8.4 Types of Facilities and Implementation Criteria

8.4.1 Water Supply

(1) Urban water supply

With regard to the development/expansion of urban water supply by municipality, existing conditions, future requirements and planned/on-going projects were reviewed during the preparation of this PW4SP. The potential water source for future development was also evaluated in Chapter 7, taking into account the possibility to utilize untapped spring sources. The location of urban areas of the respective municipalities/city was referred to Figure 3.4.1 in Chapter 3, Supporting Report. Table 8.4.1 presents the basic figures on the existing service coverage, water sources and future requirements. The following show the results of this rapid study by municipality.

Baungon

Only one Level III system exists which is managed by the municipality (served population is 1,000, or 21% of urban population). Water source (estimated supply amount of 100 cu.m/day) is a combination of spring and deep well. The project to augment transmission line and expansion of distribution system is under way waiting funding from the ADB-urban and LGU-urban project. Expansion work will cover part of rural barangays, since the transmission line passes these areas. Spring source is sufficient for the project.

Cabanglasan

There is no Level III system at present. The Poblacion area (4,000 population) uses Level I with deep wells. There is an on-going Level II project using spring source (however, supplementary spring source is necessary; about 20km away from the service area is costly and requires river crossing). Investigations on both spring and wells shall be proceeded.

Damulog

There is no Level III system at present and instead uses Level I and II systems. The water source is deep well. Upgrading from Level II to Level III was made at some systems, but only adopted the so called "spaghetti connection". Proper plan and design for the upgrading are requisites. Urban population to be served is less than 4,000.

Dangcagan

There is one Level III system with Level II service (combined sources; spring and deep well are used) which is managed by the municipal government. About 20% of the urban

Table 8.4.1 Existing Condition and Future Requirements of Urban Water Supply by Municipality

Name of Municipality	Existing Condition (1997)									Phase I (2003)									Phase II (2010)						
	Urban Population (1997)	Existing Level III System and Others					L-III Water Source			Urban Population (2003)	Pop. Served by Level III and Others						Newly Developed/Additional Water Source	Total Water Source Required (m3/d)	Urban Population (2010)	Pop. Served by Level-III			Newly developed/ Additional Water source	Total Water Source Required (m3/d)
		No. of Level-III and Operating Body	Pop. Served by Level-III	%	Pop. Served by Level-I/II	Total Pop. Served	Total (%)	Type	Production (m3/d)		Additional Pop. Served by L-III	Total Pop. Served by Level-III	%	Additional Pop. Served by Level-I/II	Total Pop. Served	%				Additional Pop. Served	Total	%		
Baungon	4,960	1(Mun)	1,032	21%	2,912	3,944	80%	DW/SP	-	5,827	718	1,750	30%	None	4,662	80%	100	300	10,542	8,265	10,015	95%	1,100	1,400
Cabanglasan	4,013	None			3,271	3,271	82%		-	4,556	373	373	8%	None	3,645	80%	100	100	11,966	10,994	11,367	95%	1,500	1,500
Damulog	3,870	None			2,576	2,576	67%		-	4,359	910	910	21%	None	3,487	80%	118	118	4,586	3,446	4,357	95%	500	600
Dangcagan	4,548	1(Brgy)	867	19%	3,163	4,030	89%	SP	819	5,232	155	1,022	20%	None	4,186	80%	100	200	6,039	4,715	5,737	95%	600	800
Don Carlos	23,145	1(WD)	2,133	9%	11,694	13,827	60%	DW/Surf	1,920	26,374	7,272	9,405	36%	None	21,099	80%	1,000	1,300	31,227	20,261	29,666	95%	2,600	3,900
Impasugong	5,475	1(Asc)	2,329	43%	2,162	4,491	82%	SP	480	6,286	538	2,867	46%	None	5,029	80%	100	400	12,594	9,097	11,964	95%	1,200	1,600
Kadingilan	4,794	None			2,856	2,856	60%		-	5,323	1,403	1,403	26%	None	4,259	80%	200	200	5,323	3,654	5,057	95%	400	700
Kalilangan	17,250	1(Mun)	1,156	7%	11,985	13,141	76%	SP	3,715	19,922	2,796	3,952	20%	None	15,938	80%	400	600	21,444	16,420	20,372	95%	2,200	2,700
Kibawe	4,347	1(WD)	2,772	64%	52	2,824	65%	DW	332	4,746	973	3,745	79%	None	3,797	80%	200	500	4,746	764	4,509	95%	100	600
Kitaotao	9,891	None			6,809	6,809	69%		-	11,260	2,199	2,199	20%	None	9,008	80%	300	300	11,260	8,498	10,697	95%	1,100	1,400
Lantapan	14,761	1(Mun)	1,015	7%	11,356	12,371	84%	SP	1,382	16,551	870	1,885	11%	None	13,241	80%	200	300	17,133	14,391	16,276	95%	1,900	2,200
Libona	2,317	1(Asc)	935	40%	335	1,270	55%	DW	130	2,529	753	1,688	67%	None	2,023	80%	100	300	2,529	715	2,402	95%	100	400
Malaybalay	28,759	1(WD)	25,261	88%		25,261	88%	Surf/DW	6,538	35,268	2,953	28,214	80%	None	28,214	80%	400	3,700	42,973	12,610	40,824	95%	1,700	5,400
Malitbog	2,704	None			2,272	2,272	84%		-	3,029	151	151	5%	None	2,423	80%	100	100	3,637	3,304	3,455	95%	500	500
Manolo Fortich	5,512	1(Mun)	4,281	78%	701	4,982	90%	DW/SP	5,166	6,173		4,281	69%	None	4,982	81%	100	600	14,336	9,338	13,619	95%	1,300	1,800
Maramag	52,948	1(WD)	5,879	11%	14,940	20,819	39%	SP	4,078	61,403	28,304	34,183	56%	None	49,123	80%	3,700	4,500	78,701	40,584	74,766	95%	4,600	9,800
Pangantucan	23,078	1(Brgy)	1,200	5%	17,915	19,115	83%	SP	151	25,137	995	2,195	9%	None	20,110	80%	200	300	28,298	24,688	26,883	95%	3,100	3,500
Quezon	14,458	1(Mun)	7,639	53%	5,930	13,569	94%		14,438	15,341		7,639	50%	None	13,569	88%	100	1,000	22,393	13,634	21,273	95%	1,800	2,800
San Fernando	13,130	None			10,522	10,522	80%		-	16,024	2,297	2,297	14%	None	12,819	80%	300	300	16,864	13,724	16,021	95%	1,800	2,100
Sumilao	10,880	1(Mun)	3,881	36%	6,783	10,664	98%	SP	545	12,988		3,881	30%	None	10,664	82%	100	600	18,398	13,597	17,478	95%	1,600	2,500
Talakag	5,663	1(Brgy)	4,800	85%	252	5,052	89%	SP	480	6,440	100	4,900	76%	None	5,152	80%	100	700	6,440	1,218	6,118	95%	200	800
Valencia	36,445	2(WD,Brgy)	20,552	56%	13,883	34,435	94%	DW/SP	-	41,207		20,552	50%	None	34,435	84%	100	2,700	92,583	67,402	87,954	95%	3,800	11,500
Provincial Total	292,948		85,732	29%	23,151	218,103	74%			335,977	53,761	139,493	42%		271,864	81%	8,118	19,118	464,013	301,319	440,812	95%	38,700	58,300

