deposits usually grade into reefs towards the shoreline.

Well depth not to exceed 6 meters in most localities. Near the coast the wells, mostly dugwells are only few meters deep. Only shallow hand-pumped wells and/or dugwells are recommended.

Saltwater intrusion is common in most of the wells near the coast.

N_2S — ***Late Miocene to Pliocene Clastic Rocks*** This unit consists of interbedded conglomerate, sandstone, fossiliferous siltstone, mudstone and light-colored reefal limestone. The clastic rocks are porous and moderately indurated with calcareous clay as cementing material. The basal conglomerate and sandstone were derived from basaltic rocks.

Groundwater occurs mainly within the sandstone and conglomerate. Some low-yielding wells were reported.

WITH LIMITED OR NO GROUNDWATER POTENTIAL

QV — ***Quaternary Volcanics*** Composed of basalt and andesite flows which are generally hard and massive unless they are fractured or weathered.

Pumpable groundwater, if any, is likely to be surficial. Limited groundwater may also occur within the fractured and/or weathered zones.

There are no reported wells however springs may be viable water supply sources in this formation.

UC — ***Ultramafic Complex*** This is made up of serpentinized peridotite and its related magmatic differentiates.

Limited pumpable groundwater, if any, occurs in the fractured and/or weathered zones.

BC — ***Basement Complex*** The oldest rock in the province made up of serpentine. Limited pumpable groundwater, if any, occurs in the fractured and/or weathered zones.

Figure 6-1

GROUNDWATER AVAILABILITY MAP OF TAWI-TAWI

Table 6-1 Existing Water Supply System

LOCATION (MUNICIPALITY, Barangay)	WELL NUMBER	DRILLING DEPTH (m)	ACTUAL CAPACITY (lps)	SPECIFIC CAPACITY (lps/m)	STATIC WATER LEVEL (mbgs)
BALIMBING					
1. Bato-Bato I	BPW 10235	-	-	-	-
2. Tawi-Tawi	BPW 10326	-	-	-	-
3. Tawi-Tawi Settlement	BPW 10237	-	-	-	-
4. Tarawakan	NAWASA 49-60-13	21.3	1.26	2.07	3.66
5. Bato-Bato	NAWASA 10234	28.1	0.32	0.01	6.40
6. Tawi-Tawi	NAWASA 10239	18.3	-	-	5.49
BONGAO					
1. Bongao Elementary School	BPW 66-76-5	18.3	1.76	-	3.66
2. Sanga-Sanga	BPW 66-76-2	19.8	1.26	4.13	3.96
3. Sapa Cagayan	BPW 66-75-3	17.7	0.30	0.10	6.10
4. Poblacion Bongao	BPW 66-75-4	14.02	1.26	-	4.57
5. Sanga-Sanga	BPW 66-77-6	22.3	-	-	4.27
6. Pasiagan	BPW 66-77-2	18.9	0.19	0.02	9.15
7. Tubig Sallang	BPW 66-77-3	3.96	0.63	2.06	2.44
8. Monkay Simunul	BPW 66-75-4	14.02	1.26	-	4.57
9. Bongao-Bongao	NAWASA 17889	3.66	0.63	-	0.76
10. Bongao Proper	NAWASA 1197	54.30	0.32	0.05	9.15
11.Bongao School Site	NAWASA 7198	62.50	0.95	0.13	6.10
12.Bokong	NAWASA 17890	3.05	0.57	-	0.76
13.Karundung	NAWASA 49-60-11	15.60	0.63	0.69	6.40
14.Tubig Basag	NAWASA 49-60-15	7.62	0.63	2.07	2.74
15.Pangasinan	NAWASA 49-60-12	13.70	-	-	4.57
16.Pahut	NAWASA 49-61-11	8.50	0.63	2.07	2.74
17.Sanga-Sanga	NAWASA 49-60-11	15.60	0.63	0.69	5.79
18.Pahut Proper	NAWASA 49-61-12	5.18	0.63	1.03	0.91
BENTRILUM ISLAND					
1. Nusa-Nusa	NAWASA 49-61-37	3.96	-	-	-
2. Libub	NAWASA 49-61-38	3.66	-	-	-
CAGAYAN DE SULU					
1. Lupang de Sulu	NAWASA 7203	6.10	-	-	-
2. Lupang de Sulu	NAWASA 10322	6.28	-	-	-
3. Duhul Bato	NAWASA 10233	20.96	5.59	-	27.1
4. Cagayan de Sulu Airport	BPW 66-75-1	17.1	0.31	-	5.49
5. Tandumanak	BPW 66-76-4	17.7	0.95	-	1.83
6.Tangsibalo Sibuto	BPW 66-77-7	6.10	0.63	-	5.49
7. Salingoh Elem. School	BPW 66-77-9	7.01	0.63	-	3.66
8. Tongikat	BPW 66-72-11	6.71	0.63	-	3.66
9. Tambulian	BPW 66-76-1	26.20	0.63	0.03	10.70
10.Tandulbanak	BPW 66-76-4	4.88	0.63	-	1.83
11.Lupa-Pula	BPW 66-75-2	13.40	0.63	0.69	5.79
SIMUNUL					
1. Tubig Indangan	NAWASA 7202	38.10	0.95	-	-
2. Mongkai	NAWASA 21213	3.05	-	-	2.13

Table 6-1 Existing Water Supply System (Continuation)

LOCATION (MUNICIPALITY, Barangay)	WELL NUMBER	DRILLING DEPTH (m)	ACTUAL CAPACITY (lps)	SPECIFIC CAPACITY (lps/m)	STATIC WATER LEVEL (mbgs)
SANGA-SANGA					
1. Tubig Salang	NAWASA 1789	5.79	5.96	-	3.66
2. Sanga-Sanga	NAWASA 17897	15.20	1.20	-	9.15
3. Tubig Basag	NAWASA 17599	2.13	5.96	-	0.91
4. Tubig Basag	NAWASA 21211	2.13	-	-	0.91
5. Sanga-Sanga	BPW 66-77-4	15.20	1.26	2.07	7.93
SITANGKAI					
1. Sikutu Center	NAWASA 7200	3.66	0.32	1.03	2.44
2. Talisay	NAWASA 7199	3.66	0.32	1.03	2.44
3. Tandubanak	NAWASA 7201	3.66	0.32	1.03	2.44
4. Lipud	NAWASA 49-61-17	4.88	-	-	-
TANDUBAS					
1. Laum Secubong	NAWASA 1781	3.96	0.63	-	0.91
2. Dalo-Dalo Mantabusan	NAWASA 13945	4.27	0.63	-	1.37
3. Tungason Banaran	NAWASA 13944	5.49	0.63	1.03	0.91
4. Lauan Sicubang	NAWASA 13940	3.66	0.95	-	1.37
5. Malanta	NAWASA 13939	5.49	0.95	-	2.74
6. Malanta	NAWASA 13938	5.49	0.95	-	1.83
7. Ballak	NAWASA 13937	5.79	-	-	1.22
8. Ballak	NAWASA 13937	4.27	-	-	-
9. Salanga	NAWASA 13942	4.88	0.95	-	1.37
10.Licudsebong	NAWASA 13942	5.79	-	-	0.46
11.Sapa-Sapa	NAWASA 49-61-31	4.57	-	-	1.22
12.Luuk-Bato	NAWASA 49-61-33	3.66	-	-	
13.Kahic	NAWASA 49-61-34	3.66	-	-	
14.Lapian Buin	NAWASA 49-61-51	3.66	-	-	
15.Gadjamina	NAWASA 49-61-62	5.79	-	-	
16.Licud Sumbong	NAWASA 13943	5.49	0.63	-	0.91
17.Edcor Farm	NAWASA 10236	36.60	0.95	0.19	8.54
18.Tandubas Proper	NAWASA 49-61-15	4.57	0.63	2.07	3.05
19.Sapa	NAWASA 49-61-14	5.18	0.63	0.34	1.52
20.Gagjamina	NAWASA 49-61-62	6.40	0.32	2.07	0.73
21.Baskas	NAWASA 49-61-16	4.88	0.63	0.26	1.22
22.Bunton	NAWASA 49-61-36	4.27	0.63	1.38	3.66
23.Latuan	NAWASA 49-61-35	4.57	0.63	0.46	3.96
24.Balidatal Islam	NAWASA 49-61-53	12.20	0.50	1.65	13.70
25.Lakit-Lakit	NAWASA 49-61-52	6.71	0.63	2.07	5.79
26.Sitio Tinggah	NAWASA 49-61-64	5.79	0.50	-	5.34
27.Licud Sicubong	NAWASA 49-61-63	5.18	0.38	-	4.57
28Mantabuan	NAWASA 49-61-61	3.66	0.32	1.03	2.90
29.Boldotol Islam	NAWASA 49-61-53	14.90	0.50	1.65	13.4
LANGOYON					
1. Tangayan Proper	BPW 66-77-8	6.10	-	-	-

Table 6-1 Existing Water Supply System (Continuation)

LOCATION (MUNICIPALITY, Barangay)	WELL NUMBER	DRILLING DEPTH (m)	ACTUAL CAPACITY (lps)	SPECIFIC CAPACITY (lps/m)	STATIC WATER LEVEL (mbgs)
PANGASINAN					
1. Pangasinan Elem. School	BPW 66-77-1	9.15	0.95	1.55	6.10
2. Pangasinan Elem. School	BPW 66-77-2	8.84	0.95	-	6.10
SALLANG					
1. Tibig	BPW 66-77-5	3.96	0.63	2.06	2.44
2. Tubig	BPW 66-76-7	7.62	0.63	1.03	4.88
SIBUTO					
1. Tong Sibalo	BPW 66-76-6	4.27	0.63	-	1.37

Table 6-2 Water Well Data by Municipality

Town	No. of Wells Based on Static Water Level			No. of Wells Considered	Specific Capacity (lps/m)		Well Depth (m)		Static Water Level (m)	
	1-3 mbgs	3.1-6 mbgs	>6 mbgs		Average	Range	Average	Range	Average	Range
1. Bongao	6.00	8.00	6.00	20.00	1.18	0.02 - 4.13	17.09	.66 - 62.50	4.37	0.76 - 9.15
2. Languyan	-	-	-	-	-	-	6.10	6.10	-	-
3. Mapun										
4. Plima Sugala										
5. Sapa-Sapa										
6. Simunul	-	1.00	-	1.00	-	-	20.57	3.05 - 38.1	2.13	2.13
7. Sitangkai	3.00	1.00	-	4.00	1.03	1.03	3.96	3.66 - 4.88	2.82	2.44 - 3.96
8. South Ubian										
9. Tandubas	16.00	9.00	2.00	27.00	1.18	0.26 - 2.07	6.58	3.6 - 36.6	3.36	0.91 - 13.4
10. Turtle Island										
11. Balimbing	-	2.00	1.00	3.00	1.04	0.01 - 2.07	22.56	18.3 - 28.1	3.51	3.66 - 6.4
12. Bentrilum Island	-	-	-	-	-	-	3.81	3.66 - 3.96	-	-
13. Cagayan de Tawi-Tawi	2.00	5.00	2.00	9.00	1.03	0.03 - 0.69	12.83	4.88 - 26.2	-	1.83 - 27.1
14. Sanga-Sanga	2.00	1.00	2.00	5.00	2.07	2.07	8.09	2.13 - 15.2	4.51	0.91 - 9.15
15. Pagasinan	-	-	2.00	2.00	1.55	1.55	8.99	8.84 - 9.15	6.10	6.10
16. Sibutu	1.00	-	-	1.00	-	-	4.27	4.27	1.37	1.37
17. Sallang	1.00	1.00	-	2.00	1.54	1.03 - 2.06	5.79	3.96 - 7.62	3.64	2.44 - 4.88

Source : National Water Resources Board

N

0 10 20

KILOMETERS

CAGAYAN DE TAWI-TAWI	
WD	4.88-26.2
SC	0.03-0.69
SWL	1.83-27.1

TANDUBAS	
WD	3.6-36.6
SC	0.26-2.07
SWL	0.91-13.4

CAGAYAN DE TAWI-TAWI ISLAND

MAPON (CAGAYAN DE TAWI-TAWI)

SULU SEA

KANGTIPAYAN DAKULA ISLAND

CACATAN ISLAND

SUGBAI PASSAGE

MANIACOLLAT ISLAND

SUGBALI ISLAND

BUBUAN ISLAND

TUMBAGAAR ISLAND

BONGAO	
WD	3.66-62.5
SC	0.02-4.13
SWL	0.76-9.15

LANGUYAN

TANDUBAS

SOUTH UBIAN

SOUTH UBIAN ISLAND

TURTLE ISLAND

BONGAO

PANGLIMA SUGALA (BALIMBING)

SAPA-SAPA

TANDUBAS ISLAND

TABUAN ISLAND

SANGA-SANGA ISLAND

SECUBONG ISLAND

SIMUNUL	
WD	3.05-38.1
SC	-
SWL	2.13

TAGANAK ISLAND

MANTABUAN ISLAND

BANARAN ISLAND

BILATAN ISLAND

BALIMBING	
WD	18.3-28.1
SC	0.01-2.07
SWL	3.66-6.4

SIMUNUL

UMAPOY ISLAND

SIBUTU ISLAND

SITANGKAI

MANUK MANGKAW ISLAND

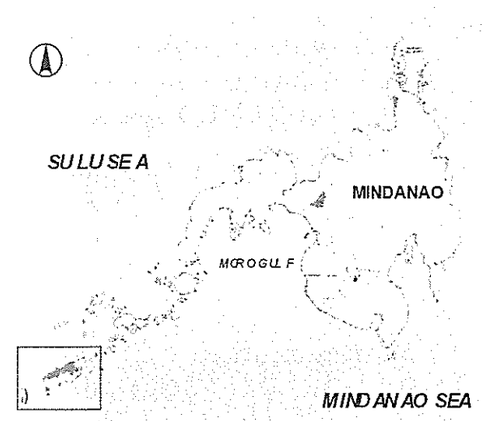
SIBUTU	
WD	4.27
SC	-
SWL	1.37

SITANGKAI ISLAND

SITANGKAI	
WD	3.66-4.88
SC	1.03
SWL	2.44-3.96

SANGA-SANGA	
WD	2.13-15.2
SC	2.07
SWL	0.91-9.15

MINDANAO SEA



KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Provincial Road
- City Center
- Town Center
- WD — Well Depth in meters
- SC — Specific Capacity in liters per second per meter of drawdown (lps/m)
- SWL — Static Water Level in meters below ground surface

Figure 6-2

WELL LOCATION MAP OF TAWI-TAWI

For planning purposes, the different rock units in the province can be classified into the following in terms of groundwater availability.

- ***Shallow well areas.*** By definition, these are areas with water-bearing formations where water can be withdrawn up to the depth of not more than 20m from the ground surface. These are the areas underlain mostly by Recent corals and alluvium, if present, and possibly in Late Miocene to Pliocene Clastic Rocks (N_2S).

- ***Deep well areas.*** In deep well areas, the aquifers exist to depths of more than 20m from the ground surface. These can be found in areas underlain by N_2S.

- ***Difficult areas.*** These are areas not suitable for well development. In the province the areas under this category are Basement Complex (BC), Ultramafic Complex (UC) and Quaternary Volcanics (QV). Limited groundwater, if any, occurs in the fractured and/or weathered zones. Springs may be present but expected not to be significant.

6.3.1 Groundwater Quality

In the Winrock – Amore Water Supply and Sanitation Feasibility Assessment, water quality analyses were conducted on existing water supply sources. These include electrical conductivity (EC), temperature, pH, chloride, arsenic and coliform bacteria.

The highest EC or TDS levels were found in wells completed close to the shorelines. Chloride concentrations followed a pattern similar to that of EC levels and were highest near the shore/coast. On the smaller islands ($<5km^2$), most of the wells sampled showed brackish to saline EC levels. Arsenic was not detected in any of the samples collected. Spring and surface water sources generally showed low total dissolved solid (TDS) levels.

Some water samples from Bongao, Languyan, Panglima and Sapa-sapa were collected and subjected to laboratory analysis. The results of the tests are presented in Table 6-3. Some of tested samples have exceeded the permissible limits of turbidity, chloride content and total hardness.

Field analysis for coliform bacteria showed that most of the open dug wells currently used for drinking and washing have bacteriological contamination. The construction of these wells provides no protection of the well from surface water contamination.

Table 6-3 Laboratory Analytical Results for Well and Spring Samples (MCWD Laboratory)

PARAMETERS (mg/l)	Municipality							
	Bongao			Languyan		Panglima Sugala		Sapa-Sapa
	Paba-bag	Pagat-pat	Mandu-lan	Tumba-gaan	Bas Likud	Buan	Balim-bing	Tapian Bohe South
Turbidity (NTU)	0.2	7.0*	0.1	6.0*	12*	0.15	8.0*	0.5
Chloride	60	3	25	120	24	24	32	25
Calcium	78	40	55	54	68	44	50	54.26
Total Hardness	350*	380*	325*	452*	280	250	385*	168
Iron	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Mg	3.5	24	4.6	36	72	40	24	1.2
Chromium	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Solids	650	720	420	790	810	430	575	295
Total Dissolved Solids	570	450	301	600	472	180	300	220
Total Suspended Solids	80	270	119	190	338	250	275	75

* - *Laboratory result exceeds the permissible limits.*

6.4 Surface Water

The bodies of fresh surface water in Tawi-Tawi are limited to some perennial small rivers and creeks. The principal rivers include the Malum and Dungun Rivers.

6.5 Future Development Potential of Water Sources

6.5.1 Groundwater

Based on the study of existing water sources, groundwater is considered as the safer and more economical source for future water supply requirements of the province.

Shallow wells are possible sources for Level I service and also for Level II in some places. Potential aquifers for shallow wells occur even from less than 3 to about 20 mbgs. One disadvantage of shallow well is its high susceptibility to direct infiltration of surface pollutants.

In general, deep wells have better quality and invariable yields when developed with appropriate technology. It reduces the hazards of groundwater pollution. In this province, the geologic unit, Late Miocene to Pliocene Clastic Rocks (N_2S) consisting of inter bedded conglomerates, sandstone, siltstone, mud stone and limestone can be considered as deepwell areas.

6.5.2 Spring

Although their yields may be minimal, springs are viable water supply sources particularly in areas with difficulty in getting water from wells.

6.5.3 Surface Water

In places where there are difficulty in getting potable water both from wells and springs, the different rivers and creeks in the study areas can be considered as alternative sources of water supply. The principal rivers in Tawi-Tawi are the Malum and Dungun Rivers.

Tapping these possible surface water sources will necessitate the construction of intake structures and other facilities needed for complete treatment. Considering the facilities needed for surface water source, the initial investments involved would entail huge expenses. Hence, it is recommended that surface water should only be considered as a source when other sources (e.g. groundwater through wells or springs) are no longer practical to develop.

CHAPTER 7

FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

7. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION

7.1 General

The future needs in water supply and sanitation facilities for each municipality were basically assessed base on existing condition as presented in Chapter 3 of this report. Other considerations in determining the future requirements were based on the Program of Works (POW) submitted to us by the respective LGU's, taking into account the water sources availability, and service area population and our engineering judgment during the site visit. For the municipalities which were not reached during the investigation. the Poblacion and other urban areas of the municipality were considered to a certain water service level basing it from the general information gathered from the PPDO .

7.2 Targets of Provincial Sector Plan

The master plan aims to provide a ten-year design period for water and sanitation project in the Province of Tawi-Tawi. It was foreseen that the project would be done in two phases. Phase I will cover the need of the province from year 2005 to 2010, and the second Phase from 2010 to 2015. As discussed in Chapter 3 mostly of the water service in the province of Tawi-Tawi is level I. This is being looked by into providing a water level service in the municipality, which is technically viable. The targets of development plan for each town were evaluated based on the factors stated in Clause 7.1. Target assumptions were established to be used in projecting the future requirements for each sub sector. Since setting targets for each municipality seems to vary depending on the final evaluation and judgment of the area, a logical percentage for each town was used in projecting the future requirements. The percentages set for Phase Phase II and I are 50% and 60% of the barangay population, respectively for each water service level. For the sanitation facilities, the percentage used for Phase I is 50% while for Phase II is 60%. The sample percentage application for each water level service and household toilets as target design year is shown below. Table 7-1 summarizes the provincial targets for the water and sanitation projects.

Phase	Barangay Population (a)	Water Service Level			Household Toilets
		Level 3 (b)	Level 2 (c)	Level (d)	
Phase I (2005-2010)	1,000	50% x (a)	50% x (a)	* [(a)-(b)] x 50% ** [(a)-(c)] x 50% *** (a) x 50%	(a) x (30% to 80%)
Phase II (2010-2015)	1,500	60% x (a)	60% x (a)	* [(a)-(b)] x 60% ** [(a)-(c)] x 60% ***' (a) x 60%	(a) x (50% to 85%)

Notes: * *For level III system barangay* ** *For level II system barangay*
*** *For level I system barangay*

Table 7-1 Provincial Sector Targets

FACILITIES	Existing (2003)		Phase I (2005-2010)		Phase II (2010-2015)	
WATER SUPPLY	***Population Served***	***Population Coverage***	***Additional Population to be Served***	***Population Coverage***	***Additional Population to be Served***	***Population Coverage***
Urban	33,258	10%	33,528	19%	42,835	25%
Rural	88,729	27%	71,908	46%	56,127	56%
Total	121,987	37%	105,436	65%	98,963	80%
SANITATION - HOUSEHOLD TOILETS	***Household Served***	***Additional Household to be Served***	***Additional Household to be Served***	***Household Coverage***	***Additional Household to be Served***	***Household Coverage***
Urban	6,178	11%	2,401	14%	2,153	17%
Rural	13,554	24%	8,268	36%	5,043	43%
Total	19,732	35%	10,669	50%	7,196	60%
SANITATION - SCHOOL TOILETS	***Schools Served***	***Coverage***	***Additional Schools to be Served***	***Coverage***	***Additional Schools to be Served***	***Coverage***
	217	100%	24	100%	13	100%
SANITATION - PUBLIC TOILETS	***Public Utilities Served***	***Coverage***	***Additional No. of Public Toilet***	***Coverage***	***Additional No. of Public Toilet***	***Coverage***
	12	100%	7	100%	7	100%

7.3 Projection of Frame Values

7.3.1 Population Projection

Future population for all municipalities was projected for the target years 2005, 2010, and 2015. The references used in the projection were the census data for the years 1980, 1990, 1995, and 2000. NSO's population projection for the period 1995 to 2005 was also used as reference and integrated with past population trends. Using the growth rates mentioned, the municipal population was computed based on the formula shown below:

$$P_1 = P_0 \times (1+r)^n$$

where:

P_1 = population after n years

P_0 = population in base year

r = growth rate

n = no. of years

Population projection was made only in 8 out of 10 towns that consist the Province of Tawi Tawi. Two (2) municipalities which are Turtle Islands and South Ubian were temporarily deferred due to limited information and lack of technical data. For the barangay population projection, the ratio method was applied to project the barangay population with respect to its municipal population. For the 10 towns, projections are broken down into urban and rural category are shown in Table 7-2.