(Note) WD: Water District. Prov: Province. Mun: Municipality. Asc: Association
Unit consumption: 100 lpcd
Additional population served in 2010 includes the served population that will be absorbed by Level III system.

population (urban population is only 4,500) is served by the system. Expansion of the system is required. There is a good spring source, 8km away from the service area (pumping system is required). Study on the expansion with reference to the source shall be conducted considering the services to the barangays where transmission line will pass.

Don Carlos

There is one WD covering about 2,100 population (9% of urban population). Promotion of the users to join the WD is under way. Currently, they use shallow wells (more than 1,000 in number). Water sources of the WD are lake water and deep well. Expansion shall be provided with sufficient information dissemination.

Impasugong

One Level III system exists which is operated by the RWSA (2,300 persons are served, 43% of urban population). Water source is a spring (deep well is stand-by). Expansion shall be done using spring (sufficient quantity) with emphasis on the distribution line (financial arrangement is the subject).

Kadingilan

There in no Level III system at present. There are two Level II systems using deep wells. Urban population is 4,800 and about 34 % are covered by the Level II systems. Expansion plan using deep wells shall be studied.

Kalilangan

There is one Level III system managed by the municipality. The system covers 1,200 population (7% of urban population). Spring source is used for the supply. Majority of the people use free flowing Level I (abundant water available). LGU- urban water supply project is planned for expansion of the system.

Kibawe

One WD exists. Served population is 2,800 (64% service coverage of urban population) Water sources are deep wells. Expansion of the system is planned by the WD using deep wells. Financial support is being sought from LWUA.

Kitaotao

No Level III system exists at present. They use Level I and II systems. Level II service covers only 1,000 persons (10% of urban population, 10,000 people). Water source is deep well. Water quality (iron and manganese) problem is prevalent. A simple treatment facility shall be considered.

Lantapan

One Level III exists which is operated by the municipality. The system serves 1,000 persons (7% of urban population; 4 urban barangays exist). Water source is spring. This municipality is one of the recipient of LGU-urban water supply.

Libona

One Level III is operated by the RWSA. Service population is 940 (40% of the urban population). Water source is deep well. Expansion of the system to cover 11 barangays (including 10 rural barangays) is being planned using surface water. Financial support from ADB is being sought.

Malaybalay

There is one WD. Service population is 25,000 (88% of urban population). Deep well and surface water are utilized. Insufficient water source and limited capacity of treatment plant are current problems. The WD requested LWUA for financial assistance for the improvement needs.

Malitbog

No Level III system exists at present. Majority of the people uses Level I facilities and supplemented by limited Level II systems. Water source is spring. The plan for Level III shall be prepared in consultation with the people.

Manolo Fortich

One Level III exists which is operated by the municipal government. About 4,300 persons are served by the system (78% of urban population). Water sources are combined ones (spring and deep well). The area is covered by the ADB assisted project. Expansion of the system using spring shall be sought.

Maramag

There is one WD. Water source is spring. There are 12 urban barangays. The WD serves for 5,900 persons (11% of urban population). Many Level II systems also serve urban barangays. The upgrading from Level II to Level III is a requisite in the future.

Pangantucan

One Level III exists which is operated by the RWSA. Service population is 1,200 in 8 urban barangays (5% of urban population). Water source is spring. Majority of the urban barangays is served by Level II systems. Upgrading of such systems is a requisite using spring sources.

Quezon

One Level III exists that is operated by the municipality. About 7,600 persons are served by the system (53% of urban population). Water source is spring using pumps. Water source is sufficient, but costly due to the pumping measures. Expansion shall be planned to increase service coverage using a spring (17 km away from urban area) with gravity system.

San Fernando

No Level III exists at present. Either Level I (majority) or Level II systems serve them. Water source is spring and deep well. Development of Level III shall be planned using deep well, since potential spring sources have insufficient quantity or are located in remote area.

Sumilao

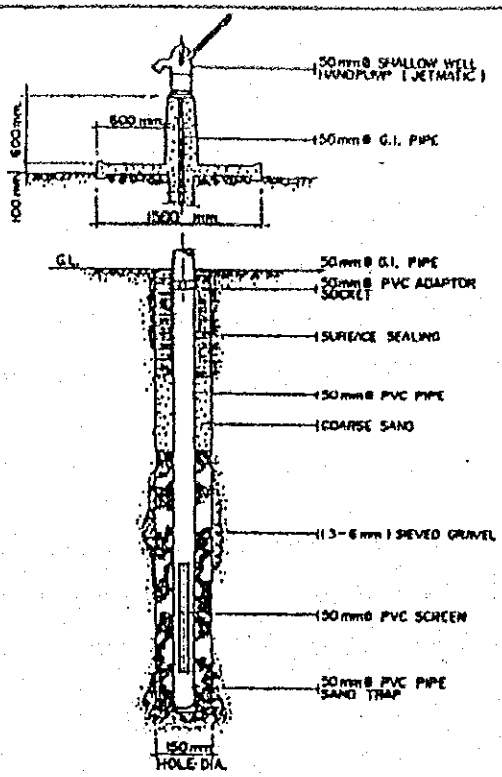
One Level III exists being managed by the municipality. The system serves for 3,900 persons (36% of urban population). Water source is spring. Expansion/construction of Level III shall be implemented by the municipality using spring sources.

Talakag

There is one Level III together with Level II operated by RWSA. Service population is 5,000 (90% of urban population). Water sources are spring and deep well. This municipality is one of the recipients of the ADB project. A supplemental spring source identified shall be used for the extension of the system.

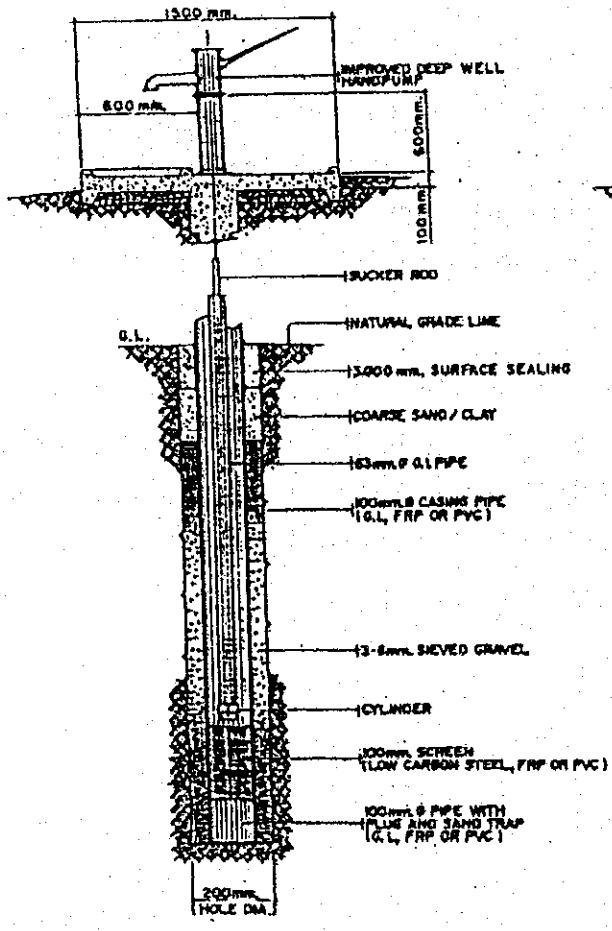
Valencia

One WD and another Level III (RWSA) exist. Water source is a combination of spring and deep well. Served population by these two systems is 20,600 (56% of urban population). The WD has a plan to expand the system covering one rural and one urban barangays with financial support from the Land Bank. Deep well may be the supplemental water source.



OPEN HOLE DRILLING & GRAVEL PACK METHOD

SHALLOW WELLS



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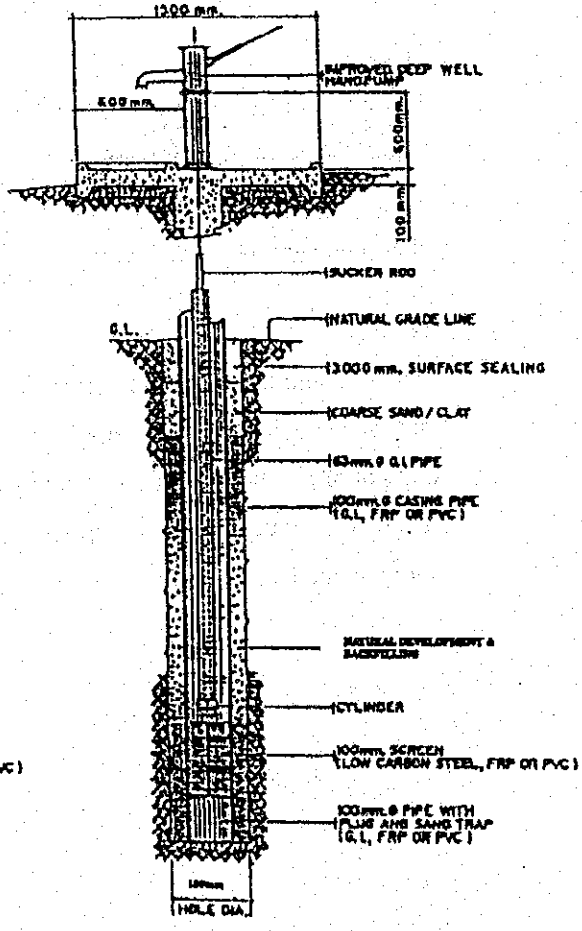
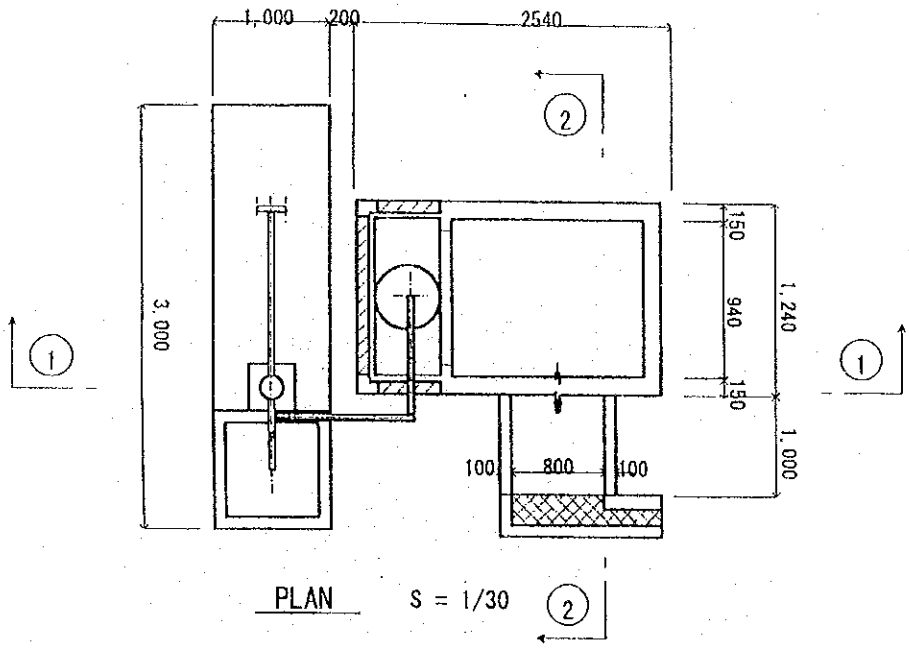