Table 7-2 Population Projection, Province of Tawi-Tawi

Municipality	2000			2003			2005			2010			2015		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
1 Bongao	9,037	49,137	58,174	9,821	50,199	60,020	10,406	54,088	64,495	12,206	58,702	70,909	14,213	63,747	77,960
2 Languyan	5,145	36,895	42,040	5,151	37,491	42,642	5,156	37,910	43,065	5,155	38,791	43,946	5,167	39,678	44,845
3 Mapun	5,939	16,072	22,011	5,235	16,716	21,951	4,887	17,287	22,174	4,731	17,543	22,274	4,568	17,807	22,375
4 Panglima Sugala (	2,311	31,004	33,315	1,093	33,362	34,455	663	35,540	36,203	708	38,353	39,061	743	41,402	42,145
5 Sapa-Sapa	25,976	266	26,242	26,701	273	26,974	27,195	278	27,473	28,327	290	28,617	29,506	302	29,808
6 Simunul	4,665	27,297	31,962	4,835	28,212	33,047	4,953	28,867	33,820	5,214	30,371	35,584	5,477	31,964	37,440
7 Sitangkai	27,503	25,269	52,772	29,248	26,675	55,923	30,480	27,657	58,137	33,526	30,013	63,538	36,829	32,613	69,441
Sub-Total	80,576	185,940	266,516	82,084	192,928	275,012	83,740	201,627	285,368	89,867	214,062	303,930	96,503	227,512	324,015
8 South Ubian	7,367	19,934	27,301	8,383	19,001	27,384	8,397	19,043	27,440	8,410	19,094	27,505	8,424	19,145	27,570
9 Tandubas	4,041	20,859	24,900	3,910	21,287	25,197	3,826	21,638	25,463	3,609	22,335	25,944	3,417	23,016	26,433
10 Turtle Islands	1,326	2,274	3,600	1,373	2,283	3,656	1,405	2,289	3,694	1,475	2,300	3,776	1,541	2,318	3,859
* Provincial Total	93,310	229,007	322,317	95,750	235,498	331,249	97,368	244,596	341,965	103,362	257,792	361,154	109,885	271,992	381,877

* Inclusion of South Ubian, Tandubas and Turtle Islands is temporarily deferred in the evaluation due to limited information and lack of technical data

7.3.2 Public Schools and Public Utilities

The number of public schools was projected by applying the current ratio of student population to the total municipal population and the ratio of the number of schools to the number of students. The ratio values were then applied to the projected municipal population.

Generally, in the province of Tawi-Tawi, there is only one place for the markets and bus/jeepney terminals for each town. The number of sanitation facilities for the public utilities were estimated to have one additional sanitation facility for every phase of the project implementation. Table 7-3 shows the projected facilities.

Table 7-3 Projected Schools and Public Utilities by Municipality

Municipality	Public Schools			Public Utilities		
	2003	2010	2015	2003	2010	2015
1 Bongao	34	41	46	3	4	5
2 Languyan	26	27	28	1	2	3
3 Mapun	23	23	23	1	2	3
4 Panglima	32	38	40	1	2	3
5 Sapa-Sapa	27	29	31	1	2	3
6 Simunul	24	27	28	1	2	3
7 Sitangkai	24	29	32	1	2	3
Provincial Total	190	214	228	9	16	23

7.4 Types of Facilities and Implementation Criteria

7.4.1 Water Supply

A. Urban Water Supply

Service Level. The levels of water service for each municipality were determined based on the different considerations as mentioned in Clause 7.1. Generally, a Level III water system is appropriate for urban areas but Levels I and II facilities can also be implemented in urban areas in the future.

Utilization of Existing Facilities. The existing Level I and II facilities are considered to be utilized during Phase I period. However, the population served by these facilities is assumed to be absorbed by Level III service in Phase II.

Water Source. Most of the existing Level III systems use deep wells. In this context, a deep well source would be used as the primary source in the project development plan, wherever applicable.

Number of System. Generally, there is one Level III system considered for each municipality. Whenever a Level III system exists in the municipality, the future requirements are considered as an expansion of the existing system, otherwise a new system was considered.

Rehabilitation. Rehabilitation of existing and future facilities is assumed to be undertaken by the operating organization or individual.

B. Rural Water Supply

Service Level. The Level I systems are generally planned for rural areas where houses are scattered. Service level standards are set at 15 households per source for Level I and 5 households per communal faucet for Level II. Application of Level III in rural areas may be considered on a case basis during implementation.

Utilization of Existing Facilities. The usable existing facilities of all water system levels will be use and integrated in the future development plan.

Water Source. Generally, shallow/deep wells are recommended for Level I and deep well for Level II wherever applicable, in view of safety against possible contamination and stable water supply. Conventional construction method (driven well) may be employed under the favorable substrata or hydrogeological conditions. Spring development is also considered in Levels I and II, specifically for municipalities where shallow/deep wells are not possible. Standard specification of shallow and deep wells is summarized in the succeeding Table 7-4.

Table 7-4 Standard Specifications of Level I Wells

Specification	Shallow Well	Deep Well
Construction Method	Open-hole drilling and gravel pack	
Casing Diameter	50 mm	100 mm
Borehole Diameter	150 mm	200 mm
Ranges of well Depth	20 m	<20 m

Number of Systems and Facilities. Generally, there is one Level III water system in the municipality except for other towns where other urban barangays are distantly located from the Poblacion and where satellite system is recommended. The same case is applied to Level II system when potential Level II barangays are located far from each other, separate systems are applied. The number of Level I wells and the number stand faucets for Level II were estimated using the service level standard set.

7.4.2 Sanitation

The type of toilet facilities is dependent on the service level of water supply in the community. In the province of Tawi-Tawi, a flush type toilet was allocated to be used in areas where Level III water system is existing and proposed and pour flush type is considered for Level I and II water systems.

7.5 Service Coverage by Target Year

7.5.1 Water Supply

The sector service coverage percentage target was set for each town based on the existing facilities. Applying the percentages shown in the table of Clause 7.2 , the average targets for Level III are 12 % and 26 % of the municipal population for Phase I and Phase II, respectively. For Level II, average targets are 18% and 14% of the municipal population for Phase I and Phase II, respectively. And for Level I, the average targets are 35% and 40 % of the municipal population for Phase I and Phase II, respectively.

The decreased figure for level II target indicates that the level II project to be implemented in Phase I will be upgraded to Level III during Phase II implementation. Table 7-5 shows service area population and served population for the water supply system. Figures 7-1 and 7-2 show the proposed water supply facilities coverage for Phases I and II.

7.5.2 Sanitation

The service area coverage target of sanitation facilities was carried out based on the existing sanitary condition of the municipality. Applying the percentages as shown in the table of Clause 7.2, the computed target percentage for Phase I and Phase II are 50% and 60 %,

respectively. For the public school toilets and public utility toilets, it is projected that all facilities will be served. Table 7-6 shows projected service area population and served population for the sanitation facilities. Figures 7-3 and 7-4 show the proposed sanitation facilities coverage for Phases I and II.

7.6 Facilities, Equipment and Rehabilitation to Meet the Target Services

7.6.1 Water Supply

The required facilities for each water level service were estimated taking into account the existing water supply facilities and their condition, and the projected served population for all service areas. Based on analyses made (presented in the preceding sections), the required facilities for future development listed as the number of water systems, and service connections for Level III; the number of water systems and public faucets for Level II; and the number of shallow and deep wells Level I, are presented in Table 7-7.

Anticipated sets of equipment needed in the implementation of the water supply projects are listed below.

- Truck-mounted rotary drilling machine
- Truck-mounted percussion drilling machine
- Well rehabilitation equipment
- Service truck with crane
- Support vehicle (Pick-up with winch)

7.6.2 Sanitation

Future requirements on the number of household toilets were estimated based on the additional number of households to be served both for urban and rural population by municipality. Likewise the future requirements for public school and public toilets were estimated based on the projected increase in the number of public school and public utilities. The future requirements for the household toilets, school toilets, and public toilets for each target year of implementation are presented in Table 7-8.

Table 7-5 Population to be Served by Target Year (Water Supply)

Municipality	Type	Phase I (2005-2010)									Phase II (2010-2015)								
			Service Coverage				Aadditional Population to be served					Service Coverage				Andditional Population to be served			
		Total Population	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total	Total Population	Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
1 Bongao	Urban	12,206	6,103	-	3,052	9,155	3,550	-	199	3,749	14,213	8,528	-	8,528	17,056	2,425	-	5,476	7,901
	Rural	58,702	11,249	-	23,727	34,976	6,521	-	6,270	12,792	63,747	14,841	-	38,248	53,090	3,592	-	14,583	18,175
	Total	70,909	17,352	-	26,778	44,131	10,071	-	6,470	16,541	77,960	23,369	-	46,776	70,145	6,017	-	20,059	26,076
2 Languyan	Urban	5,155	2,578	-	1,289	3,866	2,578	-	-	2,578	5,167	3,100	-	1,240	4,341	523	-	-	523
	Rural	38,791	4,035	4,990	14,883	23,908	4,035	4,990	2,294	11,319	39,678	4,871	6,258	17,129	28,258	836	1,268	2,355	4,459
	Total	43,946	6,613	4,990	16,172	27,774	6,613	4,990	2,294	13,897	44,845	7,971	6,258	18,370	32,599	1,358	1,268	2,355	4,982
3 Mapun	Urban	2,606	1,303	-	652	1,955	1,303	-	6	1,309	2,432	1,459	-	584	2,043	156	-	-	156
	Rural	19,668	1,364	2,730	7,787	11,881	1,364	1,859	1,373	4,596	19,943	1,393	3,639	8,947	13,979	28	909	1,263	2,201
	Total	22,274	2,668	2,730	8,438	13,836	2,668	1,859	1,379	5,905	22,375	2,852	3,639	9,531	16,021	184	909	1,263	2,356
4 Panglima Sugala	Urban	708	354	-	177	531	354	-	-	354	743	446	-	178	624	92	-	1	93
	Rural	38,353	4,561	10,236	11,778	26,575	4,561	10,236	1,629	16,427	41,402	5,988	13,212	13,321	32,521	1,427	2,976	1,543	5,946
	Total	39,061	4,915	10,236	11,955	27,106	4,915	10,236	1,629	16,781	42,145	6,434	13,212	13,499	33,145	1,518	2,976	1,545	6,039
5 Sapa-Sapa	Urban	28,327	-	4,841	11,743	16,584	-	4,841	4,050	8,891	29,506	4,471	5,051	11,991	21,512	4,471	4,339	1,912	10,722
	Rural	290	-	-	145	145	-	-	63	63	302	-	-	181	181	-	-	36	36
	Total	28,617	-	4,841	11,888	16,729	-	4,841	4,113	8,954	29,808	4,471	5,051	12,172	21,694	4,471	4,339	1,948	10,758
6 Simunul	Urban	5,214	-	1,643	1,785	3,428	-	1,643	208	1,850	5,477	2,109	1,177	1,314	4,601	2,109	1,177	22	3,308
	Rural	30,371	4,713	4,744	10,457	19,914	4,713	4,744	1,307	10,764	31,964	12,121	6,045	8,278	26,445	7,408	6,045	372	13,825
	Total	35,584	4,713	6,387	12,242	23,342	4,713	6,387	1,514	12,615	37,440	14,230	7,223	9,593	31,045	9,516	7,223	394	17,133
7 Sitangkai	Urban	33,526	-	13,608	9,959	23,567	-	13,608	1,188	14,796	36,829	17,093	1,512	10,934	29,540	17,093	1,512	1,527	20,132
	Rural	30,013	-	12,553	8,730	21,283	-	12,553	3,395	15,948	32,613	8,705	7,655	9,752	26,111	8,705	1,760	1,022	11,487
	Total	63,538	-	26,161	18,689	44,849	-	26,161	4,583	30,744	69,441	25,798	9,167	20,686	55,651	25,798	3,272	2,548	31,619
Total	Urban	87,742	10,338	20,092	28,656	59,086	7,785	20,092	5,651	33,528	94,367	37,206	7,740	34,769	79,716	26,868	7,028	8,939	42,835
	Rural	216,187	25,923	35,253	77,506	138,682	21,195	34,382	16,331	71,908	229,648	47,918	36,809	95,857	180,584	21,995	12,958	21,174	56,127
	Total	303,930	36,261	55,345	106,162	197,768	28,980	54,473	21,983	105,436	324,015	85,125	44,549	130,626	260,300	48,863	19,986	30,113	98,963

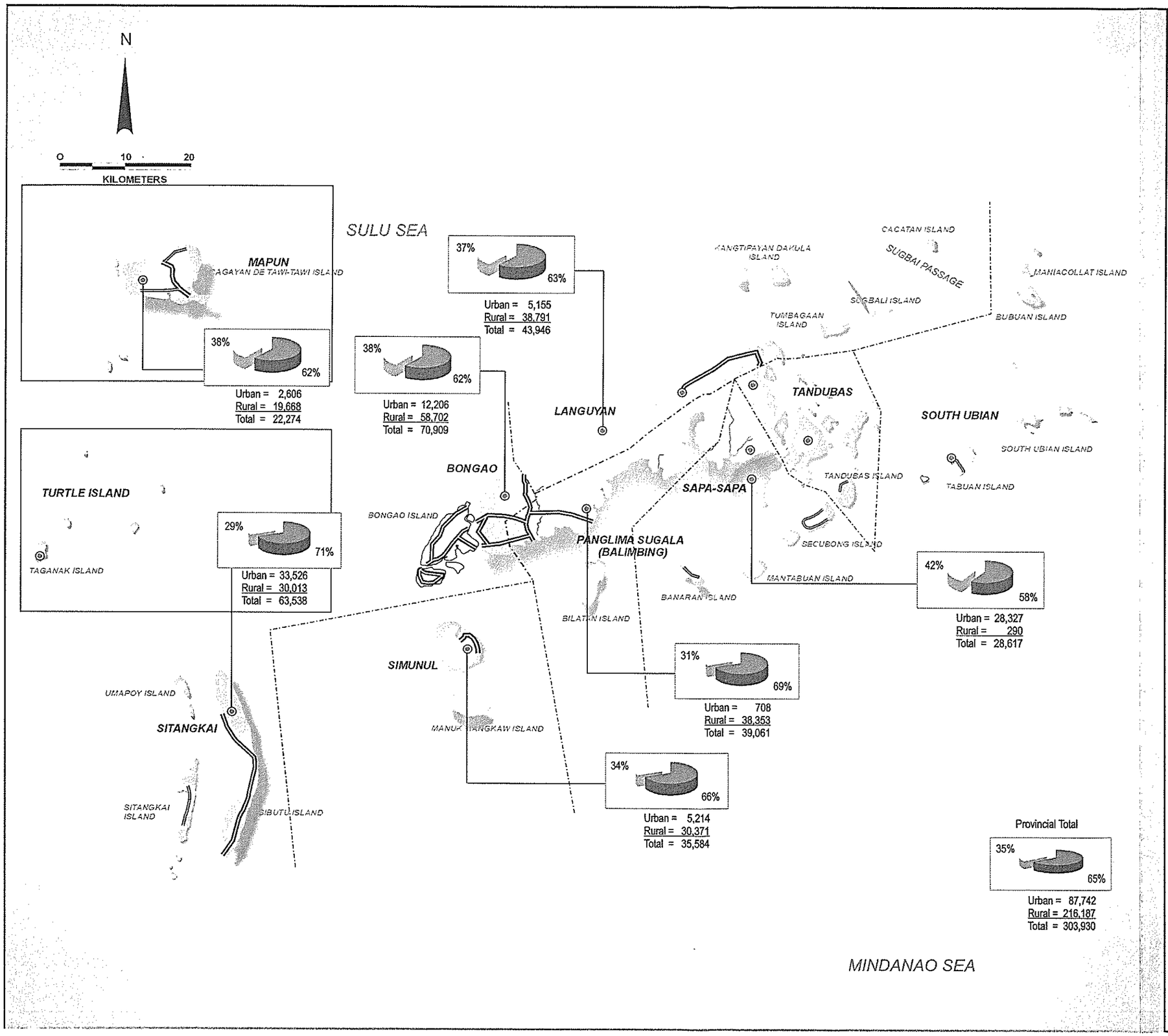


Figure 7-1

WATER SUPPLY FACILITIES
FUTURE REQUIREMENT
PHASE I (2005-2010)
TAWI-TAWI

N

0 10 20

KILOMETERS

SULU SEA

MAPUN

TAGAYAN DE TAWI-TAWI ISLAND

28% 72%

Urban = 2,189
Rural = 17,342
Total = 19,531

27% 73%

Urban = 5,167
Rural = 39,678
Total = 44,845

20% 90%

Urban = 14,213
Rural = 63,747
Total = 77,960

LANGUYAN

BONGAO

BONGAO ISLAND

TURTLE ISLAND

TAGANAK ISLAND

20% 80%

Urban = 36,829
Rural = 32,613
Total = 69,441

PANGLIMA SUGALA (BALIMBING)

BANARAN ISLAND

BILATAN ISLAND

SIMUNUL

MANUK MANGKAW ISLAND

21% 79%

Urban = 743
Rural = 41,402
Total = 42,145

17% 83%

Urban = 5,477
Rural = 31,964
Total = 37,440

UMAPOY ISLAND

SITANGKAI

SITANGKAI ISLAND

SIBUTU ISLAND

KANGTIPAYAN DAKULA ISLAND

CAGAYAN ISLAND

SUGBAI PASSAGE

SUGBALI ISLAND

TUMBAGAAN ISLAND

MANIACOLLAT ISLAND

BUBUAN ISLAND

TANDUBAS

SOUTH UBIAN

SOUTH UBIAN ISLAND

TANDUBAS ISLAND

TABUAN ISLAND

SAPA-SAPA

SECUBONG ISLAND

MANTABUAN ISLAND

27% 73%

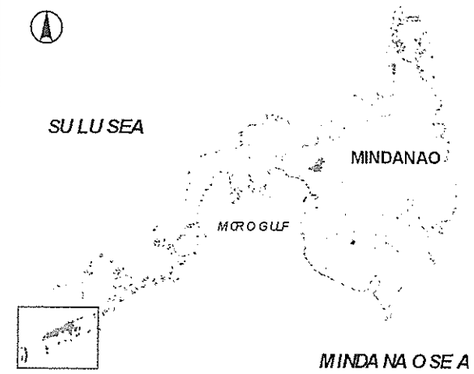
Urban = 29,506
Rural = 302
Total = 29,808

Provincial Total

20% 80%

Urban = 94,367
Rural = 229,648
Total = 324,015

MINDANAO SEA



KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Provincial Road
- City Center
- Town Center
- Population served by water supply facilities (%)
- Population un-served by water supply facilities (%)

Source: PPDO & ACTUAL FIELD VERIFICATION

Figure 7-2

WATER SUPPLY FACILITIES
FUTURE REQUIREMENT
PHASE II (2010-2015)
TAWI-TAWI

Table 7-6 Population to be Served by Target Year (HH toilet)

Municipality	Type	Phase I (2050-2010)							Phase II (2010-2015)						
		Total HH	Total HH to be served			Additional HH to be served			Total HH	Total HH to be served			Additional HH to be served		
			Flush	Pour Flush	Total	Flush	Pour Flush	Total		Flush	Pour Flush	Total	Flush	Pour Flush	Total
1 Bongao	Urban	2,129	1,064	-	1,064	551	-	551	2,479	1,487	-	1,487	423	-	423
	Rural	10,238	1,680	3,439	5,119	828	1,646	2,475	11,118	2,216	4,455	6,671	536	1,026	1,562
	Total	12,367	2,744	3,439	6,184	1,379	1,646	3,025	13,597	3,704	4,455	8,158	959	1,026	1,985
2 Languyan	Urban	953	476	-	476	267	-	267	955	573	-	573	97	-	97
	Rural	7,170	746	2,839	3,585	420	1,641	2,061	7,334	900	3,500	4,401	154	661	815
	Total	8,123	1,222	2,839	4,062	687	1,641	2,328	8,290	1,473	3,500	4,974	251	661	912
3 Mapun	Urban	414	207	-	207	21	-	21	386	231	-	231	25	-	25
	Rural	3,120	-	1,560	1,560	-	316	316	3,164	-	1,898	1,898	-	352	352
	Total	3,534	207	1,560	1,767	21	316	337	3,550	231	1,898	2,130	25	352	376
4 Panglima Sugala	Urban	115	57	-	57	-	-	-	121	72	-	72	15	-	15
	Rural	6,224	740	2,372	3,112	281	835	1,116	6,718	972	3,059	4,031	232	688	919
	Total	6,338	798	2,372	3,169	281	835	1,116	6,839	1,044	3,059	4,103	246	688	934
5 Sapa-Sapa	Urban	4,665	-	2,333	2,333	-	266	266	4,860	-	2,916	2,916	-	583	583
	Rural	48	-	24	24	-	3	3	50	-	30	30	-	6	6
	Total	4,713	-	2,357	2,357	-	269	269	4,909	-	2,946	2,946	-	589	589
6 Simunul	Urban	801	-	400	400	-	237	237	841	324	181	505	72	33	104
	Rural	4,666	724	1,609	2,333	462	917	1,379	4,910	1,756	1,190	2,946	395	218	613
	Total	5,466	724	2,009	2,733	462	1,154	1,616	5,752	2,080	1,371	3,451	467	251	718
7 Sitangkai	Urban	5,698	-	2,849	2,849	-	1,059	1,059	6,259	-	3,756	3,756	-	907	907
	Rural	5,101	-	2,550	2,550	-	918	918	5,543	-	3,326	3,326	-	775	775
	Total	10,799	-	5,399	5,399	-	1,978	1,978	11,802	-	7,081	7,081	-	1,682	1,682
Total *	Urban	14,774	1,805	5,582	7,387	839	1,562	2,401	15,901	2,688	6,852	9,540	631	1,522	2,153
	Rural	36,567	3,890	14,393	18,283	1,992	6,276	8,268	38,837	5,844	17,458	23,302	1,317	3,726	5,043
	Total	51,341	5,695	19,975	25,670	2,830	7,839	10,669	54,738	8,532	24,311	32,843	1,948	5,248	7,196

* Provincial Household Total lower than Base Year Total (2003) since South Ubian, Tandubas & Turtle Islands are deferred from this evaluation.