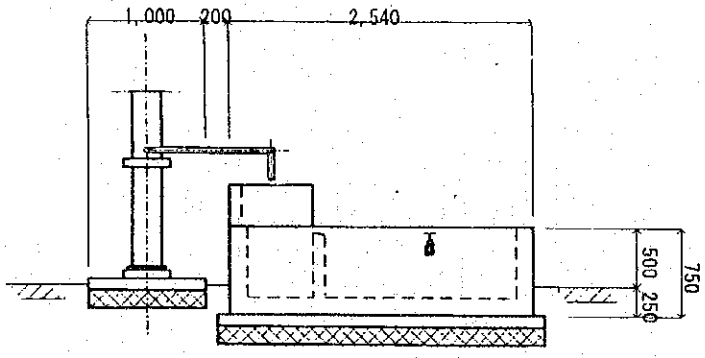
OPEN HOLE DRILLIG & NATURAL GRAVEL PACK METHOD

DEEP WELLS

FIGURE 8.4.1

TYPICAL STRUCTURE OF LEVEL I WELL FACILITY





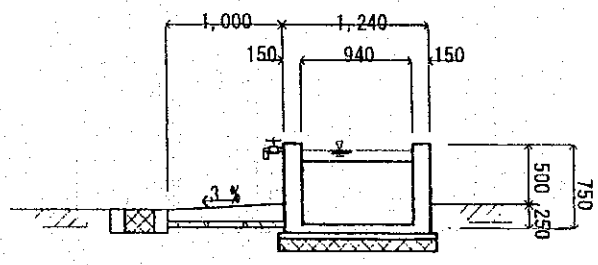


Figure 8.4.2(a) Iron Removal Facility

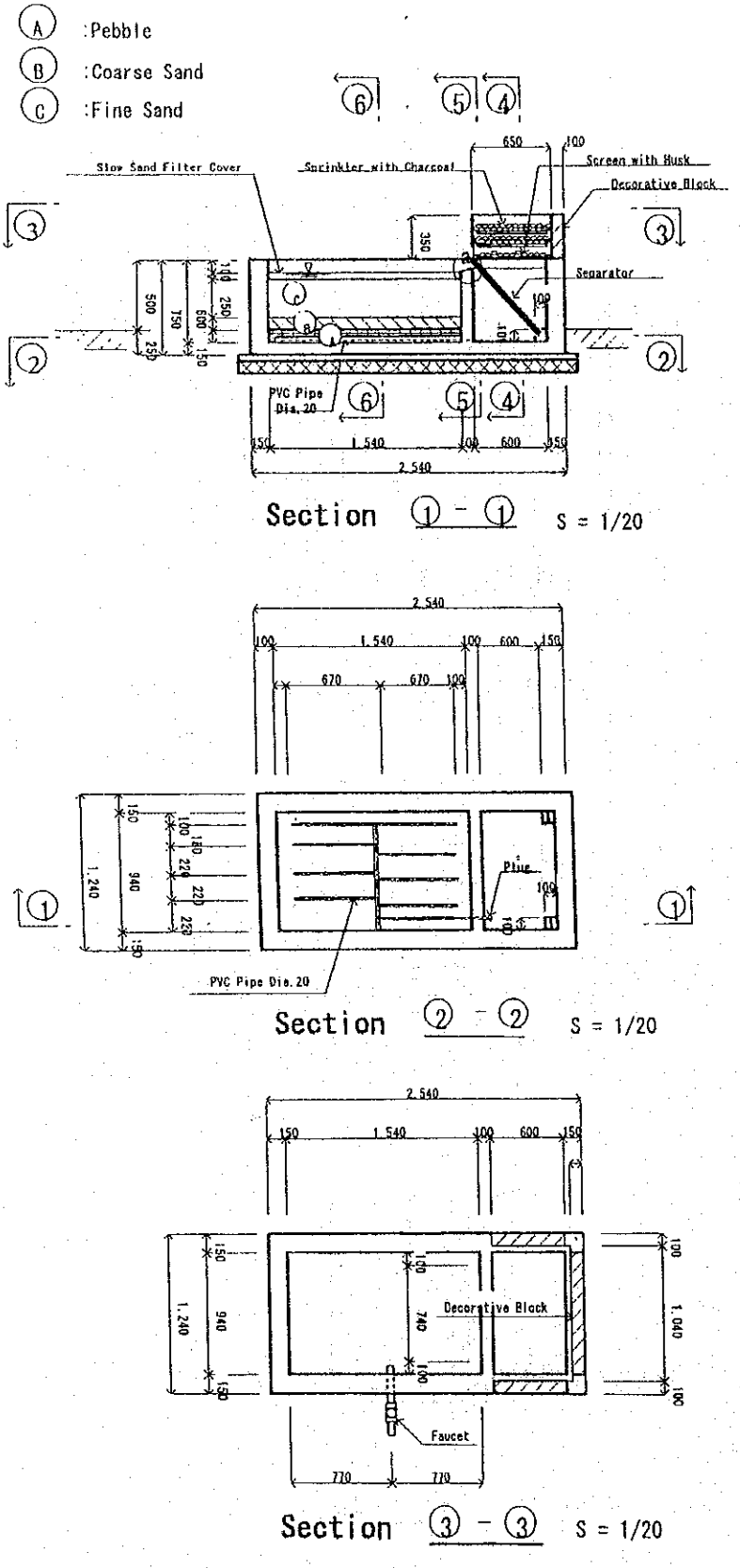


Figure 8.4.2(b) Iron Removal Facility

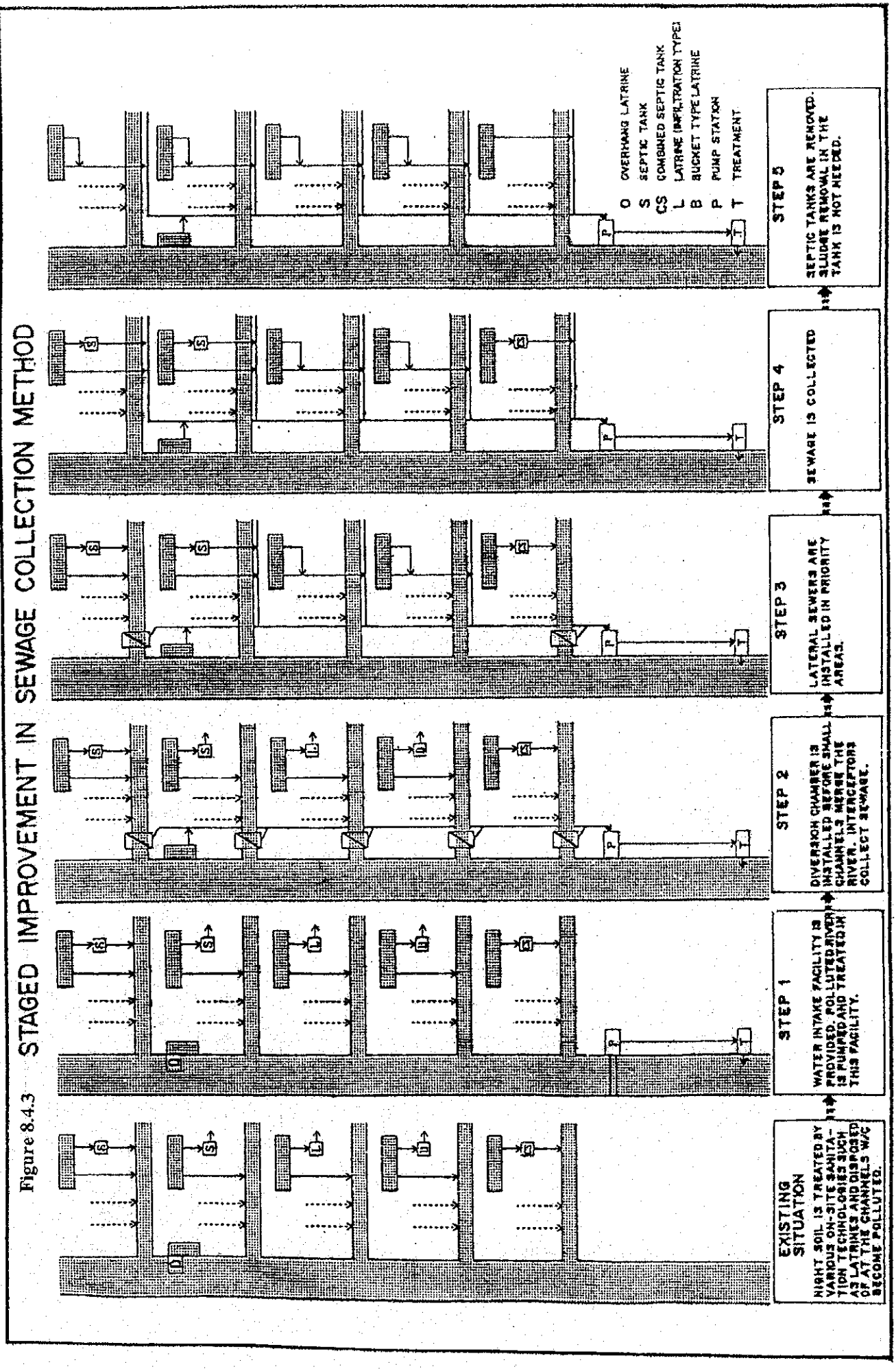

STAGED IMPROVEMENT IN SEWAGE COLLECTION METHOD
EXISTING SITUATION
NIGHT SOIL IS TREATED BY VARIOUS ON-SITE SANITATION TECHNOLOGIES SUCH AS LATRINES AND DISPOSED OF AT THE CHANNELS W/C BECOME POLLUTED.
STEP 1
WATER INTAKE FACILITY IS PROVIDED. POLLUTED RIVER IS PUMPED AND TREATED IN THIS FACILITY.
STEP 2
DIVERSION CHAMBER IS INSTALLED BEFORE SMALL CHANNELS MERGE THE RIVER. INTERCEPTORS COLLECT SEWAGE.
STEP 3
LATERAL SEWERS ARE INSTALLED IN PRIORITY AREAS.
STEP 4
SEWAGE IS COLLECTED
STEP 5
SEPTIC TANKS ARE REMOVED. SLUDGE REMOVAL IN THE TANK IS NOT NEEDED.
O OVERHANG LATRINE
S SEPTIC TANK
CS COMBINED SEPTIC TANK
L LATRINE (INFILTRATION TYPE)
B BUCKET TYPE LATRINE
P PUMP STATION
T TREATMENT

Figure 8.4.3

8.5 Service Coverage by Target Year

8.5.1 Water Supply

(1) Population to be served by Level II system in Phase I

Ninety (90) untapped spring sources were confirmed to be suitable for Level II systems in rural water supply during the PW4SP preparation as shown in Table 8.5.1. The conditions and assumptions applied for this estimate are as follows:

Source capacity:

The average source capacity of untapped spring was assumed to meet the needs of 100 households based on the review of existing Level II systems with spring sources.

Number of system:

Of the 90 untapped springs identified, 73 were considered to serve 73 Level II systems in 73 rural barangays of 14 municipalities.

Table 8.5.1 Population to be Served by Level II System in Phase I

Part 1 of 2

Municipality/City	Number of Untapped Spring	Number of Barangay to be Served	Number of Households to be Served	Population to be Served
Baungon	3	3	300	1,593
Cabanglasan	3	3	300	1,638
Damulog				
Dangcagan	1	1	100	547
Don Carlos	1	1	100	531
Impasugong	10	10	1,000	5,600
Kadingilan	3	3	300	1,572
Kalilangan				
Kibawe	8	8	800	4,096
Kitaotao	5	5	500	2,585
Lantapan				
Libona				
Malaybalay (Capital)				

Table 8.5.1 Population to be Served by Level II System in Phase I

Part 2 of 2

Municipality/City	Number of Untapped Spring	Number of Barangay to be Served	Number of Households to be Served	Population to be Served
Malitbog	10	10	1,000	5,330
Manolo Fortich				
Maramag	4	4	400	2,124
Pangantucan	6	6	600	3,240
Quezon	17			
San Fernando	10	10	1,000	5,360
Sumilao	6	6	600	3,306
Talakag	3	3	300	1,617
Valencia				
Provincial Total	90	73	7,300	39,139

(2) Population to be served by target year

Phase I

For urban area, the additional service coverage was estimated to be served by Level III service. For rural area, the population to be served by Level II systems with untapped springs was first calculated and the rest of the additional service coverage was estimated to be served by Level I facilities.