N

0 10 20

KILOMETERS

SULU SEA

MINDANAO SEA

CAGAYAN DE TAWI-TAWI ISLAND

MAPUN

50% 50%

Urban = 2,606
Rural = 19,668
Total = 22,274

50% 50%

Urban = 5,155
Rural = 38,791
Total = 43,946

50% 50%

Urban = 12,206
Rural = 58,702
Total = 70,909

TURTLE ISLAND

TAGANAK ISLAND

50% 50%

Urban = 33,526
Rural = 30,013
Total = 63,538

LANGUYAN

BONGAO

BONGAO ISLAND

PANGLIMA SUGALA (BALIMBING)

BANARAN ISLAND

BILATAN ISLAND

SIMUNUL

MANUK MANGKAW ISLAND

UMAPOY ISLAND

SITANGKAI

SITANGKAI ISLAND

SIBUTU ISLAND

KANGTIPAYAN DAKULA ISLAND

CAGAYAN ISLAND

SUGBAI PASSAGE

SUGBALI ISLAND

TUMBAGAAN ISLAND

MANIACOLLAT ISLAND

BUBUAN ISLAND

TANDUBAS

SOUTH UBIAN

SOUTH UBIAN ISLAND

TANDUBAS ISLAND

TABUAN ISLAND

SAPA-SAPA

SECUBONG ISLAND

MANTABUAN ISLAND

50% 50%

Urban = 28,327
Rural = 290
Total = 28,617

50% 50%

Urban = 708
Rural = 38,353
Total = 39,061

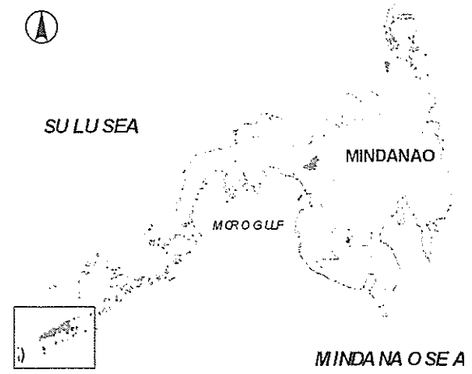
50% 50%

Urban = 5,214
Rural = 30,371
Total = 35,584

Provincial Total

50% 50%

Urban = 87,742
Rural = 216,187
Total = 303,930



KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Provincial Road
- City Center
- Town Center
- Population served by water supply facilities (%)
- Population un-served by water supply facilities (%)

Source: PPDO & ACTUAL FIELD VERIFICATION

Figure 7-3

SANITATION FACILITIES
FUTURE REQUIREMENT
PHASE I (2005-2010)
TAWI-TAWI

N

0 10 20

KILOMETERS

SULU SEA

MINDANAO SEA

CAGAYAN DE TAWI-TAWI ISLAND

MAPUN

40% 60%

Urban = 2,432
Rural = 19,943
Total = 22,375

40% 60%

Urban = 14,213
Rural = 63,747
Total = 77,960

40% 60%

Urban = 5,167
Rural = 39,678
Total = 44,845

LANGUYAN

BONGAO

BONGAO ISLAND

TURTLE ISLAND

TAGANAK ISLAND

40% 60%

Urban = 36,829
Rural = 32,613
Total = 69,441

PANGLIMA SUGALA (BALIMBING)

BANARAN ISLAND

BILATAN ISLAND

SIMUNUL

MANUK MANGKAW ISLAND

UMAPOY ISLAND

SITANGKAI

SITANGKAI ISLAND

SIBUTU ISLAND

40% 60%

Urban = 743
Rural = 41,402
Total = 42,145

40% 60%

Urban = 5,477
Rural = 31,964
Total = 37,440

KANGTIPAYAN DAKULA ISLAND

CACATAN ISLAND

SUGBAI PASSAGE

SUGBALI ISLAND

TUMBAGAAN ISLAND

MANIACOLLAT ISLAND

SUBUAN ISLAND

TANDUBAS

SOUTH UBIAN

SOUTH UBIAN ISLAND

TANDUBAS ISLAND

TABUAN ISLAND

SAPA-SAPA

SECUBONG ISLAND

MANTABUAN ISLAND

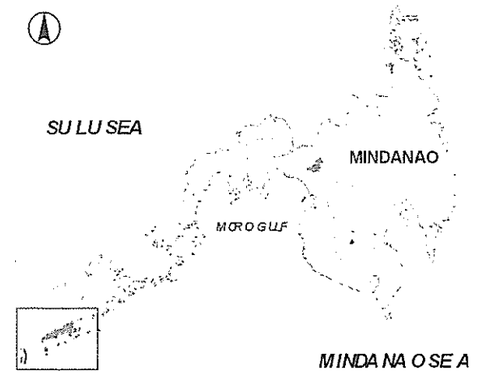
40% 60%

Urban = 29,506
Rural = 302
Total = 29,808

Provincial Total

40% 60%

Urban = 94,367
Rural = 229,648
Total = 324,015



KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Provincial Road
- City Center
- Town Center
- Population served by water supply facilities (%)
- Population un-served by water supply facilities (%)

Source: PPDO & ACTUAL FIELD VERIFICATION

Figure 7-4

SANITATION FACILITIES
FUTURE REQUIREMENT
PHASE II (2010-2015)
TAWI-TAWI

Table 7-7 Water Supply Facilities Required by Target Year

Municipality	Phase I (2005-2010) Requirement					Phase II (2010-2015) Requirement		
	Level III		Level II		Level I	Level III	Level II	Level I
	Mode of Project	No. of Connections	Mode of Project	No. of stand faucets	Total No. of wells	No. of Connections	No. of stand faucets	No. of add'l wells
1 Bongao	Improvement	1,756			75	1,049	0	233
2 Languyan	New	1,222	New	184	28	251	47	29
3 Mapun (Cagayan de Oro)	New	423	New	59	423	29	29	13
4 Panglima Sugala	New	798	Improvement	332	18	246	97	17
5 Sapa-Sapa		0	New	159	15	736	143	21
6 Simunul	New	724	New	196	16	0	1,462	0
7 Sitangkai		0	New	889	31	4,385	111	29
Provincial Total		**4,924**		**1,821**	**606**	**6,697**	**1,888**	**343**

Table 7-8 Sanitation Facilities Required by Target Year

Municipality	Phase I (2005-2010) Requirement			Phase II (2010-2015) Requirement		
	No. of Household Toilet	No. of Public School Toilet	No. of Public Toilet	No. of Household Toilet	No. of Public School Toilet	No. of Public Toilet
1 Bongao	3,025	7	1	1,985	4	1
2 Languyan	2,328	1	1	912	1	1
3 Mapun	337	0	1	376	0	1
4 Panglima Sugala	1,116	6	1	934	3	1
5 Sapa-Sapa	269	2	1	589	1	1
6 Simunul	1,616	3	1	718	1	1
7 Sitangkai	1,978	5	1	1,682	3	1
Total	**10,669**	**24**	**7**	**7,196**	**13**	**7**

CHAPTER 8

INSTITUTIONAL STRENGTHENING PLAN

8. INSTITUTIONAL STRENGTHENING PLAN

8.1 General

This Chapter recommends the initial mechanisms, processes and structures needed to achieve the goals and targets of the sector.

8.1.1 Development Framework for the Sector

One basic institutional deficiency at the local level is the absence of a common goal and strategy for the sector. The Province has to set the specific goals, objectives/targets and strategy for the sector. While the province has a Physical Framework Plan, this is not sufficient to establish sector priorities and considering the problems besetting the sector, the province needs identify priority activities that must be funded.

8.1.2 Operating Policies

The following general policy and strategy statements as established already in the PW4SP could form the initial policy set for sector for adoption and approval by the Provincial Government:

- Sustainability shall be promoted through community-based organizing, training and information dissemination to increase willingness to organize, willingness to pay and willingness to learn O&M of facility;

- Criteria for selection and prioritizing projects to the community should consider sustainability factors and should be based on the demonstrated commitment of the beneficiaries to participate in the project, the current needs for water and sanitation and overall health conditions, potentials for growth and costs;

- Appropriate service level shall be determined based on sustainability parameters, goals and purposes of the Province, the needs of the community based on demographics and demonstrated capacity and willingness to participate in the project by the communities;

- Technology to be used for the projects shall be appropriate to the local conditions and resources. Upgrading of existing systems and facilities will be promoted based on needs of the community. In urban areas, a range of technologies may be needed integrating wastewater collection and treatment, as well as drainage;

- All projects developed by the LGU must involve an integrated approach to the provision of potable water supply, sanitation and hygiene education;

- Cost Recovery and Cost Sharing (Subsidy Policies). The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation;

- Private Sector Participation policies and incentives shall be primarily encouraged, but regulated by the LGU. The LGU should take measures to institutionalize its regulatory functions in order to regulate private water service providers;

- In terms of financing, capital costs generally used to construct water supply projects shall be financed mainly out of the concerned LGU's own resources given that in ARMM, non-devolved services provide the LGUs with surplus funds;

- Concerns for environmental protection and management including water pollution control, conservation and proper utilization of water and land resources should be part of the LGU's programs;

- Policies to be formulated should be gender-responsive. The different aspects of the sector project – technical, economic, financial, institutional and community participation – should provide for equal participation of women and men in the beneficiary community.

8.1.3 Regulatory Policies

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework on the following:

- Water allocation and water rights policies and rate review, which are within the mandate of the National Water Resources Board.

- Water Service Providers Registration/Accreditation - The LGU shall adopt a registration and franchising system for water service associations/ providers. Annual reporting requirements will have to be established for monitoring and auditing purposes.

- Water Quality - The LGU will have to establish a viable mechanism, including water testing and standards enforcement, to ensure that water delivered meet the potability standards set by the National Drinking Water Standards. The DOH currently has the responsibility and the regulatory power to stop the operations of water systems not delivering potable water. The LGU shall establish Water Surveillance Program thru the creation of a Local Drinking Water Quality Monitoring Committee (per Implementing Rules and Regulations of Chapter II, Water Supply, of the Code of Sanitation of the Philippines, P.D.856).

8.2 Institutional Arrangements

In the medium-term, a full-time Provincial (WATSAN) Sector Team (PST) to provide a focal point in the Province shall be set up for coordination, monitoring and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This may be replicated at the municipal and barangay level of the LGU.

In the long term, the PST may be formed as a Provincial Water and Sanitation Office (PWSO) under the office of the Chief Executive of the LGU. For LGU-run water systems, this would be the office of the economic enterprise within the LGU with duties and functions beyond coordination and monitoring. It would become the focal point of WATSAN activities of the Province and coordination and monitoring of all WATSAN activities would emanate from that office. It would also be the regulating arm of the Province for all WATSAN activities within its provincial jurisdiction. This should be replicated at the municipal level. A PMO for water supply and sanitation at the DILG-ARMM to provide technical and managerial assistance in the formative years of the PST/PWSO is highly recommended to be set up.

Both the Province and Municipality may set up such a Team (for the medium-term) or Office (for the long-term) in their respective LGUs.

With the devolution of water supply and sanitation to the LGU, the DPWH-DEO-ARMM may still provide technical services at cost and in competition with other private contractors. Sharing of resources (equipment and staff) with the LGU at cost may be looked into subject to policy decision and guidelines approved at the national level.

The initial professional-level staffing of the PST/PWSO is estimated, as follows:

- Provincial Water Supply & Sanitation Coordinator 1
- Community Development, Gender & Training Specialist 2
- Water Supply & Sanitation Engineer 2
- Monitoring and Evaluation Specialist 1
- Total Personnel Required 6

The recommended roles for the various staff positions are as follows:

- The **Provincial Waterworks & Sanitation Coordinator** shall lead an interdisciplinary Provincial Sector Team, shall be responsible for coordination and supervision of all development planning, implementation, monitoring and evaluation, database development and progress reporting of all activities in the water supply and sanitation sector, shall also liaise with all project implementers and key players in the sector and shall be the key contact person of the DILG for WATSAN concerns.

- The **Community Development, Gender and Training Specialist** shall be responsible for implementing community organizing and community participation aspects of the sector with a gender-responsive approach, shall be responsible for developing and implementing community-based programs and activities for the sector in the various barangays and municipalities, including criteria for community and site selection, conducting regular dialogues and disseminating information among local leaders on water supply, sanitation and health and hygiene education program province-wide, shall oversee accreditation of community-based organizations responsible for the water supply and sanitation facilities, and shall annually review past training programs and develop and implement the province's training programs for water supply and sanitation, hygiene and sanitation education, and community organization and development, including any manuals or other training materials used.

- The **Water Supply and Sanitation Engineer** shall be responsible for all the technical aspects of the project including feasibility studies, design, construction, operation and maintenance, review of the existing technical and environmental situation relating to WSS facilities, proper construction supervision and monitoring in coordination with the municipal liaison, adequate maintenance of LGU equipment and tools for water and sanitation facilities, including drilling rigs and vehicles supervise major repair or

rehabilitation work beyond the capacity of communities to undertake and implement, in coordination with the IPHO, the water quality surveillance system.

- The **Monitoring and Evaluation Specialist** shall assist the Coordinator in all monitoring and evaluation activities including development of database and data processing and reporting for baseline, monitoring and evaluation data.

The same can be done at the municipal level, with the Municipal Waterworks and Sanitation Coordinator also acting as Sector Liaison for the municipality to the Province.

At the barangay level, the Barangay Councils will continue to play a major role in fulfilling the community's aspirations for improved water and sanitation services. It will play a key role particularly in the preparatory stages before the organization of the association (or the appointment of the responsible group). By default, many of the previously failed systems have ended up as responsibilities of the barangay councils. Although the Councils will not have any supervisory role over the associations operating the water systems, it is important that they monitor the performance of the associations.

8.3 Project Management Arrangements

8.3.1 Levels I and II

Project Selection. A community-responsive approach should be used as primary process for project selection. The initiative of the community should be encouraged. All barangays should be properly and consistently informed about sector opportunities and policies by the Provincial through its municipal LGUs. The barangays should take the first step by assessing their needs, deciding that they want to improve their water and sanitation above all other needs and express this needs to the Municipal LGU's WATSAN Unit. The barangay should also decide on desired service levels, with a full understanding of the cost recovery aspects and other responsibilities.

Organization of associations. More flexibility is needed in order to tap into local community resources. The basic principle is for the community to agree on what type of organization, association, community-based organization, cooperative, etc. they want to form in preparation for accepting the responsibility for the facilities. Existing community-based groups with an active track record and with leaders and members who are ready, willing and able to take on the O&M functions may be tasked with the responsibility for the facilities. LGUs will assess the

readiness of the communities and approve the arrangements and accredit the organization. Failure of community-based organizations to live up to their responsibilities can be grounds for removing their accreditation and giving the responsibility to another accredited group. The organization can decide how to organize itself internally in coordination with the municipal liaison ensuring that roles, responsibilities and accountabilities are adhered.

Technology and Technical Design Standards. The former Rural Waterworks Development Corporation (whose functions were absorbed by LWUA) and the DPWH have developed a simplified procedure for conducting the initial data gathering. The format used is recommended for adaptation by the LGUs. These forms can also be revised to suit the specific needs of the LGU.

For Level II systems, technical standards have been in use by LWUA for RWSAs and by DPWH. As these are considered as national standards, their adoption is recommended.

8.4 Community-Based Organizations

The traditional view of communities as mere beneficiaries and recipients of projects has been undergoing changes and transformation in recent years through the policy reforms and transition in the sector. Communities are now provided avenues for more participation in terms of decision-making and initiation of resolution of issues in critical aspects of the sector's project management and implementation.

This implies the need for the LGU to establish an institutional mechanism at the provincial and municipal levels to enhance trust and confidence of communities on its ability for provision of such basic services as water supply and sanitation. Communities will be encouraged to collectively take stock of their resources and constraints and agree on a development program appropriate for their needs.

The LGU shall promote the participation of NGOs, people's organizations (POs), and community-based organizations (CBOs) to catalyze the involvement of women, youth, people's organizations (POs) and other segments of the community in project decision-making and management. It will focus on the role of women in the context of the design of institutional arrangements at all levels. Towards increasing community involvement, the LGU shall develop a community-based implementation strategy and delivery mechanism to ensure the sustainability of sector projects. It shall review the roles and responsibilities of central and local government,

NGOs, the private sector and communities themselves. It shall assess the community participation activities and related institutional arrangements of past community projects and recommend workable community participation approaches.

8.5 Human Resource Development

The main objective for training human resources is to improve individual competence, organizational effectiveness and efficiency, and espouse national development. Training is a function and a responsibility of every leader. It ensures the availability of qualified and able manpower, the shortage of which is considered as one of the major obstacles to improvements in the water supply and sanitation sector.

Training shall be designed and implemented for implementers, planners from national level to regional to LGUs and down to the community level. Needs Assessments will be conducted as the basis for the design of the courses. Participants will be selected based on the their tasks and responsibilities. The PST/PWSO shall establish and maintain a reference library and information/documentation center and shall include training materials and equipment to service needs of the municipalities. The DILG-ARMM shall provide inputs to these training activities.

The LGU role is not to run courses but to ensure that training programs take place and are effective. Actual training activities may be organized or contracted out to well-functioning water districts and government-accredited training, technical and vocational schools. Training may cover but should not be limited to the following areas: source development principally for deep wells, shallow wells, spring development and surface water intake structures, operation and maintenance, plumbing and pipe-laying and basic hydraulics, bookkeeping and management and special courses for water and sanitation caretakers.

8.6 Health and Hygiene Education

The LGUs shall establish an on-going hygiene education program through appropriate methods and channels. These shall include immediate short-run programs: information campaigns; as well as, long-term value formation interventions, possibly through the formal school system. Household and individual hygiene practices, such as hand washing, in house water storage, etc., are part of benefit assessment since these are part of improvement in lifestyle and practices. Three approaches are recommended:

- Community-based Approach: Direct house-to-house campaigns can be implemented through the Rural Health Units as part of their current functions. Special presentations can also be done during the regular meetings of community-based socio-civic clubs. Multi-media presentations may be developed and prepared for information dissemination and campaign.

- School-based Approach: Students are the main targets of this approach, either directly or through their teachers. Special focus activities, such as Water and Sanitation Week or Nutrition Week can be introduced with programs or convocations to make the student aware of the issues and solutions. Posters, flip charts, and other audio-visual materials would be helpful.

- Media-based Approach: This approach utilizes radio and print media to introduce and reinforce health messages. Many NGOs and the Philippines Information Agency (in coordination with the DOH) have developed interesting and attractive materials.

The community development specialist at the PST/PWSO shall be given the responsibility for the health and hygiene education function. The CDS will formulate an action plan; implementation will be done with the municipal liaison staff and other local officials. At the barangay level, its implementation will involve the close coordination among the midwives, the barangay health workers and the Committee on Health of the barangay council. Materials for this efforts have been previously developed and can be found with the various PHOs and RHUs. UNICEF has provided strong support in the preparation of these materials.

A continuous health and hygiene education program will be launched by the LGU. Simple, clear messages and approaches will have to be defined. These messages may include the following: Relationship among health, water supply and sanitation; sector opportunities; services available at the rural health units. For Levels I and II systems, the protection of household storage containers from contamination; hand washing; conservation; pay bills/fees on time; etc. The relevance of these, or other messages will have to be determined by the PST/PWSO.

8.7 Gender and Development

Consistent with the national policy of fundamental equality of men and women before the law, as well as of providing equal opportunities to both genders, the water supply and sanitation

sector shall promote the full participation of men and women in all the phases of the project development cycle. Sustainability of the WATSAN facilities shall be achieved through the partnership of men and women, and their total involvement in its management, operation and maintenance. The socio-cultural norms and practices in the Province, however, should be taken into consideration in conceptualizing gender-responsive influences in the WATSAN institutional set-up in the Province. Nevertheless, women should be encouraged to participate in all aspects and phases of the project cycle.

A gender-responsive approach should consider the following:

- The training of the LGU officials and employees from the regional, provincial, municipal and barangay levels on gender and development.

- The conscious integration of gender concerns in all aspects of project development, that is, from project identification, planning, design and implementation, where the unique needs and requirements of both genders are recognized.

- The equal representation and distribution of responsibilities to the men and women of the beneficiary community, particularly in sharing work, making decisions, cooperation and control of activities such as but not limited to institutional and CD structures and processes, the organization and management of the WATSAN facilities, the training of managers, operators and maintenance personnel.

To provide the LGU insight on how to conceptualize gender-responsive approaches in the Province, it shall conduct a provincial survey to review the role of women in the context of the design of the community participation structure of the project. The review shall include: brief overview of women's socio-economic situation and their role in water and sanitation; gender analysis; analysis of relevant NGOs, women's groups and private agencies that will support community and women's activities; assessment of support action for women's participation essential for project sustainability; and proposed steps to enhance women's role and participation in the project.

CHAPTER 9

COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

9. COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

9.1 General

The total investment cost required for the two-phased implementation as identified in Chapter 7 is defined to include direct costs for construction of required facilities and sector management, as well as physical and price contingencies. Cost requirements for the equipment and vehicle are considered for O& M and long-term development.

Conditions and assumptions used to come up with investment costs covering all sub-sector components were established in coordination with concerned provincial and municipal LGUs and to current standards of relevant sector agencies like the DILG, LWUA, DOH and DPWH.

With regards to construction cost, unit costs per person/household facility were prepared under contract-out basis for respective sub-sector component facilities in current 2003 price levels.

9.2 Assumptions for Cost Estimates

9.2.1 Unit Construction Cost

The unit construction cost per person, household, or facility of each sector component was established based on the PW4SP study's unit analysis model for each component. The unit price of the items of work for each component was escalated at current price level, with the base price level at year 1999 (as per PW4SP Report) and escalated at 2% per annum. But the unit price of water sources was based on the latest implementation cost of PW4SP project.

Unit construction costs consist of direct cost (mobilization/demobilization, material and labor), indirect cost profit and inclusive taxes

Freight cost of construction materials, excluding locally available materials such as sand and gravel, was considered for sanitation and water supply facilities in consideration of the hauling distance from Manila. The cost is estimated as fixed percentage (11%) based on the standard practice being adopted by other agencies. Table 9-1 shows a summary of unit construction costs and their descriptions are given in the succeeding paragraphs. Details of unit cost is tabulated in Appendix 9.1.1 to Appendix 9.1.13.

Table 9-1 Unit Cost of Facilities by Type and Service Level

Sector Service Level		Unit Construction Cost per Facility (Pesos)	Service Coverage		Unit Cost	
			Served Population	Served House-holds	Pesos/ Person	Pesos/ House-hold
Urban Water Supply	**Level III**					
	New System					
	For 5,000 Population	23,261,531	5,000	N/A	4,652	N/A
	For 10,000 Population	35,852,859	10,000	N/A	3,585	N/A
	Expansion					
	For 5,000 Population	21,711,488	5,000	N/A	4,342	N/A
	For 10,000 Population	34,302,816	10,000	N/A	3,430	N/A
Rural Water Supply	**Level II**					
	Deep Well Source	950,200	600	120	1,584	7,918
	Spring Source	1,154,509	600	120	1,924	9,621
	Level I					
	Deep Well					
	30 meter depth	164,000	N/A	15	N/A	10,933
	50 meter depth	198,000	N/A	15	N/A	13,200
	70 meter depth	314,000	N/A	15	N/A	20,933
	Shallow well					
	10 meter depth	72,000	N/A	15	N/A	4,800
	20 meter depth	105,000	N/A	15	N/A	7,000
Sanitation	Household Toilet					
	Flush	4,871	N/A	1	N/A	4,871
	Pour Flush	653	N/A	1	N/A	653
	Public School Toilet	271,000	271,000	N/A	N/A	N/A
	Public Toilet	342,000	342,000	N/A	N/A	N/A

Urban water supply

- Unit cost for two sizes of Level III system covering served population of 5,000 and 10,000.
- Unit cost for Level III was estimated utilizing deep well sources. In case of spring source, it is desirable to confirm transmission lengths during the implementation stage.

Rural water supply

- Unit cost for five types of Level I wells (shallow wells at 10 and 20m depths and deep wells at 30, 50 and 70m depths).

- Unit cost for deep well was estimated using open-hole gravel packed method. Natural gravel pack wells may be considered only after initial implementation when soil formation in prospective sites shall have been established and identified. Facilities requiring appropriate Iron Removal System, and its cost, will be identified during the detailed study.
- Unit cost for Level II system covers 600 served population.

Sanitation

- Unit cost for two types of sanitary toilets, the flush and the pour flush to accommodate one served household in urban and rural areas. Cost of toilet includes only the cost of toilet bowls or water closet.
- Public School Toilet: unit cost includes the whole structure, septic tank and facilities. One toilet is designed with three squat type and two sit type toilet bowls to cover 250 served students. The structure is made of concrete materials, GI roofing, tiled floor and walls (part) and painted. The unit cost also includes one shallow well.
- The Public toilet unit cost includes the whole structure, septic tank and facilities: One toilet is designed with six toilet bowls and three urinals. The structure is made of concrte materials, GI roofing, tiled floor and walls (part) and painted.

Price Escalation

- PW4SP price level in 1999 adjusted to current 2003 prices at 2% per annum.

Unit Cost of Equipment

The unit cost of equipment shown below was prepared using current standard procurement cost and is shown in the suceeding Table 9-2.

Table 9-2 Unit Cost of Equipment and Vehicle

Name of Equipment	Unit Cost (Pesos 1,000)
Truck-mounted rotary drilling machine.	34,978
Truck-mounted percussion drilling machine	27,691
Well rehabilitation equipment	303
Service truck with crane	1,299
Support vehicle (Pick-up with winch)	639

Sector Management Cost

Sector management cost consists of: the following:

- Engineering studies (F/S, D/D and construction supervision) for water supply, public toilet and school toilet facilities. Community development and training including health and hygiene education and logistic support.

- Cost of engineering studies was estimated based on fixed percentages of 9% for F/S and D/D and 4% for construction supervision of the total direct cost

- Community development and training with logistic support was also estimated at 12% of respective construction costs for rural water supply and sanitation and 3% of construction cost for urban water supply and sanitation.

- Contingency cost covers both physical and price contingencies for water and sanitation facilities. Physical contingency is assumed to be 15% of the direct construction cost. Price contingency is assumed to be 10% of the direct cost and physical contingency.

9.3 Cost of Required Facilities and Equipment

The total construction cost of required facilities as public investment of LGUs are shown in Table 9-3 while the summarized costs are shown in Table 9-4 by municipality for each target year.

During the 2005 Medium Term Development period, a total of 910 million pesos will be required for construction of required facilities. Of the requirements, urban and rural water supply will share 20 % and 68 %, respectively. The remaining 12% will be required for urban and rural sanitation.

Five sets of equipment required were allocated for the Province of Tawi-Tawi. The total cost of equipment to be procured by the province is shown in Table 9-5.

Table 9-3 Total Investment Costs (P x 1,000)

Municipality	Phase I (2005-2010) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	24,233	0	6,121	3,935	0	0	502	47,972	0	207,557	6,381	1,699	3,189	0
2 Languyan	17,597	0	0	1,908	0	0	502	29,685	12,496	47,880	3,235	1,693	505	0
3 Mapun (Cagayan De Tawi-Tawi)	8,897	0	120	150	0	0	502	10,037	4,654	28,655	10,508	1,918	118	0
4 Panglima Sugala (Balimbing) (Capital)	1,863	0	0	0	0	0	502	25,857	25,633	34,009	35,130	10,565	2,365	0
5 Sapa-Sapa	0	11,250	64,976	0	255	0	502	0	0	1,089	0	3	1,047	0
6 Simunul	0	3,817	3,332	0	227	0	502	34,674	11,880	22,593	3,561	946	1,166	0
7 Sitangkai	0	31,623	12,207	0	1,015	0	502	0	31,434	37,577	0	12,956	2,098	0
Total Provincial	**52,590**	**46,691**	**86,756**	**5,993**	**1,496**	**0**	**3,513**	**148,225**	**86,098**	**379,360**	**58,815**	**29,780**	**10,488**	**0**

Municipality	Phase II (2010-2015) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	16,553	-	168,218	3,023	-	0	502	26,424	-	482,703	4,131	1,059	1,766	541
2 Languyan	3,570	-	-	691	-	0	502	6,147	3,175	737,448	1,190	682	238	541
3 Mapun (Cagayan De Tawi-Tawi)	1,064	-	-	177	-	0	502	209	2,276	26,367	-	363	45	541
4 Panglima Sugala (Balimbing) (Capital)	585	-	25	106	-	0	502	9,796	7,452	32,212	1,783	710	1,269	541
5 Sapa-Sapa	30,522	10,083	30,678	-	558	0	502	-	-	9,401	-	6	525	541
6 Simunul	14,397	2,735	357	512	31	0	502	54,493	15,139	96,361	3,043	225	597	541
7 Sitangkai	108,916	3,515	15,682	-	868	0	502	59,770	4,407	169,645	-	800	1,150	541
Total Provincial	**175,607**	**16,333**	**214,961**	**4,509**	**1,458**	**0**	**3,513**	**156,840**	**32,449**	**1,554,137**	**10,147**	**3,845**	**5,592**	**3,786**

Table 9.4 Summarized Investment Cost of Required Facilities (Px1,000)
Phase I (2005-2010) Requirements

Municipality	Phase I (2005-2010) Requirement						
	Urban Area			Rural Area			Total
	Water Supply	Sanitation	Sub-total	Water Supply	Sanitation	Sub-total	
1 Bongao	30,354	4,437	34,791	255,529	11,270	266,798	301,590
2 Languyan	17,597	2,410	20,007	90,061	5,433	95,494	115,501
3 Mapun (Cagayan De Tawi-Tawi)	9,017	652	9,668	43,347	12,545	55,891	65,560
4 Panglima Sugala (Balimbing) (Capital)	1,863	502	2,365	85,500	48,059	133,560	135,924
5 Sapa-Sapa	76,226	756	76,983	1,089	1,050	2,139	79,122
6 Simunul	7,149	729	7,878	69,146	5,673	74,819	82,697
7 Sitangkai	43,830	1,517	45,346	69,012	15,054	84,065	129,412
Provincial Total	**186,036**	**11,003**	**197,039**	**613,683**	**99,084**	**712,767**	**909,805**

Municipality	Phase II (2005-2010) Requirement						
	Urban Area			Rural Area			Total
	Water Supply	Sanitation	Sub-total	Water Supply	Sanitation	Sub-total	
1 Bongao	184,771	3,524	188,296	509,126	7,497	516,624	704,919
2 Languyan	3,570	1,193	4,762	746,770	2,651	749,421	754,183
3 Mapun (Cagayan De Tawi-Tawi)	1,064	679	1,742	28,852	949	29,801	31,543
4 Panglima Sugala (Balimbing) (Capital)	610	608	1,219	49,460	4,303	53,763	54,981
5 Sapa-Sapa	71,283	1,060	72,343	9,401	1,072	10,473	82,816
6 Simunul	17,490	1,045	18,535	165,993	4,407	170,400	188,935
7 Sitangkai	128,113	1,370	129,483	233,823	2,491	236,314	365,797
Provincial Total	**406,900**	**9,480**	**416,380**	**1,743,425**	**23,370**	**1,766,795**	**2,183,174**

Table 9-5 Total Equipment Cost (P x 1,000)

Name of Equipment	Quantity	Unit	Unit Cost	Total Cost
Truck-mounted rotary drilling machine	5	set	34,978	174890
Truck-mounted percussion drilling machine	5	set	27,691	138455
Well rehabilitation equipment	5	set	303	1515
Service truck with crane	5	set	1,299	6495
Support vehicle (Pick-up with winch)	5	set	639	3195
Total Equipment Cost				324,550

CHAPTER 10

EXAMINATION OF CRITERIA FOR SELECTING PRIORITY PROJECT/AREA

10. EXAMINATION OF CRITERIA FOR SELECTING PRIORITY PROJECT/AREA

10.1 Criteria for Selecting Projects/Areas

In the province of Taw-Tawi, majority of the municipalities are in need of assistance for the improvement of their respective water supply and sanitation facilities. The prioritization and selection, however, depends on various factors. Tables 10-1 to 10-3 respectively lists the technical, socio-economic, and financial criteria established and considered during the course of this study. The above criteria, however, were not fully used primarily due to lack of data and information for making the selection. These criteria may be used by JICA in its future project selection.

Table 10-1 Technical Criteria for Project/Area Prioritization

PARAMETERS	INDICATORS	CRITERIA	POINTS
Water system existing level of service	Presence of existing Level III service	With less existing level 3 service	No existing Level III: 5.0; With existing Level III: 1.0
Availability of water source	With available water sources	Have abundant water sources	=>2 abundant sources: 5.0; < 2 abundant sources: 1.0

Note: Point System: High Priority = 5.0, Low Priority = 1.0

Table 10-2 Socio-economic Criteria for Project/Area Prioritization

PARAMETERS	INDICATORS	CRITERIA	POINTS
Capacity to Pay	Average Income, Average Water Rate	Ratio of Income to Water Rate (3% or less)	3%: 5.0; >3%: 1.0
Peace and Order Situation	Crime Rate	With Low Rate in the area	10/1000 population: 5.0 >10/1000 population: 1.0
Health	Water-Borne Diseases Morbidity and Mortality Rates	With highest rates	10/1000 population: 5.0 >10/1000 population: 1.0
Access by the Poor	Number/percentage of poor in the area, Poverty Incidence, Average Household Monthly Income	Highest percentage of poor in the area	Ave. HH Income=< Poverty Level Income: 5.0; Ave. HH Income > Poverty Level Income: 1.0
Served vs. Unserved Population	Percentage of Unserved population in the area	With highest % of unserved in the area	=>50% unserved: 5.0 <50% unserved: 1.0

Note: Point System: High Priority = 5.0, Low Priority = 1.0

Table 10-3 Institutional/Financial Criteria for Project/Area Prioritization

Parameters	Indicators	Criteria	Points
Willingness to Pay	Collection Efficiency (%)	Highest Collection Efficiency	80%: 5.0 <80%: 1.0
Willingness to Organize	Number of Functioning Community Organizations	With 2 or more functioning organizations	=>2: 5.0 <2.0:1.0
Willingness to Learn and to O&M Facilities	Level of Educational Attainment and Training of Population	Population has Mostly College Graduates	=>60% of population are college graduates: 5.0; <60%: 1.0

Note: Point System: High Priority = 5.0, Low Priority = 1.0

10.2 Identification of Priority Projects for Medium-Term Development Plan

In the province of Lanao del Sur, almost all towns are in need of assistance for water and sanitation improvement. Likewise, potential water sources are also available in each locality. Based on the investment cost presented in Chapter 9, the viability of each town shall depend on its financial evaluation.

The towns of Lanao del Sur shall be ranked based on the aspects of accessibility of the project area, type of proposed water service, and number of potential served population. From these identified potential projects, a feasibility study shall be conducted to evaluate the priority projects in terms of its requirements and viability. Basically, first level of priority is given to projects with positive feasibility indicator.

APPENDICES

APPENDIX 5-1

BUDGET OPERATIONS STATEMENT - TAWI-TAWI

INCOME & EXPENDITURES

	1999	2000	2001
INCOME			
LOCAL SOURCES	56,229	262,654	108,218
REVENUE FROM TAXATION	55,544	262,654	108,218
Real Property Tax	6,102	174,258	73,264
Local Taxes	49,442	88,396	12,700
Other Taxes			22,254
NON-TAX REVENUES	685		
Receipt from Eco. Ent.	0		
Fees/Charges	685		
Loans and Borrowings	0		
Other Receipts	0		
AIDS AND ALLOTMENTS	105,492,830	159,714,016	166,886,881
BIR Allotments	105,492,830	159,714,016	166,886,881
National Aids		0	
National Wealth		0	
TOTAL INCOME	105,549,059	159,976,670	166,995,099
EXPENDITURES			
CURRENT EXPENDITURES	79,971,893	139,577,675	143,760,007
General Government	65,371,862	91,683,820	84,408,136
Health, Nutrition & Pop. Control			709,010
Housing & Community Devt.			0
Public Welfare & Int. Safety	1,562,767	2,427,907	7,698,340
Economic Development	13,037,264	45,465,947	15,707,996
Debt Servicing			14,900,402
Operation of Econ. Ent.	0	0	
Other Charges	0	0	20,336,124
CAPITAL OUTLAY	17,253,198	21,867,779	
TOTAL EXPENDITURES	97,225,091	161,445,454	143,760,007
EXCESS (DEFICIT) OF INCOME	8,323,968	-1,468,784	23,235,091
OVER EXPENDITURES			

Source : BOS Databank - Bureau of Local Government Finance

BUDGET OPERATIONS STATEMENT

TAWI-TAWI

LGU Name:	Bongao			Languyan			Mapun (Cagayan de Tawi-Tawi)		
INCOME	1999	2000	2001	1999	2000	2001	1999	2000	2001
Local Sources	2,025,011.47		2,172,891.10	783,720.00	1,854,919.89	1,854,919.89	553,660.56	523,513.77	542,254.83
Revenue from Taxation	843,363.60		974,363.60	207,433.00	1,338,637.35	1,338,637.35	304,844.56	307,143.77	460,179.62
Real Property Tax	77,462.67		242,535.48	2,554.00	588.85	588.85	39,850.04	41,276.42	239,588.85
Business Tax	765,900.93		590,874.06	204,879.00	1,338,048.50	1,338,048.50	264,994.52	265,867.35	206,090.77
Other Taxes	0.00		140,954.06	0.00	0.00	0.00	0.00	0.00	14,500.00
Non-Tax Revenues	1,181,647.87		1,198,527.50	576,287.00	516,282.54	516,282.54	248,816.00	216,370.00	82,075.21
Receipts from Eco. Enterprise	887,270.75		880,918.00	0.00	0.00	0.00	200,700.00	88,708.00	0.00
Fees/Charges	192,920.20		206,799.50	4,030.00	19,055.44	19,055.44	48,116.00	127,662.00	63,360.00
Loans & Borrowings	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Receipts	101,456.92		110,810.00	572,257.00	497,227.10	497,227.10	0.00	0.00	18,715.21
Aids and Allotments	24,600,404.69		28,871,662.88	17,366,084.00	25,098,197.00	25,098,197.00	13,427,335.00	16,597,200.00	16,097,200.00
BIR Allotment (IRA)	23,491,903.36		27,972,688.00	17,366,084.00	25,098,197.00	25,098,197.00	13,427,335.00	16,597,200.00	16,097,200.00
National Aids	1,108,501.33		898,974.88	0.00	0.00	0.00	0.00	0.00	0.00
National Wealth	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL INCOME	**26,625,416.16**		**31,044,553.98**	**18,149,804.00**	**26,953,116.89**	**26,953,116.89**	**13,980,995.56**	**17,120,713.77**	**16,639,454.83**
EXPENDITURES									
Current Expenditures	25,637,277.47		29,195,311.47	18,317,389.00	26,080,938.44	17,525,747.49	13,988,243.85	17,249,525.09	16,402,787.37
General Government	14,212,856.74		21,470,371.12	10,159,935.00	12,926,680.93	12,926,680.93	10,272,114.00	13,095,255.81	16,402,787.37
Public Welfare & Internal Safety	3,615,872.00		1,593,991.99	1,615,489.00	3,254,909.85	3,254,909.85	0.00	0.00	0.00
Economic Development	1,648,183.46		550,000.00	4,613,907.00	797,256.71	0.00	751,358.00	285,956.00	0.00
Operation of Eco. Enterprise	1,060,000.00		3,046,828.98	672,257.00	546,900.00	1,344,156.71	0.00	0.00	0.00
Other Charges	5,100,365.27		2,534,119.38	1,255,801.00	8,555,190.95	0.00	2,964,771.85	3,868,313.28	0.00
Capital Outlay	917,488.00		1,672,051.84	0.00	0.00	8,555,190.95	0.00	0.00	0.00
TOTAL EXPENDITURES	**26,554,765.47**		**30,867,363.31**	**18,317,389.00**	**26,080,938.44**	**26,080,938.44**	**13,988,243.85**	**17,249,525.09**	**16,402,787.37**
Excess (Deficit) of Income	70,650.69		177,190.67	-167,585.00	872,178.45	872,178.45	-7,248.29	-128,811.32	236,667.46
Over Expenditures									