Phase II

For urban area, the population served by Level I and II facilities in the base year was considered to be absorbed by Level III service aside from the additional service coverage to be estimated by the sector target. For rural area, all existing facilities in Phase I were assumed to be utilized throughout the future.

The population to be served by target year is exhibited in Table 8.5.2 and Table 8.5.3.

Table 8.5.2 Population to be Served in Phase I (Water Supply)

Name of Municipality	Area	Population Served in the Base Year				Phase I Coverage (2003)								
						Total Population	Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Baungon	Urban	1,032	210	2,702	3,944	5,827	1,750	210	2,702	4,662	718			718
	Rural		1,368	14,075	15,443	22,213		2,961	15,920	18,881		1,593	1,845	3,438
	Total	1,032	1,578	16,777	19,387	28,040	1,750	3,171	18,622	23,543	718	1,593	1,845	4,156
Cabanglasan	Urban		390	2,881	3,271	4,556	374	390	2,881	3,645	374			374
	Rural		3,876	21,174	25,050	30,127		5,514	20,094	25,608		1,638		1,638
	Total		4,266	24,055	28,321	34,683	374	5,904	22,975	29,253	374	1,638		2,012
Damulog	Urban		175	2,401	2,576	4,359	911	175	2,401	3,487	911			911
	Rural		1,315	9,839	11,154	13,228		1,315	9,929	11,244			90	90
	Total		1,490	12,240	13,730	17,587	911	1,490	12,330	14,731	911		90	1,001
Dangcagan	Urban	867	612	2,551	4,030	5,232	1,023	612	2,551	4,186	156			156
	Rural		200	2,486	2,686	14,852		747	11,877	12,624		547	9,391	9,938
	Total	867	812	5,037	6,716	20,084	1,023	1,359	14,428	16,810	156	547	9,391	10,094
Don Carlos	Urban	2,133	972	10,722	13,827	26,374	9,405	972	10,722	21,099	7,272			7,272
	Rural	1,503	912	16,462	18,877	34,426	1,503	1,443	26,316	29,262		531	9,854	10,385
	Total	3,636	1,884	27,184	32,704	60,800	10,908	2,415	37,038	50,361	7,272	531	9,854	17,657
Impasugong	Urban	2,329		2,162	4,491	6,286	2,867		2,162	5,029	538			538
	Rural	728	1,604	17,622	19,954	24,236	728	7,204	12,669	20,601		5,600		5,600
	Total	3,057	1,604	19,784	24,445	30,522	3,595	7,204	14,831	25,630	538	5,600		6,138
Kadingilan	Urban		1,620	1,236	2,856	5,323	1,402	1,620	1,236	4,258	1,402			1,402
	Rural		1,040	13,094	14,134	24,683		2,612	18,369	20,981		1,572	5,275	6,847
	Total		2,660	14,330	16,990	30,006	1,402	4,232	19,605	25,239	1,402	1,572	5,275	8,249
Kalilangan	Urban	1,156	540	11,445	13,141	19,922	3,953	540	11,445	15,938	2,797			2,797
	Rural	193	897	4,415	5,505	12,760	193	897	9,756	10,846			5,341	5,341
	Total	1,349	1,437	15,860	18,646	32,682	4,146	1,437	21,201	26,784	2,797		5,341	8,138
Kibawe	Urban	2,772	52		2,824	4,746	3,745	52		3,797	973			973
	Rural	369		23,848	24,217	29,866	369	4,096	20,921	25,386		4,096		4,096
	Total	3,141	52	23,848	27,041	34,612	4,114	4,148	20,921	29,183	973	4,096		5,069
Kitaotao	Urban		1,008	5,801	6,809	11,260	2,199	1,008	5,801	9,008	2,199			2,199
	Rural			22,285	22,285	34,389		2,585	26,646	29,231		2,585	4,361	6,946
	Total		1,008	28,086	29,094	45,649	2,199	3,593	32,447	38,239	2,199	2,585	4,361	9,145
Lantapan	Urban	1,015	197	11,159	12,371	16,551	1,885	197	11,159	13,241	870			870
	Rural	667	5,325	15,056	21,048	26,485	667	5,325	16,520	22,512			1,464	1,464
	Total	1,682	5,522	26,215	33,419	43,036	2,552	5,522	27,679	35,753	870		1,464	2,334
Libona	Urban	935		335	1,270	2,529	1,688		335	2,023	753			753
	Rural	4,584	5,145	9,648	19,377	33,319	4,584	5,145	18,592	28,321			8,944	8,944
	Total	5,519	5,145	9,983	20,647	35,848	6,272	5,145	18,927	30,344	753		8,944	9,697

Table 8.5.2 Population to be Served in Phase I (Water Supply) (cont'd.)