Source : SIE Databank - Bureau of Local Government Finance

BUDGET OPERATIONS STATEMENT

TAWI-TAWI

LGU Name:	Panglima Sugala (Balimbing)			Sapa-Sapa			Simunul		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
INCOME									
Local Sources	156,099.12	135,916.79	109,215.17	0.00	0.00	0.00	8,118.00		208,352.00
Revenue from Taxation	143,878.12	104,361.79	57,293.17	0.00	0.00	0.00	7,101.00		113,672.00
Real Property Tax	89,971.12	4,447.79	6,325.17	0.00	0.00	0.00	1,486.00		19,073.00
Business Tax	53,907.00	99,914.00	50,968.00	0.00	0.00	0.00	5,615.00		5,030.00
Other Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00		89,569.00
Non-Tax Revenues	12,221.00	31,555.00	51,922.00	0.00	0.00	0.00	1,017.00		94,680.00
Receipts from Eco. Enterprise	3,636.00	15,777.50	44,420.00	0.00	0.00	0.00	0.00		0.00
Fees/Charges	8,585.00	15,777.50	7,502.00	0.00	0.00	0.00	0.00		94,680.00
Loans & Borrowings	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Other Receipts	0.00	0.00	0.00	0.00	0.00	0.00	1,017.00		0.00
Aids and Allotments	17,591,948.00	23,504,707.00	22,199,593.00	12,118,979.00	16,176,322.00	13,477,374.00	1,221,530.00		18,048,741.15
BIR Allotment (IRA)	17,591,948.00	23,504,707.00	22,199,593.00	12,118,979.00	14,076,322.00	13,477,374.00	1,221,530.00		18,048,741.15
National Aids	0.00	0.00	0.00	0.00	2,100,000.00	0.00	0.00		0.00
National Wealth	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
TOTAL INCOME	**17,748,047.12**	**23,640,623.79**	**22,308,808.17**	**12,118,979.00**	**16,176,322.00**	**13,477,374.00**	**1,229,648.00**		**18,257,093.15**
EXPENDITURES									
Current Expenditures	17,756,632.12	26,450,024.05	20,957,301.09	12,343,321.41	17,021,905.65	13,383,397.88	967,745.00		18,343,670.17
General Government	11,213,125.13	17,389,856.01	14,645,610.64	8,622,786.87	9,402,210.75	11,828,102.88	967,745.00		12,356,384.99
Public Welfare & Internal Safety	435,286.54	1,256,739.00	267,000.00	0.00	0.00	0.00	0.00		1,008,500.00
Economic Development	3,917,484.09	374,540.04	0.00	683,393.06	775,149.20	0.00	0.00		692,000.00
Operation of Eco. Enterprise	0.00	0.00	5,551,950.45	0.00	0.00	387,574.60	0.00		4,116,898.32
Other Charges	2,190,736.36	7,428,889.00	492,740.00	3,037,141.48	6,844,545.70	1,167,720.40	0.00		169,886.86
Capital Outlay	0.00	0.00	17,000.00	0.00	0.00	0.00	0.00		300,000.00
TOTAL EXPENDITURES	**17,756,632.12**	**26,450,024.05**	**20,974,301.09**	**12,343,321.41**	**17,021,905.65**	**13,383,397.88**	**967,745.00**		**18,643,670.17**
Excess (Deficit) of Income Over Expenditures	-8,585.00	-2,809,400.26	1,334,507.08	-224,342.41	-845,583.65	93,976.12	261,903.00		-386,577.02

Source : SIE Databank - Bureau of Local Government Finance

BUDGET OPERATIONS STATEMENT

TAWI-TAWI

LGU Name:	Sitangkai			South Ubian			Tandubas		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
INCOME									
Local Sources	2,129,770.33	1,501,027.30	4,313,468.96	54,081.53	15,677.00	13,862.24	470,839.00	282,373.15	282,373.15
Revenue from Taxation	1,567,297.98	1,335,487.30	1,157,048.96	33,395.53	14,157.00	13,862.24	8,395.00	45,293.50	45,293.50
Real Property Tax	26,365.98	11,983.60	34,807.07	1,905.53	0.00	160.24	0.00	3,387.68	3,387.68
Business Tax	1,540,932.00	1,323,503.70	1,070,085.89	31,490.00	14,157.00	7,565.00	8,395.00	41,905.82	41,905.82
Other Taxes	0.00	0.00	52,156.00	0.00	0.00	6,137.00	0.00	0.00	0.00
Non-Tax Revenues	562,472.35	165,540.00	3,156,420.00	20,686.00	1,520.00	0.00	462,444.00	237,079.65	237,079.65
Receipts from Eco. Enterprise	60,170.05	59,750.00	60,010.00	4,666.00	1,195.00	0.00	0.00	0.00	9,620.00
Fees/Charges	131,643.50	105,790.00	96,410.00	16,020.00	325.00	0.00	0.00	9,620.00	0.00
Loans & Borrowings	0.00	0.00	3,000,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Receipts	370,658.80	0.00	0.00	0.00	0.00	0.00	462,444.00	227,459.65	227,459.65
Aids and Allotments	20,517,022.00	24,791,436.00	23,426,944.00	9,082,231.00	12,054,455.00	14,296,468.00	8,673,669.00	21,716,113.00	21,716,113.00
BIR Allotment (IRA)	20,517,022.00	24,791,436.00	23,426,944.00	9,082,231.00	12,054,455.00	14,296,468.00	8,673,669.00	19,864,428.00	19,864,428.00
National Aids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,851,685.00	1,851,685.00
National Wealth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL INCOME	**22,646,792.33**	**26,292,463.30**	**27,740,412.96**	**9,136,312.53**	**12,070,132.00**	**14,310,330.24**	**9,144,508.00**	**21,998,486.15**	**21,998,486.15**
EXPENDITURES									
Current Expenditures	21,303,720.49	16,457,848.97	18,469,757.48	9,127,620.12	8,903,591.86	13,344,708.77	9,491,495.00	21,902,616.63	21,902,616.63
General Government	15,261,756.87	5,445,037.53	18,469,757.48	5,924,014.64	7,605,694.54	11,882,588.61	4,985,181.00	14,684,648.37	14,684,648.37
Public Welfare & Internal Safety	0.00	5,962,811.44	0.00	227,917.00	319,225.16	0.00	439,568.00	354,318.55	354,318.55
Economic Development	1,123,955.62	0.00	0.00	742,393.48	685,526.05	1,243,109.00	3,351,574.00	4,984,037.71	4,984,037.71
Operation of Eco. Enterprise	0.00	0.00	0.00	0.00	0.00	0.00	220,000.00	0.00	0.00
Other Charges	4,918,008.00	5,050,000.00	0.00	2,233,295.00	293,146.11	219,011.16	495,172.00	1,879,612.00	1,879,612.00
Capital Outlay	1,341,268.00	5,283,076.57	3,967,059.18	0.00	600,000.00	831,241.00	0.00	0.00	0.00
TOTAL EXPENDITURES	**22,644,988.49**	**21,740,925.54**	**22,436,816.66**	**9,127,620.12**	**9,503,591.86**	**14,175,949.77**	**9,491,495.00**	**21,902,616.63**	**21,902,616.63**
Excess (Deficit) of Income Over Expenditures	1,803.84	4,551,537.76	5,303,596.30	8,692.41	2,566,540.14	134,380.47	346,987.00	95,869.52	95,869.52

Source : SIE Databank - Bureau of Local Government Finance

BUDGET OPERATIONS STATEMENT

TAWI-TAWI

LGU Name:	Turtle Islands		
	1999	2000	2001
INCOME			
Local Sources	1,407,732.00		379,098.60
Revenue from Taxation	5,096.00		12,098.60
Real Property Tax	2,519.00		10,024.60
Business Tax	2,577.00		0.00
Other Taxes	0.00		2,074.00
Non-Tax Revenues	1,402,636.00		367,000.00
Receipts from Eco. Enterprise	0.00		0.00
Fees/Charges	282,000.00		367,000.00
Loans & Borrowings	0.00		0.00
Other Receipts	1,120,636.00		0.00
Aids and Allotments	5,021,200.00		13,405,954.49
BIR Allotment (IRA)	5,021,200.00		8,405,954.49
National Aids	0.00		0.00
National Wealth	0.00		5,000,000.00
TOTAL INCOME	**6,428,932.00**		**13,785,053.09**
EXPENDITURES			
Current Expenditures	6,210,131.00		12,878,778.17
General Government	4,007,806.00		7,285,235.68
Public Welfare & Internal Safety	402,037.00		593,542.49
Economic Development	1,045,643.00		2,500,000.00
Operation of Eco. Enterprise	678,345.00		0.00
Other Charges	76,300.00		2,500,000.00
Capital Outlay	0.00		449,465.00
TOTAL EXPENDITURES	**6,210,131.00**		**13,328,243.17**
Excess (Deficit) of Income Over Expenditures	218,801.00		456,809.92

Source : SIE Databank - Bureau of Local Government Finance

Appendix 9. 1 Unit Cost of Facilities by Type and Service Level

Sector service Level		Unit Construction Cost per Facility (Pesos)	Service Coverage		Unit Cost	
			Served Population	Served Households	Pesos/Person	Pesos/ Household
Urban Water Supply	Level III					
	New System					
	For 5,000 Population	23,261,531	5,000	N/A	4,652	N/A
	For 10,000 Population	35,852,859	10,000	N/A	3,585	N/A
	Expansion					
	For 5,000 Population	21,711,488	5,000	N/A	4,342	N/A
	For 10,000 Population	34,302,816	10,000	N/A	3,430	N/A
Rural Water Supply	Level II					
	Deep Well Source	950,200	600	120	1,584	7,918
	Spring Source	1,154,509	600	120	1,924	9,621
	Level I					
	Deep Well					
	30 meter depth	164,000	N/A	15	N/A	10,933
	50 meter depth	198,000	N/A	15	N/A	13,200
	70 meter depth	314,000	N/A	15	N/A	20,933
	Shallow well					
	10 meter depth	72,000	N/A	15	N/A	4,800
	20 meter depth	105,000	N/A	15	N/A	7,000
Sanitation	Household Toilet					
	Flush	4,871	N/A	1	N/A	4,871
	Pour Flush	653	N/A	1	N/A	653
	Public School Toilet	271,000	N/A	N/A	N/A	
	Public Toilet	313,000	N/A	N/A	N/A	

Appendix 9.1.1 Unit Cost of Level I (Shallow Well - 10m Depth)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Mobilization/Demobilization**	1	LS	9,768.90	**9,768.90**
B	**Well Drilling and Geophysical Logging**				
	150-mm Dia. borehole by Rotary Method	10	m	1,072.29	10,722.90
	Geophysical Borehole Logging	1	LS	7,231.00	7,231.00
	Sub-Total of (B)				**17,953.90**
C	**Well Development/Disinfection**				
	Well Development By Airlifting Method	12	hr	1,172.24	14,066.88
	Disinfection	1	LS	4,573.32	4,573.32
	Sub-Total of (C)				**18,640.20**
D	**Furnishing and Installation of 50 mm Dia. Well Casings and Screens, Centralizers, Gravel Packing, Cement Grout, Seal, Handpump and Construction of Platform**				
	1. Materials				
	50mm diam. uPVC Casing Pipes	7.5	m	101.20	759.00
	50mm diam. uPVC Well Screens	3	m	440.00	1,320.00
	Centralizers	3	pc	80.00	240.00
	Gravel Pack	5	m	70.00	350.00
	Cement Grout	2	m	88.20	176.40
	Clay	1	m	7.53	7.53
	Backfill	2	m	6.87	13.74
	Hand Pump	1	no.	945.00	945.00
	Cement	7	bag	140.00	980.00
	Sand	0.5	m3	400.00	200.00
	Gravel	1	m3	700.00	700.00
	10mmx6m Reinf. Steel Bar	6	pc	53.00	318.00
	No. 16 GI Wire	0.5	kg	45.00	22.50
	CHB	35	pc	7.50	262.50
	Sub-Total of Materials				6,294.67
	2. Labor (40% of Materials)				2,517.87
	3. Freight Cost (11% of Materials)				692.41
	Sub-Total of (D)				**9,504.95**
E	**Water Quality Analysis**	1	LS	1,300.00	**1,300.00**
F	**Indirect Cost**				
	Profit (10% of A to E)				5,716.80
	Overhead Expense (13% of A to E)				7,431.83
	VAT (10% of Profit and Overhead Expenses)				1,314.86
	Sub-Total of (F)				**14,463.49**
	Total Construction Cost (A+B+C+D+E+F)				**71,631.44**
G	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (G)				**0.00**
	GRAND TOTAL				**71,631.44**
	SAY				**72,000.00**

Note: L.S. - Lump Sum

Source: DILG-RWSSP V Project Standard Cost Estimate in 2002 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.2 Unit Cost of Level I (Shallow Well - 20m Depth)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Mobilization/Demobilization**	1	LS	11,311.40	**11,311.40**
B	**Well Drilling and Geophysical Logging**				
	200-mm Dia. borehole by Rotary Method	20	m	1,214.90	24,298.00
	Geophysical Borehole Logging	1	LS	7,231.00	7,231.00
	Sub-Total of (B)				**31,529.00**
C	**Well Development/Disinfection**				
	Well Development By Airlifting Method	12	hr	1,172.24	14,066.88
	Disinfection	1	LS	4,573.32	4,573.32
	Sub-Total of (C)				**18,640.20**
D	**Furnishing and Installation of 50 mm Dia. Well Casings and Screens, Centralizers, Gravel Packing, Cement Grout, Seal, Handpump and Construction of Platform**				
	1. Materials				
	100mm diam. uPVC Casing Pipes	17.5	m	310.70	5,437.25
	100mm diam. uPVC Well Screens	3	m	1,300.00	3,900.00
	Centralizers	4	pc	80.00	320.00
	Gravel Pack	10	m	70.00	700.00
	Cement Grout	3	m	88.20	264.60
	Clay	1	m	7.53	7.53
	Backfill	6	m	6.87	41.22
	Hand Pump	1	no.	945.00	945.00
	Cement	7	bag	140.00	980.00
	Sand	0.5	m3	400.00	200.00
	Gravel	1	m3	700.00	700.00
	10mmx6m Reinf. Steel Bar	6	pc	53.00	318.00
	No. 16 GI Wire	0.5	kg	45.00	22.50
	CHB	35	pc	7.50.	262.50
	Sub-Total of Materials				14,098.60
	2. Labor (40% of Materials)				5,639.44
	3. Freight Cost (11% of Materials)				1,550.85
	Sub-Total of (D)				**21,288.89**
E	**Water Quality Analysis**	1	LS	1,300.00	**1,300.00**
F	**Indirect Cost**				
	Profit (10% of A to E)				8,406.95
	Overhead Expense (13% of A to E)				10,929.03
	VAT (10% of Profit and Overhead Expenses)				1,933.60
	Sub-Total of (F)				**21,269.58**
	Total Construction Cost (A+B+C+D+E+F)				**105,339.07**
G	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (G)				**0.00**
	GRAND TOTAL				**105,339.07**
	SAY				**105,000.00**

Note: L.S. - Lump Sum

Source: DILG-RWSSP V Project Standard Cost Estimate in 2002 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.3 Unit Cost of Level I (Deep Well - 30m Depth)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Mobilization/Demobilization**	1	LS	11,311.40	**11,311.40**
B	**Well Drilling and Geophysical Logging**				
	200-mm Dia. borehole by Rotary Method	30	m	1,369.77	41,093.10
	Geophysical Borehole Logging	1	LS	7,231.00	7,231.00
	Sub-Total of (B)				**48,324.10**
C	**Well Development/Disinfection**				
	Well Development By Airlifting Method	24	hr	766.20	18,388.80
	Disinfection	1	LS	4,453.05	4,453.05
	Sub-Total of (C)				**22,841.85**
D	**Furnishing and Installation of 50 mm Dia. Well Casings and Screens, Centralizers, Gravel Packing, Cement Grout, Seal, Handpump, Riser pipe and Fittings and**				
	1. Materials				
	100mm diam. uPVC Casing Pipes	24.5	m	310.70	7,612.15
	100mm diam. uPVC Well Screens	6	m	1,300.00	7,800.00
	Centralizers	4	pc	80.00	320.00
	Gravel Pack	15	m	70.00	1,050.00
	Cement Grout	6	m	88.20	529.20
	Clay	1	m	7.53	7.53
	Backfill	8	m	6.87	54.96
	Malawi Deep Well Hnad pump	1	no.	9,378.00	9,378.00
	50 mm uPVC Riser	18	m	101.20	1,821.60
	50 mm uPVC Coupling	5	no.	14.10	70.50
	50 mm Male Threaded Adoptor	1	no.	27.00	27.00
	Cement	7	bag	140.00	980.00
	Sand	0.5	m3	400.00	200.00
	Gravel	1	m3	700.00	700.00
	10mmx6m Reinf. Steel Bar	6	pc	53.00	318.00
	No. 16 GI Wire	0.5	kg	45.00	22.50
	CHB	35	pc	7.50	262.50
	Sub-Total of Materials				31,153.94
	2. Labor (40% of Materials)				12,461.58
	3. Freight Cost (11% of Materials)				3,426.93
	Sub-Total of (D)				**47,042.45**
E	**Water Quality Analysis**	1	LS	1,300.00	**1,300.00**
F	**Indirect Cost**				
	Profit (10% of A to E)				13,081.98
	Overhead Expense (13% of A to E)				17,006.57
	VAT (10% of Profit and Overhead Expenses)				3,008.86
	Sub-Total of (F)				**33,097.41**
	Total Construction Cost (A+B+C+D+E+F)				**163,917.21**
G	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (G)				**0.00**
	GRAND TOTAL				**163,917.21**
	SAY				**164,000.00**

Note: L.S. - Lump Sum
Source: DILG-RWSSP V Project Standard Cost Estimate in 2002 Price Level.
Cost Adjusted to 2003 Price Level.

Appendix 9.1.4 Unit Cost of Level I (Deep Well - 50m Depth)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Mobilization/Demobilization**	1	LS	11,311.40	**11,311.40**
B	**Well Drilling and Geophysical Logging**				
	200-mm Dia. borehole by Rotary Method	50	m	1,271.32	63,566.00
	Geophysical Borehole Logging	1	LS	7,231.00	7,231.00
	Sub-Total of (B)				**70,797.00**
C	**Well Development/Disinfection**				
	Treatment w/ Polyphosphate and Backwashing	12	hr	929.07	11,148.84
	Well Development By Airlifting Method	24	hr	795.27	19,086.48
	Disinfection	1	LS	6,370.18	6,370.18
	Sub-Total of (C)				**17,519.02**
D	**Furnishing and Installation of 50 mm Dia. Well Casings and Screens, Centralizers, Gravel Packing, Cement Grout, Seal, Handpump, Riser pipe and Fittings and**				
	1. Materials				
	100mm diam. uPVC Casing Pipes	44.5	m	310.70	13,826.15
	100mm diam. uPVC Well Screens	6	m	1,300.00	7,800.00
	Centralizers	4	pc	80.00	320.00
	Gravel Pack	20	m	70.00	1,400.00
	Cement Grout	6	m	88.20	529.20
	Clay	1	m	7.53	7.53
	Backfill	23	m	6.87	158.01
	Malawi Deep Well Hnad pump	1	no.	9,378.00	9,378.00
	50 mm uPVC Riser	18	m	101.20	1,821.60
	50 mm uPVC Coupling	5	no.	14.10	70.50
	50 mm Male Threaded Adoptor	1	no.	27.00	27.00
	Cement	7	bag	140.00	980.00
	Sand	0.5	m3	400.00	200.00
	Gravel	1	m3	700.00	700.00
	10mmx6m Reinf. Steel Bar	6	pc	53.00	318.00
	No. 16 GI Wire	0.5	kg	45.00	22.50
	CHB	35	pc	7.50	262.50
	Sub-Total of Materials				37,820.99
	2. Labor (40% of Materials)				15,128.40
	3. Freight Cost (11% of Materials)				4,160.31
	Sub-Total of (D)				**57,109.69**
E	**Water Quality Analysis**	1	LS	1,300.00	**1,300.00**
F	**Indirect Cost**				
	Profit (10% of A to E)				15,803.71
	Overhead Expense (13% of A to E)				20,544.82
	VAT (10% of Profit and Overhead Expenses)				3,634.85
	Sub-Total of (F)				**39,983.39**
	Total Construction Cost (A+B+C+D+E+F)				**198,020.50**
G	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (G)				**0.00**
	GRAND TOTAL				**198,020.50**
	SAY				**198,000.00**

Note: L.S. - Lump Sum

Source: DILG-RWSSP V Project Standard Cost Estimate in 2002 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.5 Unit Cost of Level I (Deep Well - 70m Depth)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Mobilization/Demobilization**	1	LS	11,311.40	**11,311.40**
B	**Well Drilling and Geophysical Logging**				
	200-mm Dia. borehole by Rotary Method	70	m	1,132.14	79,249.80
	Geophysical Borehole Logging	1	LS	7,231.00	7,231.00
	Sub-Total of (B)				**86,480.80**
C	**Well Development/Disinfection**				
	Treatment w/ Polyphosphate and Backwashing	12	hr	929.07	11,148.84
	Well Development By Airlifting Method	24	hr	795.27	19,086.48
	Disinfection	1	LS	6,370.18	6,370.18
	Sub-Total of (C)				**17,519.02**
D	**Furnishing and Installation of 50 mm Dia. Well Casings and Screens, Centralizers, Gravel Packing, Cement Grout, Seal, Handpump, Riser pipe and Fittings and**				
	1. Materials				
	100mm diam. GI Casing Pipes	64.5	m	663.40	42,789.30
	100mm diam. Low Carbon Well Screens	6	m	1,666.67	10,000.00
	Centralizers	6	pc	138.00	828.00
	Gravel Pack	20	m	70.00	1,400.00
	Cement Grout	6	m	88.20	529.20
	Clay	1	m	7.53	7.53
	Backfill	43	m	6.87	295.41
	Malawi Deep Well Hnad pump	1	no.	9,378.00	9,378.00
	50 mm uPVC Riser	18	m	101.20	1,821.60
	50 mm uPVC Coupling	5	no.	14.10	70.50
	50 mm Male Threaded Adoptor	1	no.	27.00	27.00
	Cement	7	bag	140.00	980.00
	Sand	0.5	m3	400.00	200.00
	Gravel	1	m3	700.00	700.00
	10mmx6m Reinf. Steel Bar	6	pc	53.00	318.00
	No. 16 GI Wire	0.5	kg	45.00	22.50
	CHB	35	pc	7.50	262.50
	Sub-Total of Materials				69,629.54
	2. Labor (40% of Materials)				27,851.82
	3. Freight Cost (11% of Materials)				7,659.25
	Sub-Total of (D)				**105,140.61**
E	**Water Quality Analysis**	1	LS	1,300.00	**1,300.00**
F	**Indirect Cost**				
	Profit (10% of A to E)				22,175.18
	Overhead Expense (13% of A to E)				28,827.74
	VAT (10% of Profit and Overhead Expenses)				5,100.29
	Sub-Total of (F)				**56,103.21**
	Total Construction Cost (A+B+C+D+E+F)				**277,855.04**
G	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (G)				**0.00**
	GRAND TOTAL				**277,855.04**
	SAY				**314,000.00**

Note: L.S. - Lump Sum

Source: DILG-RWSSP V Project Standard Cost Estimate in 2002 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.6 Unit Cost of Level II (Deep Well Source, 600 Service Population)

	Work Items	Quantity	Unit	Unit Cost	Cost
A	**Deep Well Source (30m)**	1	LS	149,910.66	**149,910.66**
B	**Pumping Unit**	1	LS	70,000.00	**70,000.00**
C	**RC Elevated Tank:**				
	1. Materials				
	Portland Cement	211	bags	140.00	29,540.00
	Waterproofing Compound	100	bags	70.00	7,000.00
	Washed Sand	13	cu.m.	250.00	3,250.00
	Crushed Gravel	26	cu.m.	400.00	10,400.00
	Type A Boulder	3	cu.m.	250.00	750.00
	16mm x 6m. Reinf. Steel Bars	224	pcs.	175.00	39,200.00
	12mm x 6m Reinf. Steel Bars	145	pcs.	85.00	12,325.00
	10mm x 6m Reinf. Steel Bars	89	pcs.	60.00	5,340.00
	20mm x 6m GI Steel Bars	4	pcs.	350.00	1,400.00
	Sub-Total of Materials				**109,205.00**
	2. Labor (40% of Materials)				43,682.00
	3. Freight Cost (11% of Materials)				12,012.55
	Sub-Total of (C)				**164,899.55**
D	**Pump House**	1	LS	30,000.00	**30,000.00**
E	**Forms & Scaffoldings**	1	LS	20,000.00	**20,000.00**
F	**Distribution System:**				
	1. Materials				
	50mm GI Pipe, Sch. 40	14	m	250.00	3,500.00
	50mm uPVC Pipe, Class 150	94	m	125.00	11,750.00
	38mm uPVC Pipe, Class 150	672	m	80.00	53,760.00
	25mm uPVC Pipe, Class 150	253	m	55.00	13,915.00
	Sub-Total of Materials				**82,925.00**
	2. Labor (40% of Materials)				33,170.00
	3. Freight Cost (11% of Materials)				9,121.75
	Sub-Total of (F)				**125,216.75**
G	**Public Faucets, Fire Hydrant and Fittings**				
	1. Materials				
	Faucet W/ RC Stand Posts	33	set	2,500.00	83,333.33
	Fire Hydrants	4	pcs.	7,500.00	30,000.00
	Fittings, Appurtenances	1	LS	18,000.00	18,000.00
	Sub-Total of Materials				**131,333.33**
	2. Labor (40% of Materials)				52,533.33
	3. Freight Cost (11% of Materials)				14,446.67
	Sub-Total of (G)				**198,313.33**
H	**Indirect Cost**				
	Profit (10% of A to G)				75,834.03
	Overhead Expense (13% of A to G)				98,584.24
	VAT (10% of Profit and Overhead Expenses)				17,441.83
	Sub-Total of (H)				**191,860.09**
	Total Construction Cost (A+B+C+D+E+F+G+H)				**950,200.39**
I	**Estimated Government Expenses**				
	1. Preliminary and Detailed Engineering Cost				
	2. Construction Supervision				
	Sub-Total of (I)				**0.00**
	Total Estimated Cost				**950,200.39**
	Unit Cost per person Served				**1,583.67**

Note: L.S. - Lump Sum

Source: DILG Standard Cost Estimate in 2003 Price Level.