Name of Municipality	Area	Population Served in the Base Year				Phase I Coverage (2003)							
						Total Population	Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Malaybalay (Capital)	Urban	25,261			25,261	35,268	28,214			28,214	2,953			2,953
	Rural	4,072	8,058	39,523	51,653	112,111	4,072	8,058	83,164	95,294			43,641	43,641
	Total	29,333	8,058	39,523	76,914	147,379	32,286	8,058	83,164	123,508	2,953		43,641	46,594
Malitbog	Urban		112	2,160	2,272	3,029	151	112	2,160	2,423	151			151
	Rural		1,518	11,716	13,234	16,064		6,848	6,806	13,654		5,330		5,330
	Total		1,630	13,876	15,506	19,093	151	6,960	8,966	16,077	151	5,330		5,481
Manolo Fortich	Urban	4,281		701	4,982	6,173	4,281		701	4,982				
	Rural	19,635	4,926	36,484	61,045	72,215	19,635	4,926	36,822	61,383			338	338
	Total	23,916	4,926	37,185	66,027	78,388	23,916	4,926	37,523	66,365			338	338
Maramag	Urban	5,879	11,583	3,357	20,819	61,404	34,183	11,583	3,357	49,123	28,304			28,304
	Rural	558	5,130	587	6,275	14,957	558	7,254	4,901	12,713		2,124	4,314	6,438
	Total	6,437	16,713	3,944	27,094	76,361	34,741	18,837	8,258	61,836	28,304	2,124	4,314	34,742
Pangantucan	Urban	1,200	2,181	15,734	19,115	25,137	2,195	2,181	15,734	20,110	995			995
	Rural		1,532	9,903	11,435	17,918		4,772	10,458	15,230		3,240	555	3,795
	Total	1,200	3,713	25,637	30,550	43,055	2,195	6,953	26,192	35,340	995	3,240	555	4,790
Quezon	Urban	7,639		5,930	13,569	15,341	7,639		5,930	13,569				
	Rural	1,889	1,909	54,592	58,390	64,901	1,889	1,909	54,592	58,390				
	Total	9,528	1,909	60,522	71,959	80,242	9,528	1,909	60,522	71,959				
San Fernando	Urban		360	10,162	10,522	16,024	2,297	360	10,162	12,819	2,297			2,297
	Rural		432	19,564	19,996	28,711		5,792	18,612	24,404		5,360		5,360
	Total		792	29,726	30,518	44,735	2,297	6,152	28,774	37,223	2,297	5,360		7,657
Sumilao	Urban	3,881	3,224	3,559	10,664	12,988	3,881	3,224	3,559	10,664				
	Rural		1,568	3,473	5,041	6,818		4,874	921	5,795		3,306		3,306
	Total	3,881	4,792	7,032	15,705	19,806	3,881	8,098	4,480	16,459		3,306		3,306
Talakag	Urban	4,800	252		5,052	6,440	4,900	252		5,152	100			100
	Rural		450	29,653	30,103	40,298		2,067	32,186	34,253		1,617	2,533	4,150
	Total	4,800	702	29,653	35,155	46,738	4,900	2,319	32,186	39,405	100	1,617	2,533	4,250
Valencia	Urban	20,552		13,883	34,435	41,208	20,552		13,883	34,435				
	Rural	11,053	5,984	78,256	95,293	110,301	11,053	5,984	78,256	95,293				
	Total	31,605	5,984	92,139	129,728	151,509	31,605	5,984	92,139	129,728				
Provincial Total	Urban	85,732	23,488	108,881	218,101	335,977	139,495	23,488	108,881	271,864	53,763			53,763
	Rural	45,251	53,189	453,755	552,195	784,878	45,251	92,328	534,327	671,906		39,139	97,946	137,085
	Total	130,983	76,677	562,636	770,296	1,120,855	184,746	115,816	643,208	943,770	53,763	39,139	97,946	190,848

Table 8.5.3 Population to be Served in Phase II (Water Supply)

Name of Municipality	Area	Population Served in 2003				Phase II Coverage (2010)							
						Total Population	Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Baungon	Urban	1,750	210	2,702	4,662	10,542	10,015			10,015	8,265			8,265
	Rural		2,961	15,920	18,881	18,983		2,961	15,920	18,881				
	Total	1,750	3,171	18,622	23,543	29,525	10,015	2,961	15,920	28,896	8,265			8,265
Cabanglasan	Urban	374	390	2,881	3,645	11,966	11,368			11,368	10,994			10,994
	Rural		5,514	20,094	25,608	31,789		5,514	24,050	29,564			3,956	3,956
	Total	374	5,904	22,975	29,253	43,755	11,368	5,514	24,050	40,932	10,994		3,956	14,950
Damulog	Urban	911	175	2,401	3,487	4,586	4,357			4,357	3,446			3,446
	Rural		1,315	9,929	11,244	13,958		1,315	11,666	12,981			1,737	1,737
	Total	911	1,490	12,330	14,731	18,544	4,357	1,315	11,666	17,338	3,446		1,737	5,183
Dangcagan	Urban	1,023	612	2,551	4,186	6,039	5,737			5,737	4,714			4,714
	Rural		747	11,877	12,624	15,242		747	13,428	14,175			1,551	1,551
	Total	1,023	1,359	14,428	16,810	21,281	5,737	747	13,428	19,912	4,714		1,551	6,265
Don Carlos	Urban	9,405	972	10,722	21,099	31,227	29,666			29,666	20,261			20,261
	Rural	1,503	1,443	26,316	29,262	36,376	1,503	1,443	30,884	33,830			4,568	4,568
	Total	10,908	2,415	37,038	50,361	67,603	31,169	1,443	30,884	63,496	20,261		4,568	24,829
Impasugong	Urban	2,867		2,162	5,029	12,594	11,964			11,964	9,097			9,097
	Rural	728	7,204	12,669	20,601	25,272	728	7,204	15,571	23,503			2,902	2,902
	Total	3,595	7,204	14,831	25,630	37,866	12,692	7,204	15,571	35,467	9,097		2,902	11,999
Kadingilan	Urban	1,402	1,620	1,236	4,258	5,323	5,057			5,057	3,655			3,655
	Rural		2,612	18,369	20,981	25,299		2,612	20,916	23,528			2,547	2,547
	Total	1,402	4,232	19,605	25,239	30,622	5,057	2,612	20,916	28,585	3,655		2,547	6,202
Kalilangan	Urban	3,953	540	11,445	15,938	21,444	20,372			20,372	16,419			16,419
	Rural	193	897	9,756	10,846	14,870	193	897	12,739	13,829			2,983	2,983
	Total	4,146	1,437	21,201	26,784	36,314	20,565	897	12,739	34,201	16,419		2,983	19,402
Kibawe	Urban	3,745	52		3,797	4,746	4,509			4,509	764			764
	Rural	369	4,096	20,921	25,386	31,346	369	4,096	24,687	29,152			3,766	3,766
	Total	4,114	4,148	20,921	29,183	36,092	4,878	4,096	24,687	33,661	764		3,766	4,530
Kitaotao	Urban	2,199	1,008	5,801	9,008	11,260	10,697			10,697	8,498			8,498
	Rural		2,585	26,646	29,231	35,617		2,585	30,539	33,124			3,893	3,893
	Total	2,199	3,593	32,447	38,239	46,877	10,697	2,585	30,539	43,821	8,498		3,893	12,391
Lantapan	Urban	1,885	197	11,159	13,241	17,133	16,276			16,276	14,391			14,391
	Rural	667	5,325	16,520	22,512	35,087	667	5,325	26,639	32,631			10,119	10,119
	Total	2,552	5,522	27,679	35,753	52,220	16,943	5,325	26,639	48,907	14,391		10,119	24,510
Libona	Urban	1,688		335	2,023	2,529	2,403			2,403	715			715
	Rural	4,584	5,145	18,592	28,321	39,214	4,584	5,145	26,740	36,469			8,148	8,148
	Total	6,272	5,145	18,927	30,344	41,743	6,987	5,145	26,740	38,872	715		8,148	8,863

Table 8.5.3 Population to be Served in Phase II (Water Supply) (cont'd.)