Appendix 9.1.7 Unit Cost of Level II (Spring Source, 600 Service Population)

Sheet 1 of 2

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		5,412
B. Construction of Spring Box				
1. Materials		L.S.		43,189
2. Labot (35% of 1.)		L.S.		13,965
3. Freight Cost (11% of Materials)		L.S.		4,389
Sub-Total of B				61,543
C. Installation of Pipelines & Fittings				
1. Transmission Main				
(1) Materials				
1) 63mm dia. PVC Pipe (Class 12.5 with pusher type socket	500	pcs.	970	484,930
2) 63mm dia. Tee	1	no.	105	105
3) Solvent Cement	40	cans	54	2,165
4) 63mm dia. x 50mm dia. Nipple	3	nos.	161	484
5) 63mm dia. Union Patente	1	pc.	206	206
6) 63mm dia. x 50mm dia. Reducing Socket	2	pcs.	124	249
7) 63mm dia. Elbow (90 deg.)	1	pc	90	90
8) 63mm dia. Elbow (45 deg.)	1	pc.	89	89
9) 63mm dia. Gate Valve	3	pcs.	910	2,731
Sub-Total of Materials				491,048
(2) Labor (35% of Material Cost)		L.S.		171,867
(3) Freight Cost (11% of Materials)		L.S.		54,015
Sub-Total of Transmission Main				716,929
2. Distribution Pipeline				
(1) Materials				
1) 50mm dia. PVC Pipe (Class 12.5 with pusher type socket)	20	pcs.	537	10,738
2) 38mm dia. PVC Pipe (Class 12.5 with pusher type socket)	30	pcs.	357	10,716
3) 20mm dia. PVC Pipe (Class 40 with pusher type socket)	10	pcs.	119	1,191
4) 13mm dia. x 1 m Stand Pipe	10	pcs.	111	1,115
5) Solvent Cement	4	cans	54	216
6) Fittings				
a. 50mm dia. x 150mm PVC Nipple	3	pcs.	148	445
b. 32mm dia. x 150mm PVC Nipple	3	pcs.	90	270
c. 13mm dia. x 150mm PVC Nipple	40	pcs.	29	1,169
d. 50mm dia. Union Patente	1	pcs.	194	194
e. 32mm dia. Union Patente	2	pcs.	84	169
f. 13mm dia. Union Patente	10	pcs.	29	292
g. 50mm dia. x 32mm dia. Reducing Socket	6	pcs.	107	643
h. 32mm dia. x 20mm dia. Reducing Socket	10	pcs.	83	833
i. 13mm dia. x 13mm dia. Reducing Socket	10	pcs.	65	649
j. 50mm dia. PVC Elbow (90 deg.)	2	pcs.	80	160
k. 13mm dia. GI Elbow (90 deg.)	20	pcs.	15	303
l. 20mm dia. x 13mm dia. Socket Adaptor	10	pcs.	49	487
m. 50mm dia. GI Gate Valve	2	pcs.	800	1,600
n. 32mm dia. GI Gate Valve	2	pcs.	452	905
o. 13mm dia. GI Gate Valv	24	pcs.	274	6,573
p. 13mm dia. Brass Faucet	24	pcs.	49	1,169
q. 50mm dia. Tee	4	pcs.	155	619
r. 32mm dia. Tee	6	pcs.	131	786
s. Water Meter	24	pcs.	894	21,458
t. Water Meter Box	24	pcs.	1,312	31,486
Sub-Total of Materials				94,186
(2) Labor (35% of Material Cost)				32,965
(3) Freight Cost (11% of Materials)				10,360
Sub-Total of Distribution Pipeline				137,511
Sub-Total of C				854,440

Sheet 2 of 2

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
D. Indirect Cost				
1. Transmission Main				
(1) Profit (10% of C-1)				71,693
(2) Overhead Expense (13% of C-1)				93,201
(3) VAT (10% of Profit, Overhead Expense and Labor)				16,489
2. Source Facilities and Disribution Pipeline				
(1) Profit (10% of A, B, C-2)				20,447
(2) Overhead Expense (13% of A, B, C-2)				26,581
(3) VAT (10% OF Profit, Overhead Expense and Labor)				4,703
Sub-Total of D				**233,113**
Total Construction Cost (A+B+C+D)				**1,154,509**
E. Estimated Government Expenses				
1. Preliminary & Detailed Engineering				
2. Supervision				
3. Water Quality Analysis				
Sub-Total of E				**0**
Total Estimated Cost (Adjusted to 2003 Price Level)				**1,154,509**
Unit Cost per Person Served				**1,924**

Note: L.S. - Lump Sum

Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.8 Unit Cost of Level III (5,000 Service Population)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		**L.S.**		357,203
B. Source Development and Storage				
1. Deep Well	1	No.	1,915,905	1,915,905
2. Deep Well Pump	1	No.	684,097	684,097
3. Chlorinator House & Equipment	1	L.S.	519,567	519,567
4. Storage Tank (250 cu.m.)	1	No.	1,298,919	1,298,919
Sub-Total of B				**4,418,488**
C. Transmission Main				
1. 160mm dia.	500	L.M.	1,336	667,861
Sub-Total of C			1,336	667,861
			1,103	
D. Distribution Main				
1. 160mm dia.	1,000	No.	697	697,137
2. 110mm dia.	3,000	No.	1,103	3,308,995
3. 90mm dia.	3,000	L.S.	692	2,075,022
4. 75mm dia.	5,000	No.	644	3,220,236
Sub-Total of D				**9,301,391**
E. Service Connections	1,000	**Nos.**	2,314	**2,314,240**
F. Miscellaneous				
1. Vehicle	1	No.	655,954	655,954
2. Office & Workshop Building	1	No.	655,954	655,954
3. Office Equipment		L.S.		119,068
4. Tools and Spare Parts		L.S.		119,068
Sub-Total of F				**1,550,043**
Total Direct Cost (A+B+C+D+E+F)				**18,609,225**
G. Indirect Cost (25% of Direct Cost)				**4,652,306**
Total Estimated Cost (2003 Price Level)				**23,261,531**
Unit Cost per Person Served				
For New Construction				4,652
			say	**4,600**
For Expansion of Existing System (Exclude F)				4,342
			say	**4,300**

Note: L.S. - Lump Sum

Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.9 Unit Cost of Level III (10,000 Service Population)

(Cost: Peso)

Description	Unit	Unit Cost	Cost
A. Mobilization/Demobilization	L.S.		357,203
B. Source Development and Storage			
1. Deep Well	No.	1,915,905	1,915,905
2. Deep Well Pump	No.	684,097	684,097
3. Chlorinator House & Equipment	L.S.	519,567	519,567
4. Storage Tank (250 cu.m.)	No.	1,298,919	1,298,919
Sub-Total of B			**4,418,488**
C. Transmisison Main			
1. 160mm dia.	L.M.	1,336	667,861
Sub-Total of C			**667,861**
D. Distribution Main			
1. 160mm dia.	No.	1,336	2,671,443
2. 110mm dia.	No.	1,103	5,514,992
3. 90mm dia.	L.S.	692	4,150,045
4. 75mm dia.	No.	644	5,152,377
Sub-Total of D			**17,488,856**
E. Service Connections	Nos.	2,100	**4,199,837**
F. Miscellaneous			
1. Vehicle	No.	655,954	655,954
2. Office & Workshop Building	No.	655,954	655,954
3. Office Equipment	L.S.		119,068
4. Tools and Spare Parts	L.S.		119,068
Sub-Total of F			**1,550,043**
Total Direct Cost (A+B+C+D+E+F)			**28,682,287**
G. Service Connections	Nos.	2,314	**7,170,572**
Total Estimated Cost			**35,852,859**
Unit Cost per Person Served			
For New Construction			3,585
			3,600
For Expansion of Existing System (Exclude F)			3,430
			3,000

Note: L.S. - Lump Sum

Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.10 Unit Cost of Pour Flush Toilet with Double Pit Latrine

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Earthwork				
1. Materials.				
(1) Gravel Fill	1	cu.m.	459	459
Sub-Total of A-1				459
2. Labor				
(1) Excavation	6	cu.m.	142	851
(2) Backfill	2	cu.m.	129	258
(3) Gravel Fill	1	cu.m.	168	168
Sub-Total of A-2				1.276
Sub-Total of A				1,735
B. Concrete Work				
1. Materials				
Slab on wood planks				
(1) 16 - 2" x 8" x 6' Coco Lumber	128	bd.ft	9	1.108
(2) 10mm dia. x 6.0m Rebar	3	pcs.	58	175
(3) #16 Tie Wire	1	kg.	58	29
(4) Cement	10	bags	139	1.386
(5) Sand	2	cu.m	363	544
(6) Gravel	2	cu.m	459	918
(7) Stone Lining with Mortar		L.S.		1.207
Sub-Total of B-1				5.367
2. Labor (25% of B-1)				1.342
Sub-Total of B-2				1.342
Sub-Total of B				6.709
C. Carpentry Work				
1. Materials				
(1) Nipa	60	pcs.	2	130
(2) 1.5m x 1.8m, amakan	3	pcs.	76	227
(3) 2x3x10' Coco Lumber	20	bd.ft	11	216
(4) 2x2x10' Coco Lumber	33	bd.ft	11	360
(5) 3"dia. Bamboo	3	lights	22	65
(6) Assorted CWN	4	kgs.	43	173
(7) Rattan wire	20	pcs.	1	22
(8) Pale (medium)	1	pc.	206	206
(9) 3"dia. PVC x 3m	1	pc.	195	195
(10) 3"dia. PVC Elbow	2	pcs.	16	32
(11) PVC solvent	1	pint	54	54
(12) Ga. 31 x 8' plain GI sheet	1	sheet	216	216
Sub-Total of C-1				1.898
2. Labor (25% of D-1)				474
Sub-Total of C-2				474
Sub-Total of C				2.372
D. Plumbing				
1. Materials				
(1) Toilet Bowl-Squat Type	1	pc.	653	653
(2) 75mm dia .x 6.0m PVC Pipe	1	pc.	154	154
Sub-Total of D-1				806
2. Labor (25% of D-1)				202
Sub-Total of D-2				202
Sub-Total of D				1.008
E. Transportation Cost (excluding indigenous materials)		L.S.		325
F. Indirect Cost				
Profit (10% of A-D)				1.182
VAT (10% of Profit & Labor)				435
Sub-Total of F				1.617
Total Construction Cost (A+B+C+D+E+F)				13.766
			say	14.000

Note: L.S. - Lump Sum

Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.1.11 Unit Cost of Flush Water Sealed with Septic Tank Toilet

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Demolition		L.S.		1,082
B. Earthwork				
1. Materials				
(1) Gravel Fill	1	cu.m.	459	459
Sub-Total of B-1				459
2. Labor				
(1) Excavation	6	cu.m.	142	851
(2) Backfill	2	cu.m.	129	258
(3) Gravel Fill	1	cu.m.	168	168
Sub-Total of B-2				1,276
Sub-Total of B				**1,735**
C. Transmisison Main				
1. Materials				
Slab on wood planks				
(1) 16 - 2" x 8" x 6' Coco Lumber	128	bd.ft	9	1,108
(2) 10mm dia. x 6.0m Rebar	3	pcs.	58	175
(3) #16 Tie Wire	1	kg.	58	29
(4) Cement	10	bags	139	1,386
(5) Sand	2	cu.m	363	544
(6) Gravel	2	cu.m	459	918
(7) Stone Lining with Mortar		L.S.	0	1,207
Sub-Total of C-1				5,367
2. Labor (30% of C-1)				1,610
Sub-Total of C				**6,977**
D. Carpentry Work				
1. Materials				
(1) Nipa	60	pcs.	2	130
(2) 1.5m x 1.8m, amakan	3	pcs.	76	227
(3) 2x3x10' Coco Lumber	20	bd.ft	11	216
(4) 2x2x10' Coco Lumber	33	bd.ft	11	360
(5) 3"dia. Bamboo	3	lights	22	65
(6) Assorted CWN	4	kgs.	43	173
(7) Rattan wire	20	pcs.	1	22
Sub-Total of D-1				1,194
2. Labor (30% of D-1)				358
Sub-Total of D				**1,552**
E. Plumbing				
1. Materials				
(1) Water Closet	1	set	4,871	4,871
(2) Water line and sanitary fixtures		L.S.		1,624
Sub-Total of E-1				6,495
2. Labor (30% of E-1)				1,948
Sub-Total of E				**8,443**
F. Transportation Cost (excluding indigenous materials)		L.S.		**541**
G. Indirect Cost				
Profit (10% of A-F)				2,033
VAT (10% of Profit & Labor)				723
Sub-Total of G				2,756
Total of Construction Cost (A+B+C+D+E+F+G)				**23,087** **23,000**

Note: L.S. - Lump Sum
Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.
Cost Adjusted to 2003 Price Level.

Appendix 9.1.12 Unit Cost of School Toilet

Sheet 1 of 5 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization and Demobilization		L.S.		5,953
B. Earthwork				
1. Materials				
(1) Gravel Fill	3.00	cu.m.	459	1,377
Sub-Total of B-1				1,272
2. Labor				
(1) Excavation	15.88	cu.m.	142	2,252
(2) Backfill	4.97	cu.m.	129	640
(3) Gravel Fill	3.00	cu.m.	168	503
Sub-Total of B-2				3,395
Sub-Total of B				**4,667**
C. Concrete Work				
1. Materials				
(1) Cement	61.00	bags	139	8,452
(2) Sand	4.00	cu.m.	363	1,450
(3) Gravel	8.00	cu.m	459	3,672
(4) Rebars: 12mm dia. x 6m	38.00	pcs.	80	3,044
10mm dia. x 6m	57.00	pcs.	58	3,332
(5) #16 Tie Wire	8.00	kgs.	58	468
(6) Formworks:				0
1/4" Plywood	6.00	pcs.	483	2,897
2"x2"x10" Coco Lumber	200.00	bd.ft.	9	1,732
Sub-Total of C-1				25,045
2. Labor (30% of C-1)		L.S.		7,514
Sub-Total of C				**32,559**
D. Masonry Work				
1. Materials				
(1) 6"CHB	800.00	pcs.	6	5,196
(2) 4"CHB	260.00	pcs.	5	1,407
(3) Cement	97.00	bags	139	13,439
(4) Sand	10.00	cu.m.	363	3,626
(5) Rebars: 12mm dia. x 6m	30.00	pcs.	80	2,403
10mm dia. x 6m	11.00	pcs.	58	643
(6) #16 Tie Wire	4.00	kgs.	58	234
(7) Scaffolding				
2"x4"x8" = 10 pcs. Coco Lumber	53.33	bd.ft.	9	462
Sub-Total of D-1				27,410
2. Labor (30% of D-1)		L.S.		8,223
Sub-Total of D				**35,633**
E. Roofing Works				
1. Materials				
(1) GA #26 Corr. GI(1=10')	20.00	bd.ft	314	6,278
(2) GA #24 Pln. GI Flashing	3.00	pcs.	303	909
(3) GA #24 Pln. GI Gutter (Pre-Fab)	9.00	kg.	303	2,728
(4) Umbrella Nails 2 - 1/2"	12.00	bags	50	598
(5) Rafter - 2"x5"x18' = 5 pcs.	75.00	bd.ft.	36	2,679
(6) Purlins - 2"x2"x12' = 18 pcs.	72.00	bd.ft.	36	2,572
(7) WD Cleats - 2"x2"x10' = 6 pcs.	20.00	bd.ft.	36	714
(8) Nailers - 2"x2"x12' = 30 pcs.	120.00	bd.ft.	36	4,286

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
-2"x2"x10' =36 pcs.	120.00	bd.ft.	36	4,286
(9) Fascia Board				
1"x12"x12'=4 pcs.	48.00	bd.ft.	36	1,715
1"x12"x18'=2 pcs.	36.00	bd.ft.	36	1,286
(10) Wood Plate				
2"x4"x20'=2 pcs.	26.66	bd.ft.	36	952
(11) 1/4"Thk. Mar. Plywood 4"x 8"	14.00	pcs.	32	455
(12) C.W.N. Assorted	15.00	kgs.	32	487
(13) 3" dia. x 3 m Downspout (PVC)	3.00	pcs.	92	276
(14) 3" dia. Elbow (PVC)	2.00	pcs.	16	32
(15) 3" dia. Coupling (PVC)	1.00	pcs.	15	15
(16) Ceiling Vent				
1"x1"x8' = 4 pcs.	2.67	bd.ft.	92	246
(17) Screen (1/8"x1/8")	1.00	yd.	92	92
Sub-Total of E-1				**30,607**
2. Labor (30% of E-1)		L.S.		9,182
Sub-Total of E				**39,789**
F. Carpentry Work				
1. Materials				
(1) D - 1 Hollow Core Tangule				
Flush Type Door w/ Louver (.80 x 2.20)	2.00	sets	1,639	3,278
(2) D - 2 Hollow Core Tanguile				
Flush Type Door (.80 x 2.20)	1.00	sets	1,025	1,025
(3) D - 3 Louver Door (.60 x 1.40)	5.00	sets	36	179
(4) Door Jambs (Apitong)				
2" x 6" x 14" = 5 pcs.	14.00	bd.ft.	36	500
2" x 6" x 10" = 1 pc.	20.00	bd.ft.	36	714
2" x 6" x 10" = 1 pc.	18.00	bd.ft.	342	6,157
2" x 6" x 12" = 1 pc.	40.00	bd.ft.	36	1,429
(5) Wooden Jalousie Window				
with 5 Blades (.40x.50)	14.00	sets	36	500
(6) Window Jambs (Apitong)				
2" x 6" x 16" = 5 pcs.	80.00	bd.ft.	36	2,858
2" x 6" x 14" = 1 pc.	14.00	bd.ft.	36	500
2" x 6" x 10" = 1 pc.	10.00	bd.ft.	36	357
(7) Cabinet				
3/4" x 4' x 8' = 1 pc. (plyboard)	1.00	pc.	889	889
Sub-Total of F-1				18,385
2. Labor (30% of F-1)		L.S.		5,516
Sub-Total of F				**23,901**
G. Tile Work				
1. Materials				
(1) 4 - 1/4" x 4 - 1/4" Glazed Tiles	1,950.00	pcs.	4	8,443
(2) 0.10 x 0.20m Floor Tiles	900.00	pcs.	8	6,819
(3) Cement	4.00	bags	139	554
(4) White Cement	1.00	bag	750	750
Sub-Total of G-1				16,567
2. Labor (30% of G-1)				4,970
Sub-Total of G				**21,537**

Appendix 9.1.12 Unit Cost of School Toilet

Sheet 3 of 5 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
H. Plumbing Works				
1. Materials				
(1) Toilet Bowl - Squat Type	3.00	sets	711	2,133
(2) Toilet Bowl - Sit Type	2.00	sets	711	1,422
(3) Lavatory	2.00	sets	3,247	6,495
(4) 4" dia x 3m PVC San. Pipe	4.00	pcs.	178	710
(5) 3" dia x 3m PVC San. Pipe	7.00	pcs.	100	697
(6) 1 1/2" dia. x 3 m PVC San. Pipe	4.00	pcs.	63	251
(7) 2" dia. x 3 m PVC San. Pipe	2.00	pcs.	60	119
(8) 6" x 4" Floor Drain	5.00	pcs.	100	498
(9) 2" dia. Elbow PVC	4.00	pcs.	8	30
(10) 4" dia. WYB PVC	2.00	pcs.	29	58
(11) 4" dia. x 3" dia. WYB PVC	12.00	pcs.	36	429
(12) 4" dia. x 2" dia. TEE PVC	2.00	pcs.	37	74
(13) 4" dia. TEE PVC	3.00	pcs.	37	110
(14) 1 1/2" dia. WYB PVC	1.00	pcs.	14	14
(15) 4" dia. Clean Out PVC	3.00	pcs.	41	123
(16) 3" dia. Clean Out PVC	1.00	pcs.	32	32
(17) Faucet	3.00	pcs.	60	179
(18) 3" dia. x 2"dia. WYB PVC	2.00	pcs.	29	58
(19) 1 1/2" dia. Elbow PVC	6.00	pcs.	15	91
(20) PVC Cement	1.00	can	144	144
(21) 2" dia. PVC San. Pipe x 3m	2.00	pcs.	94	188
(22) 4" dia. x 2" dia. TEE	2.00	pcs.	25	50
(23) Check Valve 1 1/2"	1.00	pcs.	216	216
(24) 4" P-Trap	5.00	pcs.	78	390
Sub-Total of H-1				15,985
2. Labor (30% of H-1)		L.S.		4,796
Sub-Total of H				**20,781**
I. Painting				
1. Materials				
(1) Acrylic,Semi-gloss	8.00	gals.	299	2,390
(2) Concrete Sealer	4.00	gals.	236	944
(3) Acri Color: Wood	4.00	gals.	91	364
(4) Enamel,QDE	6.00	gals.	305	1,831
(5) Wood Putty	1.00	gals.	346	346
(6) Paint Thinner	1.00	gals.	68	68
(7) Tinting Color	4.00	gals.	45	182
(8) Sand Paper (assorted)	15.00	gals.	8	114
(9) Miscellaneous		L.S.		1,147
(10) Roof Paint (green, ready-mix)	2.00	gals.	323	645
Sub-Total of I-1				8,032
2. Labor (30%of I-1)		LS		2,409
Sub-Total of I				**10,441**
J. Electrical Work				
1. Materials				
(1) 40 Watts Flourescent Lamp	2.00	sets	292	585
(2) Elect. Wire TW#12	24.00	M	8	182
(3) Elect. Conduit - 1/2" dia. x 10"	4.00	pcs.	89	355

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(4) Entrance Cap. 1/2" dia.	1.00	pc.	32	32
(5) Switch Outlet, Flush Type	2.00	pcs.	44	89
(6) Utility Box 2"x3"	2.00	pcs.	8	15
(7) Porcelain Receptacle 2"dia.	2.00	pcs.	8	15
(8) Safety Switch 60A, 250V	1.00	sets	562	562
(9) Electrical Tape	1.00	roll	25	25
Sub-Total of J-1				1,860
2. Labor (30%of J-1)		L.S.		558
Sub-Total of J				**2,418**
K. Hardware				
1. Materials				
(1) 3"x3" Butt Hinges (Loose Pin)	10.00	pcs.	16	162
(2) 4"x4" Butt Hinges (Loose Pin)	12.00	pcs.	21	247
(3) Door Lockset (Schlage US)	3.00	pcs.	521	1,562
(4) Barrel Bolt (4")	5.00	pcs.	45	227
(5) Cabinet Pull (4")	5.00	pcs.	8	38
(6) Water Storage Cover				
Checkered Plate 1/4" thick				
1.44x0.645 w/ L bar & flat bar	1.00	set	1,129	1,129
0.645x0.633 w/ L bar & flatbar	2.00	set	636	1,273
(7) Padlock	1.00	pcs.	434	434
Sub-Total of K-1				5,072
2. Labor (30%of K-1)		L.S.		1,522
Sub-Total of K				**6,594**
L. Septic Tank and Sewage Basin				
1. Materials				
(1) 4" CHB	180.00	pcs.	5	974
(2) Cement	18.00	bags	139	2,494
(3) Sand	1.50	cu.m.	363	544
(4) Gravel	1.00	cu.m.	459	459
(5) Rebars:10mm dia.x 6m	29.00	pcs.	80	2,323
(6) #16 Tire Wire	2.00	kgs.	58	117
(7) Formworks: Coco Lumber				
2"x3"x10' = 12 pcs.	60.00	bd.ft.	9	520
1/4" plywood ord. 4'x8'	2.00	pcs.	483	966
C.W.N. (assorted)	2.00	kgs.	34	67
Sub-Total of L-1				8,463
2. Labor (30%of L-1)		L.S.		2,539
Sub-Total of L				**11,002**
M. Shallow Well (18 depth)				
a. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 63mm x 6m PVC Pipe with socket	2.00	pcs.	970	1,940
(2) 63mm x 3m PVC Pipe with plug	1.00	pc.	489	489
(3) 63mm PVC Socket	1.00	pc.	107	107
(4) 63mm x 3m PVC Screen	1.00	pc.	1,551	1,551
Sub-Total of M-a-1				4,087

Appendix 9.1.12 Unit Cost of School Toilet

Sheet 5 of 5 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
2. Labor, Fuel, Lubricant & others	18.00	m	620	11,164
Well Drilling for 18m depth at 150mm borehole				
Sub-Total of M-a-2				11,164
Sub-Total of M-a				**15,251**
b. Well Development		L.S.		595
c. Gravel Packing, Installation of Handpump & Construction of Platform				
1. Materials				
(1) 50mm Jetmatic Handpump	1.00	set	2,839	2,839
(2) 50mm x 1m GI Pipe (Sch.40)	1.00	pc.	89	89
(3) #10 Sieved Gravel	0.10	cu.m.	1,038	104
(4) Coarse Sand	0.07	cu.m.	513	36
(5) Cement for Sanitary Seal	1.00	bag	139	139
(6) Pump Base and Platform				
1) Cement	4.00	bags	139	554
2) Gravel	1.00	cu.m.	459	459
3) Sand	1.00	cu.m.	363	363
4) Plywood (1,200mm x 2,400mm x 6mm)	1.00	pc.	483	483
5) Form Lumber (50mm x 75mm x 1,800mm)	1.00	pc.	53	53
6) Nail	1.00	kg.	34	34
Sub-Total of M-c-1				5,151
2. Labor (40% of M-c-1)		L.S.		2,061
Sub-Total of M				**7,212**
N. Freight Cost (11% of Materials for A-M excluding sand & grave		**L.S.**		**17,604**
O. Indirect Cost				
Profit (10% of A-N)				24,813
VAT (10% of Profit & Labor)				6,385
Sub-Total of O				**31,198**
Total Construction Cost (A - O)				**271,288**
P. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		
2. Construction Supervision		L.S.		
Sub-Total of P				**0**
GRAND TOTAL				**271,288**
			say	**271,000**

Note: L.S. - Lump Sum
Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.
Cost Adjusted to 2003 Price Level.

Appendix 9.1.13 Unit Cost of Public Toilet

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization and Demobilization		**L.S.**		**7,361**
B. Earthwork				
1. Materials				
(1) Gravel Fill	3.00	cu.m.	459	1,377
Sub-Total of B-1				1,272
2. Labor				
(1) Excavation	15.88	cu.m.	142	2,252
(2) Backfill	4.97	cu.m.	129	640
(3) Gravel Fill	3.00	cu.m.	168	503
Sub-Total of B-2				3,395
Sub-Total of B				**4,667**
C. Concrete Work				
1. Materials				
(1) Cement	61.00	bags	139	8,452
(2) Sand	4.00	cu.m.	363	1,450
(3) Gravel	8.00	cu.m	459	3,672
(4) Rebars: 12mm dia. x 6m	38.00	pcs.	80	3,044
10mm dia. x 6m	57.00	pcs.	58	3,332
(5) #16 Tie Wire	8.00	kgs.	58	468
(6) Formworks:				
1/4" Plywood	6.00	pcs.	483	2,897
2"x2"x10" Coco Lumber	200.00	bd.ft.	9	1,732
Sub-Total of C-1				25,045
2. Labor (30% of C-1)		L.S.		7,514
Sub-Total of C				**32,559**
D. Masonry Work				
1. Materials				
(1) 6"CHB	800.00	pcs.	6	5,196
(2) 4"CHB	260.00	pcs.	5	1,407
(3) Cement	97.00	bags	139	13,439
(4) Sand	10.00	cu.m.	363	3,626
(5) Rebars: 12mm dia. x 6m	30.00	pcs.	80	2,403
10mm dia. x 6m	11.00	pcs.	58	643
(6) #16 Tie Wire	4.00	kgs.	58	234
(7) Scaffolding				
2"x4"x8" = 10 pcs. Coco Lumber	53.33	bd.ft.	9	462
Sub-Total of D-1				27,410
2. Labor (30% of D-1)		L.S.		8,223
Sub-Total of D				**35,633**
E. Roofing Works				
1. Materials				
(1) GA #26 Corr. GI(1=10')	20.00	bd.ft	314	6,278
(2) GA #24 Pln. GI Flashing	3.00	pcs.	303	909
(3) GA #24 Pln. GI Gutter (Pre-Fab)	9.00	kg.	303	2,728
(4) Umbrella Nails 2 - 1/2"	12.00	bags	50	598
(5) Rafter - 2"x5"x18' = 5 pcs.	75.00	bd.ft.	36	2,679
(6) Purlins - 2"x2"x12' = 18 pcs.	72.00	bd.ft.	36	2,572
(7) WD Cleats - 2"x2"x10' = 6 pcs.	20.00	bd.ft.	36	714
(8) Nailers - 2"x2"x12' = 30 pcs.	120.00	bd.ft.	36	4,286

Description	Quantity	Unit	Unit Cost	Cost
-2"x2"x10' =36 pcs.	120.00	bd.ft.	36	4,286
(9) Fascia Board				
1"x12"x12'=4 pcs.	48.00	bd.ft.	36	1,715
1"x12"x18'=2 pcs.	36.00	bd.ft.	36	1,286
(10) Wood Plate			0	
2"x4"x20'=2 pcs.	26.66	bd.ft.	36	952
(11) 1/4"Thk. Mar. Plywood 4"x 8"	14.00	pcs.	518	7,259
(12) C.W.N. Assorted	15.00	kgs.	32	487
(13) 3" dia. x 3 m Downspout (PVC)	3.00	pcs.	92	276
(14) 3" dia. Elbow (PVC)	2.00	pcs.	16	32
(15) 3" dia. Coupling (PVC)	1.00	pcs.	15	15
(16) Ceiling Vent				
1"x1"x8' = 4 pcs.	2.67	bd.ft.	29	78
(17) Screen (1/8"x1/8")	1.00	yd.	92	92
Sub-Total of E-1				37,243
2. Labor (30% of E-1)		L.S.		11,173
Sub-Total of E				**48,416**
F. Carpentry Work				
1. Materials				
(1) D - 1 Hollow Core Tangule				
Flush Type Door w/ Louver (.80 x 2.20)	2.00	sets	1,639	3,278
(2) D - 2 Hollow Core Tanguile				
Flush Type Door (.60 x 2.10)	1.00	sets	1,230	1,230
(3) D - 3 Louver Door (.60 x 1.40)	5.00	sets	1,025	5,125
(4) Door Jambs (Apitong)				
2" x 6" x 14" = 1 pc.	14.00	bd.ft.	36	500
2" x 6" x 10" = 2 pcs.	20.00	bd.ft.	36	714
2" x 6" x 10" = 1 pc.	18.00	bd.ft.	36	643
2" x 4" x 12" = 5 pcs.	40.00	bd.ft.	36	1,429
(5) Wooden Jalousie Window				
with 5 Blades (.40x.50)	14.00	sets	323	4,516
(6) Window Jambs (Apitong)				
2" x 6" x 16" = 5 pcs.	80.00	bd.ft.	36	2,858
2" x 6" x 14" = 1 pc.	14.00	bd.ft.	36	500
2" x 6" x 10" = 1 pc.	10.00	bd.ft.	36	357
(7) Cabinet			0	
3/4" x 4' x 8' = 1 pc. (plyboard)	1.00	pc.	889	889
Sub-Total of F-1				22,038
2. Labor (30% of F-1)		L.S.		6,611
Sub-Total of F				**28,650**
G. Tile Work				
1. Materials				
(1) 4 - 1/4" x 4 - 1/4" Glazed Tiles	1,950.00	pcs.	4	7,800
(2) 0.10 x 0.20m Floor Tiles	900.00	pcs.	7	6,300
(3) Cement	4.00	bags	128	512
(4) White Cement	1.00	bag	693	693
(5) Tiles Fittings		L.S.		5,280
Sub-Total of G-1				20,585
2. Labor (30% of G-1)				6,176
Sub-Total of G				**26,761**

Appendix 9.1.13 Unit Cost of Public Toilet

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
H. Plumbing Works				
1. Materials				
(1) Urinal	3.00	sets	1,268	3,803
(2) Toilet Bowl - Squat Type	6.00	sets	711	4,267
(3) 4" dia x 3m PVC San. Pipe	6.00	pcs.	178	1,065
(4) 3" dia x 3m PVC San. Pipe	4.00	pcs.	100	398
(5) 2" dia x 3m PVC San. Pipe	3.00	pcs.	60	179
(6) 3/4" dia. x 6 m GI Pipe Sch.40	5.00	pcs.	291	1,456
(7) 1/2" dia x 6m GI Pipe Sch.40	1.00	pcs.	213	213
(8) 4" x 4" WYE PVC	1.00	pcs.	29	29
(9) 3" dia. Elbow PVC	10.00	pcs.	36	357
(10) 3" dia. 45 deg. Bend PVC	2.00	pcs.	29	58
(11) 2" dia. Elbow PVC	6.00	pcs.	8	45
(12) 2" dia.45 deg. Bend PVC	2.00	pcs.	24	48
(13) 1/2" dia. Elbow GI	5.00	pcs.	12	60
(14) 4" dia. 3 dia. WYE PVC	8.00	pcs.	48	381
(15) 3/4" dia. TEE GI	7.00	pcs.	48	333
(16) 1/2" dia. TEE GI	5.00	pcs.	24	119
(17) 4" dia. X 2" dia. TEE PVC	6.00	pcs.	48	286
(18) 4" dia. Clean Out PVC	3.00	pcs.	41	123
(19) 2" dia. Clean Out PVC	1.00	pcs.	29	29
(20) Faucet	10.00	pcs.	60	595
(21) 3" dia. x 2" dia. Elbow Reducer PVC	1.00	pcs.	32	32
(22) 3" dia. x 2" dia. WYE PVC	3.00	pcs.	29	88
(23) 2" dia. x 2" dia. WYE PVC	3.00	pcs.	17	52
(24) PVC Cement	1.00	can	144	144
(25) 4" dia. x 2" dia. WYE PVC	2.00	pcs.	48	95
(26) Gate Valve 3/4" dia.	1.00	pcs.	144	144
(27) Gate Valve 1/2" dia.	1.00	pcs.	114	114
(28) Water Meter 3/4" dia.	1.00	pcs.	1,505	1,505
(29) 3/4" dia. x 1/2" dia Elbow Reducer GI	1.00	pcs.	16	16
Sub-Total of H-1				16,035
2. Labor (30% of H-1)		L.S.		4,811
Sub-Total of H				**20,846**
I. Painting				
1. Materials				
(1) Acrylic,Semi-gloss	8.00	gals.	299	2,390
(2) Concrete Sealer	4.00	gals.	236	944
(3) Acri Color: Wood	4.00	gals.	91	364
(4) Enamel,QDE	6.00	gals.	305	1,831
(5) Wood Putty	1.00	gals.	346	346
(6) Paint Thinner	1.00	gals.	68	68
(7) Tinting Color	4.00	gals.	45	182
(8) Sand Paper (assorted)	15.00	gals.	8	114
(9) Miscellaneous		L.S.	0	1,154
(10) Roof Paint (green, ready-mix)	2.00	gals.	323	645
Sub-Total of I-1				8,038
2. Labor (30%of I-1)		L.S.		2,411
Sub-Total of I				**10,450**

Appendix 9.1.13 Unit Cost of Public Toilet

Sheet 4 of 5

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
J. Electrical Work				
1. Materials				
(1) 40 Watts Flourescent Lamp	2.00	sets	292	585
(2) Elect. Wire TW#12	24.00	M	8	182
(3) Elect. Conduit - 1/2" dia. x 10"	4.00	pcs.	89	355
(4) Entrance Cap. 1/2" dia.	1.00	pc.	32	32
(5) Switch Outlet, Flush Type	2.00	pcs.	44	89
(6) Utility Box 2"x3"	2.00	pcs.	8	15
(7) Porcelain Receptacle 2"dia.	2.00	pcs.	8	15
(8) Safety Switch 60A, 250V	1.00	sets	562	562
(9) Electrical Tape	1.00	roll	25	25
Sub-Total of J-1				1,860
2. Labor (30%of J-1)		L.S.		558
Sub-Total of J				**2,418**
K. Hardware				
1. Materials				
(1) 3"x3" Butt Hinges (Loose Pin)	10.00	pcs.	16	162
(2) 4"x4" Butt Hinges (Loose Pin)	12.00	pcs.	21	247
(3) Door Lockset (Schlage US)	3.00	pcs.	521	1,562
(4) Barrel Bolt (4")	5.00	pcs.	45	227
(5) Cabinet Pull (4")	5.00	pcs.	8	38
(6) Water Storage Cover				
Checkered Plate 1/4" thick				
1.44x0.645 w/ L bar & flat bar	1.00	set	1,129	1,129
0.645x0.633 w/ L bar & flatbar	2.00	set	636	1,273
(7) Padlock	1.00	pcs.	434	434
Sub-Total of K-1				5,072
2. Labor (30%of K-1)		L.S.		1,522
Sub-Total of K				**6,594**
L. Septic Tank and Sewage Basin				
1. Materials				
(1) 4" CHB	180.00	pcs.	5	974
(2) Cement	18.00	bags	139	2,494
(3) Sand	1.50	cu.m.	363	544
(4) Gravel	1.00	cu.m.	459	459
(5) Rebars:10mm dia.x 6m	29.00	pcs.	80	2,323
(6) #16 Tire Wire	2.00	kgs.	58	117
(7) Formworks: Coco Lumber				
2"x3"x10' = 12 pcs.	60.00	bd.ft.	9	520
1/4" plywood ord. 4'x8'	2.00	pcs.	483	966
C.W.N. (assorted)	2.00	kgs.	34	67
Sub-Total of L-1				8,463
2. Labor (30%of L-1)		L.S.		2,539
Sub-Total of L				**11,002**
M. Concrete Water Tank (Elevated)				
1. Earth Work				
(1) Materials				
1) Gravel Fill	1.00	cu.m.	459	459
Sub-Total of M-1(1)				459

Appendix 9.1.13 Unit Cost of Public Toilet

Sheet 5 of 5

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(2) Labor				
1) Excavation	14.70	cu.m.	142	2,084
2) Backfill	13.08	cu.m.	129	1,685
3) Gravel Fill	1.00	cu.m.	168	168
Sub-Total of M-1(2)				3,937
Sub-Total of M-1				459
2. Materials				
(1) Cement	62.00		139	8,590
(2) Sand	4.50		363	1,632
(3) Gravel	8.00		459	3,672
(4) Rebars: 12mm dia. x 6m	160.00		58	9,352
(5) #16 Tie Wire	4.00		58	234
(6) Formworks:				
1/4" plywood	12.00		483	5,793
2"x3"x16' = 60 pcs.	480.00		9	4,157
(7) CWN (assorted)	5.00		34	168
Sub-Total of M-2				33,597
3. Labor (30% of M-2)				10,079
Sub-Total of M				**44,135**
N. Freight Cost (11% of Materials for A-M excluding sand & gravel		**L.S.**		**20,735**
O. Indirect Cost				
Profit (10% of A-M)				27,949
VAT (10% of Profit & Labor)				11,748
Sub-Total of O				**39,697**
Total Construction Cost (A to O)				**313,161**
P. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		
2. Construction Supervision		L.S.		
Sub-Total of P				**0**
GRAND TOTAL				**313,161**
			say	**313,000**

Note: L.S. - Lump Sum

Source: DILG - PW4SP Standard Cost Estimate in 1999 Price Level.

Cost Adjusted to 2003 Price Level.

Appendix 9.3. Total Investment Costs (P x 1,000)- breakdown - Phase I

Municipality	Phase I (2005-2010) Requirement												
	Urban Area							Rural Area					
	Water Supply			Sanitation				Water Supply			Sanitation		
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1. Bongao	16,514	0	4,171	2,682	0	0	342	30,338	0	131,261	4,035	1,075	2,017	0
1. Physiscal Contingency(15% of 1))	2,477	0	626	402	0	0	51	4,551	0	19,689	605	161	303	0
2. Price Contingency (10% of 1 & 2)	1,899	0	480	308	0	0	39	3,489	0	15,095	464	124	232	0
3. Total Direct Cost	20,891	0	5,277	3,393	0	0	433	38,378	0	166,045	5,105	1,359	2,552	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	1,880	0	475	305	0	0	39	3,454	0	14,944	459	122	230	0
6. Construction Supervision(4% of 5)	836	0	211	136	0	0	17	1,535	0	6,642	204	54	102	0
7. Training(3% and 12% for Urban $ rural)	627	0	158	102	0	0	13	4,605	0	19,925	613	163	306	0
8. Total indirect Cost	3,343	0	844	543	0	0	69	9,594	0	41,511	1,276	340	638	0
9. Total Project Cost	24,233	0	6,121	3,935	0	0	502	47,972	0	207,557	6,381	1,699	3,189	0
2. Languyan	11,992	0	0	1,300	0	0	342	18,773	7,902	30,280	2,046	1,071	319	0
1. Physiscal Contingency(15% of 1))	1,799	0	0	195	0	0	51	2,816	1,185	4,542	307	161	48	0
2. Price Contingency (10% of 1 & 2)	1,379	0	0	150	0	0	39	2,159	909	3,482	235	123	37	0
3. Total Direct Cost	15,169	0	0	1,645	0	0	433	23,748	9,997	38,304	2,588	1,355	404	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	1,365	0	0	148	0	0	39	2,137	900	3,447	233	122	36	0
6. Construction Supervision(4% of 5)	607	0	0	66	0	0	17	950	400	1,532	104	54	16	0
7. Training(3% and 12% for Urban $ rural)	455	0	0	49	0	0	13	2,850	1,200	4,596	311	163	48	0
8. Total indirect Cost	2,427	0	0	263	0	0	69	5,937	2,499	9,576	647	339	101	0
9. Total Project Cost	17,597	0	0	1,908	0	0	502	29,685	12,496	47,880	3,235	1,693	505	0
3. Mapun (Cagayan De Tawi-Tawi)	6,063	0	82	102	0	0	342	6,347	2,943	18,122	6,646	1,213	75	0
1. Physiscal Contingency(15% of 1))	909	0	12	15	0	0	51	952	442	2,718	997	182	11	0
2. Price Contingency (10% of 1 & 2)	697	0	9	12	0	0	39	730	339	2,084	764	140	9	0
3. Total Direct Cost	7,670	0	103	129	0	0	433	8,029	3,724	22,924	8,407	1,535	94	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	690	0	9	12	0	0	39	723	335	2,063	757	138	8	0
6. Construction Supervision(4% of 5)	307	0	4	5	0	0	17	321	149	917	336	61	4	0
9. Training(3% and 12% for Urban $ rural)	230	0	3	4	0	0	13	964	447	2,751	1,009	184	11	0
10. Total indirect Cost	1,227	0	17	21	0	0	69	2,007	931	5,731	2,102	384	24	0
11. Total Project Cost	8,897	0	120	150	0	0	502	10,037	4,654	28,655	10,508	1,918	118	0
4. Panglima Sugala (Balimbing) (Capital)	1,269	0	0	0	0	0	342	16,352	16,211	21,508	22,216	6,681	1,496	0
1. Physiscal Contingency(15% of 1))	190	0	0	0	0	0	51	2,453	2,432	3,226	3,332	1,002	224	0
2. Price Contingency (10% of 1 & 2)	146	0	0	0	0	0	39	1,881	1,864	2,473	2,555	768	172	0
3. Total Direct Cost	1,606	0	0	0	0	0	433	20,686	20,507	27,208	28,104	8,452	1,892	0

Appendix 9.3. Total Investment Costs (P x 1,000)- breakdown - Phase I (con't)

Municipality	Phase I (2005-2010) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	145	0	0	0	0	0	39	1,862	1,846	2,449	2,529	761	170	0
6. Construction Supervision(4% of 5)	64	0	0	0	0	0	17	827	820	1,088	1,124	338	76	0
7. Training(3% and 12% for Urban $ rural)	48	0	0	0	0	0	13	2,482	2,461	3,265	3,372	1,014	227	0
8. Total indirect Cost	257	0	0	0	0	0	69	5,171	5,127	6,802	7,026	2,113	473	0
9. Total Project Cost	1,863	0	0	0	0	0	502	25,857	25,633	34,009	35,130	10,565	2,365	0
5. Sapa-Sapa	0	7,667	44,280	0	174	0	342	0	0	689	0	2	662	0
1. Physiscal Contingency(15% of 1))	0	1,150	6,642	0	26	0	51	0	0	103	0	0	99	0
2. Price Contingency (10% of 1 & 2)	0	882	5,092	0	20	0	39	0	0	79	0	0	76	0
3. Total Direct Cost	0	9,699	56,014	0	220	0	433	0	0	871	0	2	838	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	0	873	5,041	0	20	0	39	0	0	78	0	0	75	0
6. Construction Supervision(4% of 5)	0	388	2,241	0	9	0	17	0	0	35	0	0	34	0
7. Training(3% and 12% for Urban $ rural)	0	291	1,680	0	7	0	13	0	0	105	0	0	101	0
8. Total indirect Cost	0	1,552	8,962	0	35	0	69	0	0	218	0	1	209	0
9. Total Project Cost	0	11,250	64,976	0	255	0	502	0	0	1,089	0	3	1,047	0
6. Simunul	0	2,601	2,271	0	155	0	342	21,928	7,513	14,288	2,252	599	737	0
1. Physiscal Contingency(15% of 1))	0	390	341	0	23	0	51	3,289	1,127	2,143	338	90	111	0
2. Price Contingency (10% of 1 & 2)	0	299	261	0	18	0	39	2,522	864	1,643	259	69	85	0
3. Total Direct Cost	0	3,291	2,872	0	196	0	433	27,739	9,504	18,074	2,849	757	932	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	0	296	259	0	18	0	39	2,496	855	1,627	256	68	84	0
6. Construction Supervision(4% of 5)	0	132	115	0	8	0	17	1,110	380	723	114	30	37	0
7. Training(3% and 12% for Urban $ rural)	0	99	86	0	6	0	13	3,329	1,140	2,169	342	91	112	0
8. Total indirect Cost	0	527	460	0	31	0	69	6,935	2,376	4,519	712	189	233	0
9. Total Project Cost	0	3,817	3,332	0	227	0	502	34,674	11,880	22,593	3,561	946	1,166	0
7. Sitangkai	0	21,550	8,319	0	692	0	342	0	19,879	23,764	0	8,193	1,327	0
1. Physiscal Contingency(15% of 1))	0	3,233	1,248	0	104	0	51	0	2,982	3,565	0	1,229	199	0
2. Price Contingency (10% of 1 & 2)	0	2,478	957	0	80	0	39	0	2,286	2,733	0	942	153	0
3. Total Direct Cost	0	27,261	10,523	0	875	0	433	0	25,148	30,062	0	10,365	1,679	0
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	0	2,453	947	0	79	0	39	0	2,263	2,706	0	933	151	0
6. Construction Supervision(4% of 5)	0	1,090	421	0	35	0	17	0	1,006	1,202	0	415	67	0
7. Training(3% and 12% for Urban $ rural)	0	818	316	0	26	0	13	0	3,018	3,607	0	1,244	201	0
8. Total indirect Cost	0	4,362	1,684	0	140	0	69	0	6,287	7,515	0	2,591	420	0
9. Total Project Cost	0	31,623	12,207	0	1,015	0	502	0	31,434	37,577	0	12,956	2,098	0

Appendix 9.3. Total Investment Costs (P x 1,000)- breakdown - Phase II

	Municipality	Phase II (2010-2015) Requirement													
		Urban Area							Rural Area						
		Water Supply			Sanitation				Water Supply			Sanitation			
		Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1.	Bongao	11,280	0	114,637	2,060	0	0	342	16,711	0	305,266	2,613	670	1,117	342
	1. Physiscal Contingency(15% of 1))	1,692	0	17,196	309	0	0	51	2,507	0	45,790	392	100	168	51
	2. Price Contingency (10% of 1 & 2)	1,297	0	13,183	237	0	0	39	1,922	0	35,106	300	77	128	39
	3. Total Direct Cost	14,270	0	145,016	2,606	0	0	433	21,139	0	386,162	3,305	847	1,413	433
	4. Indirect Cost														
	5. Feasibility Study/DD (9% of 5)	1,284	0	13,051	235	0	0	39	1,903	0	34,755	297	76	127	39
	6. Construction Supervision(4% of 5)	571	0	5,801	104	0	0	17	846	0	15,446	132	34	57	17
	7. Training(3% and 12% for Urban $ rural)	428	0	4,350	78	0	0	13	2,537	0	46,339	397	102	170	52
	8. Total indirect Cost	2,283	0	23,202	417	0	0	69	5,285	0	96,541	826	212	353	108
	9. Total Project Cost	16,553	0	168,218	3,023	0	0	502	26,424	0	482,703	4,131	1,059	1,766	541
2.	Languyan	2,433	0	0	471	0	0	342	3,887	2,008	466,370	752	431	151	342
	1. Physiscal Contingency(15% of 1))	365	0	0	71	0	0	51	583	301	69,956	113	65	23	51
	2. Price Contingency (10% of 1 & 2)	280	0	0	54	0	0	39	447	231	53,633	87	50	17	39
	3. Total Direct Cost	3,077	0	0	596	0	0	433	4,918	2,540	589,959	952	546	191	433
	4. Indirect Cost														
	5. Feasibility Study/DD (9% of 5)	277	0	0	54	0	0	39	443	229	53,096	86	49	17	39
	6. Construction Supervision(4% of 5)	123	0	0	24	0	0	17	197	102	23,598	38	22	8	17
	7. Training(3% and 12% for Urban $ rural)	92	0	0	18	0	0	13	590	305	70,795	114	65	23	52
	9. Total indirect Cost	492	0	0	95	0	0	69	1,229	635	147,490	238	136	48	108
	10. Total Project Cost	3,570	0	0	691	0	0	502	6,147	3,175	737,448	1,190	682	238	541
3.	Mapun (Cagayan De Tawi-Tawi)	725	0	0	120	0	0	342	132	1,439	16,675	0	230	29	342
	1. Physiscal Contingency(15% of 1))	109	0	0	18	0	0	51	20	216	2,501	0	34	4	51
	2. Price Contingency (10% of 1 & 2)	83	0	0	14	0	0	39	15	166	1,918	0	26	3	39
	3. Total Direct Cost	917	0	0	152	0	0	433	168	1,821	21,093	0	290	36	433
	4. Indirect Cost														
	5. Feasibility Study/DD (9% of 5)	83	0	0	14	0	0	39	15	164	1,898	0	26	3	39
	6. Construction Supervision(4% of 5)	37	0	0	6	0	0	17	7	73	844	0	12	1	17
	7. Training(3% and 12% for Urban $ rural)	28	0	0	5	0	0	13	20	218	2,531	0	35	4	52
	8. Total indirect Cost	147	0	0	24	0	0	69	42	455	5,273	0	73	9	108
	9. Total Project Cost	1,064	0	0	177	0	0	502	209	2,276	26,367	0	363	45	541
4.	Panglima Sugala (Balimbing) (Capital)	399	0	17	73	0	0	342	6,195	4,713	20,371	1,128	449	803	342
	1. Physiscal Contingency(15% of 1))	60	0	3	11	0	0	51	929	707	3,056	169	67	120	51
	2. Price Contingency (10% of 1 & 2)	46	0	2	8	0	0	39	712	542	2,343	130	52	92	39
	3. Total Direct Cost	504	0	22	92	0	0	433	7,837	5,962	25,770	1,426	568	1,015	433
	4. Indirect Cost														
	5. Feasibility Study/DD (9% of 5)	45	0	2	8	0	0	39	705	537	2,319	128	51	91	39
	6. Construction Supervision(4% of 5)	20	0	1	4	0	0	17	313	238	1,031	57	23	41	17
	7. Training(3% and 12% for Urban $ rural)	15	0	1	3	0	0	13	940	715	3,092	171	68	122	52

Appendix 9.3. Total Investment Costs (P x 1,000)- breakdown - Phase II (con't)

Municipality	Phase II (2010-2015) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
8. Total indirect Cost	81	0	3	15	0	0	69	1,959	1,490	6,442	357	142	254	108
9. Total Project Cost	585	0	25	106	0	0	502	9,796	7,452	32,212	1,783	710	1,269	541
5. Sapa-Sapa	20,800	6,871	20,907	0	381	0	342	0	0	5,945	0	4	332	342
1. Physiscal Contingency(15% of 1))	3,120	1,031	3,136	0	57	0	51	0	0	892	0	1	50	51
2. Price Contingency (10% of 1 & 2)	2,392	790	2,404	0	44	0	39	0	0	684	0	0	38	39
3. Total Direct Cost	26,312	8,692	26,447	0	481	0	433	0	0	7,521	0	5	420	433
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	2,368	782	2,380	0	43	0	39	0	0	677	0	0	38	39
6. Construction Supervision(4% of 5)	1,052	348	1,058	0	19	0	17	0	0	301	0	0	17	17
7. Training(3% and 12% for Urban $ rural)	789	261	793	0	14	0	13	0	0	902	0	1	50	52
8. Total indirect Cost	4,210	1,391	4,232	0	77	0	69	0	0	1,880	0	1	105	108
9. Total Project Cost	30,522	10,083	30,678	0	558	0	502	0	0	9,401	0	6	525	541
6. Simunul	9,812	1,864	243	349	21	0	342	34,462	9,574	60,940	1,925	142	378	342
1. Physiscal Contingency(15% of 1))	1,472	280	36	52	3	0	51	5,169	1,436	9,141	289	21	57	51
2. Price Contingency (10% of 1 & 2)	1,128	214	28	40	2	0	39	3,963	1,101	7,008	221	16	43	39
3. Total Direct Cost	12,412	2,358	308	441	27	0	433	43,594	12,111	77,089	2,435	180	478	433
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	1,117	212	28	40	2	0	39	3,924	1,090	6,938	219	16	43	39
6. Construction Supervision(4% of 5)	496	94	12	18	1	0	17	1,744	484	3,084	97	7	19	17
7. Training(3% and 12% for Urban $ rural)	372	71	9	13	1	0	13	5,231	1,453	9,251	292	22	57	52
8. Total indirect Cost	1,986	377	49	71	4	0	69	10,899	3,028	19,272	609	45	119	108
9. Total Project Cost	14,397	2,735	357	512	31	0	502	54,493	15,139	96,361	3,043	225	597	541
7. Sitangkai	74,224	2,395	10,687	0	592	0	342	37,799	2,787	107,285	0	506	728	342
1. Physiscal Contingency(15% of 1))	11,134	359	1,603	0	89	0	51	5,670	418	16,093	0	76	109	51
2. Price Contingency (10% of 1 & 2)	8,536	275	1,229	0	68	0	39	4,347	321	12,338	0	58	84	39
3. Total Direct Cost	93,893	3,030	13,519	0	749	0	433	47,816	3,526	135,716	0	640	920	433
4. Indirect Cost														
5. Feasibility Study/DD (9% of 5)	8,450	273	1,217	0	67	0	39	4,303	317	12,214	0	58	83	39
6. Construction Supervision(4% of 5)	3,756	121	541	0	30	0	17	1,913	141	5,429	0	26	37	17
7. Training(3% and 12% for Urban $ rural)	2,817	91	406	0	22	0	13	5,738	423	16,286	0	77	110	52
8. Total indirect Cost	15,023	485	2,163	0	120	0	69	11,954	881	33,929	0	160	230	108
9. Total Project Cost	108,916	3,515	15,682	0	868	0	502	59,770	4,407	169,645	0	800	1,150	541

Appendix 9.3.1 - Quantities

Municipality	Phase I (2005-2010) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III Pop	Level II Pop	Level I No. of wells	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	3,550	0	13	551	0		1	6,521	0	418	828	1,646	7	0
2 Languyan	2,578	0	0	267	0		1	4,035	4,990	153	420	1,641	1	0
3 Mapun (Cagayan De Tawi-Tawi)	1,303	0	0	21	0		1	1,364	1,859	92	1,364	1,859	0	0
4 Panglima Sugala (Balimbing) (Capital)	354	0	0	0	0		1	4,561	10,236	109	4,561	10,236	6	0
5 Sapa-Sapa	0	4,841	270	0	266		1	0	0	4	0	3	2	0
6 Simunul	0	1,643	14	0	237		1	4,713	4,744	87	462	917	3	0
7 Sitangkai	0	13,608	79	0	1,059		1	0	12,553	226	0	12,553	5	0
Provincial Total	**7,785**	**20,092**	**377**	**839**	**1,562**	**0**	**7**	**21,195**	**34,382**	**1,089**	**7,636**	**28,854**	**24**	**0**

Appendix 9.3.1a - Quantities (Cont.)

Municipality	Phase II (2010-2015) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	2,425	0	365	423	0	0	1	3,592	0	972	536	1,026	4	1
2 Languyan	523	0	0	97	0	0	1	836	1,268	2,355	154	661	1	1
3 Mapun (Cagayan De Tawi-Tawi)	156	0	0	25	0	0	1	28	909	84	0	352	0	1
4 Panglima Sugala (Balimbing) (Capital)	92	0	0	15	0	0	1	1,427	2,976	103	232	688	3	1
5 Sapa-Sapa	4,471	4,339	127	0	583	0	1	0	0	36	0	6	1	1
6 Simunul	2,109	1,177	1	72	33	0	1	7,408	6,045	372	395	218	1	1
7 Sitangkai	17,093	1,512	102	0	907	0	1	8,705	1,760	1,022	0	775	3	1
Provincial Total	**26,868**	**7,028**	**596**	**631**	**1,522**	**0**	**7**	**21,995**	**12,958**	**4,944**	**1,317**	**3,726**	**13**	**7**

Appendix 9.3.2 - Unit Cost

Municipality	Phase I (2005-2010) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	4,652	1,584	314,000	4,871	653	271,000	342,000	4,652	1,584	314,000	4,871	653	271,000	342,000
2 Languyan	4,652	1,584	198,000	4,871	653	271,000	342,000	4,652	1,584	198,000	4,871	653	271,000	342,000
3 Mapun	4,652	1,584	198,000	4,871	653	271,000	342,000	4,652	1,584	198,000	4,871	653	271,000	342,000
4 Panglima Sugala (Balimbing) (Capital)	3,585	1,584	198,000	4,871	653	271,000	342,000	3,585	1,584	198,000	4,871	653	271,000	342,000
5 Sapa-Sapa	4,652	1,584	164,000	4,871	653	271,000	342,000	4,652	1,584	164,000	4,871	653	271,000	342,000
6 Simunul	4,652	1,584	164,000	4,871	653	271,000	342,000	4,652	1,584	164,000	4,871	653	271,000	342,000
7 Sitangkai	3,585	1,584	105,000	4,871	653	271,000	342,000	4,652	1,584	105,000	4,871	653	271,000	342,000

Appendix 9.3.2 - Unit Cost

Municipality	Phase II (2010-2015) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	4,652	1,584	314,000	4,871	653	271,000	342,000	4,652	1,584	314,000	4,871	653	271,000	342,000
2 Languyan	4,652	1,584	198,000	4,871	653	271,000	342,000	4,652	1,584	198,000	4,871	653	271,000	342,000
3 Mapun	4,652	1,584	198,000	4,871	653	271,000	342,000	4,652	1,584	198,000	4,871	653	271,000	342,000
4 Panglima Sugala (Balimbing) (Capital)	4,342	1,584	198,000	4,871	653	271,000	342,000	4,342	1,584	198,000	4,871	653	271,000	342,000
5 Sapa-Sapa	4,652	1,584	164,000	4,871	653	271,000	342,000	4,652	1,584	164,000	4,871	653	271,000	342,000
6 Simunul	4,652	1,584	164,000	4,871	653	271,000	342,000	4,652	1,584	164,000	4,871	653	271,000	342,000
7 Sitangkai	4,342	1,584	105,000	4,871	653	271,000	342,000	4,342	1,584	105,000	4,871	653	271,000	342,000

Appednix 9.3.3 - Total Construction Cost

Municipality	Phase I (2005-2010) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	16,514	0	4,171	2,682	0	0	342	30,338	0	131,261	4,035	1,075	2,017	0
2 Languyan	11,992	0	0	1,300	0	0	342	18,773	7,902	30,280	2,046	1,071	319	0
3 Mapun (Cagayan De Tawi-Tawi)	6,063	0	82	102	0	0	342	6,347	2,943	18,122	6,646	1,213	75	0
4 Panglima Sugala (Balimbing) (Capital)	1,269	0	0	0	0	0	342	16,352	16,211	21,508	22,216	6,681	1,496	0
5 Sapa-Sapa	0	7,667	44,280	0	174	0	342	0	0	689	0	2	662	0
6 Simunul	0	2,601	2,271	0	155	0	342	21,928	7,513	14,288	2,252	599	737	0
7 Sitangkai	0	21,550	8,319	0	692	0	342	0	19,879	23,764	0	8,193	1,327	0

Appendix 9.3.3 - Total Construction Cost (Cont.)

Municipality	Phase II (2010-2015) Requirement													
	Urban Area							Rural Area						
	Water Supply			Sanitation				Water Supply			Sanitation			
	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities	Level III	Level II	Level I	HH Flush	HH Pour Flush	Public School	Public Utilities
1 Bongao	11,280	0	114,637	2,060	0	0	342	16,711	0	305,266	2,613	670	1,117	342
2 Languyan	2,433	0	0	471	0	0	342	3,887	2,008	466,370	752	431	151	342
3 Mapun (Cagayan De Tawi-Tawi)	725	0	0	120	0	0	342	132	1,439	16,675	0	230	29	342
4 Panglima Sugala (Balimbing) (Capital)	399	0	17	73	0	0	342	6,195	4,713	20,371	1,128	449	803	342
5 Sapa-Sapa	20,800	6,871	20,907	0	381	0	342	0	0	5,945	0	4	332	342
6 Simunul	9,812	1,864	243	349	21	0	342	34,462	9,574	60,940	1,925	142	378	342
7 Sitangkai	74,224	2,395	10,687	0	592	0	342	37,799	2,787	107,285	0	506	728	342