Name of Municipality	Area	Population Served in 2003				Phase II Coverage (2010)							
						Total Population	Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Level III	Level II	Level I	Total	Level III	Level II	Level I	Total
Malaybalay (Capital)	Urban	28,214			28,214	42,973	40,824			40,824	12,610			12,610
	Rural	4,072	8,058	83,164	95,294	141,962	4,072	8,058	119,895	132,025			36,731	36,731
	Total	32,286	8,058	83,164	123,508	184,935	44,896	8,058	119,895	172,849	12,610		36,731	49,341
Malitbog	Urban	151	112	2,160	2,423	3,637	3,455			3,455	3,304			3,304
	Rural		6,848	6,806	13,654	16,763		6,848	8,742	15,590			1,936	1,936
	Total	151	6,960	8,966	16,077	20,400	3,455	6,848	8,742	19,045	3,304		1,936	5,240
Manolo Fortich	Urban	4,281		701	4,982	14,336	13,619			13,619	9,338			9,338
	Rural	19,635	4,926	36,822	61,383	78,939	19,635	4,926	48,852	73,413			12,030	12,030
	Total	23,916	4,926	37,523	66,365	93,275	33,254	4,926	48,852	87,032	9,338		12,030	21,368
Maramag	Urban	34,183	11,583	3,357	49,123	78,701	74,766			74,766	40,583			40,583
	Rural	558	7,254	4,901	12,713	15,020	558	7,254	6,157	13,969			1,256	1,256
	Total	34,741	18,837	8,258	61,836	93,721	75,324	7,254	6,157	88,735	40,583		1,256	41,839
Pangantucan	Urban	2,195	2,181	15,734	20,110	28,298	26,883			26,883	24,688			24,688
	Rural		4,772	10,458	15,230	17,619		4,772	11,614	16,386			1,156	1,156
	Total	2,195	6,953	26,192	35,340	45,917	26,883	4,772	11,614	43,269	24,688		1,156	25,844
Quezon	Urban	7,639		5,930	13,569	22,393	21,273			21,273	13,634			13,634
	Rural	1,889	1,909	54,592	58,390	60,406	1,889	1,909	54,592	58,390				
	Total	9,528	1,909	60,522	71,959	82,799	23,162	1,909	54,592	79,663	13,634			13,634
San Fernando	Urban	2,297	360	10,162	12,819	16,864	16,021			16,021	13,724			13,724
	Rural		5,792	18,612	24,404	31,602		5,792	23,598	29,390			4,986	4,986
	Total	2,297	6,152	28,774	37,223	48,466	16,021	5,792	23,598	45,411	13,724		4,986	18,710
Sumilao	Urban	3,881	3,224	3,559	10,664	18,398	17,478			17,478	13,597			13,597
	Rural		4,874	921	5,795	6,555		4,874	1,222	6,096			301	301
	Total	3,881	8,098	4,480	16,459	24,953	17,478	4,874	1,222	23,574	13,597		301	13,898
Talakag	Urban	4,900	252		5,152	6,440	6,118			6,118	1,218			1,218
	Rural		2,067	32,186	34,253	48,353		2,067	42,901	44,968			10,715	10,715
	Total	4,900	2,319	32,186	39,405	54,793	6,118	2,067	42,901	51,086	1,218		10,715	11,933
Valencia	Urban	20,552		13,883	34,435	92,583	87,954			87,954	67,402			67,402
	Rural	11,053	5,984	78,256	95,293	85,520	11,053	5,984	78,256	95,293				
	Total	31,605	5,984	92,139	129,728	178,103	99,007	5,984	78,256	183,247	67,402			67,402
Provincial Total	Urban	139,495	23,488	108,881	271,864	464,012	440,812			440,812	301,317			301,317
	Rural	45,251	92,328	534,327	671,906	825,792	45,251	92,328	649,608	787,187			115,281	115,281
	Total	184,746	115,816	643,208	943,770	1,289,804	486,063	92,328	649,608	1,227,999	301,317		115,281	416,598

Table 8.5.4 Additional Number of Households to be Served in Phase I (Household Toilets)

Name of Municipality	Area	No. of Household Served in the Based Year				Phase I Coverage (2003)							
						Total No. of HHs	Household Coverage				Additional No. of HHs to be Served			
		Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total
Baungon	Urban	172	634		806	1,079	351	552	100	1,003	179		100	279
	Rural	1,032			1,032	4,183	1,032	1,634	471	3,137		1,634	471	2,105
	Total	1,204	634		1,032	5,262	1,383	2,186	571	4,140	179	1,634	571	2,384
Cabanglasan	Urban		315		315	808	263	413	75	751	263	98	75	436
	Rural	12	45	2,441	2,498	5,518	12	3,506	621	4,139		3,461		3,461
	Total	12	360	2,441	2,498	6,326	275	3,919	696	4,890	263	3,559	75	3,897
Damulog	Urban		30	352	382	872	284	446	81	811	284	416		700
	Rural			1,025	1,025	2,579		1,644	290	1,934		1,644		1,644
	Total		30	1,377	1,025	3,451	284	2,090	371	2,745	284	2,060		2,344
Dangcagan	Urban	24	718		742	965	314	493	90	897	290		90	380
	Rural		1,625	106	1,731	2,715		1,731	305	2,036		106	199	305
	Total	24	2,343	106	1,731	3,680	314	2,224	395	2,933	290	106	289	685
Don Carlos	Urban	520	1,879	800	3,199	5,033	1,638	2,575	468	4,681	1,118	696		1,814
	Rural		1,000	1,045	2,045	6,483	486	3,647	729	4,862	486	2,647		3,133
	Total	520	2,879	1,845	2,045	11,516	2,124	6,222	1,197	9,543	1,604	3,343		4,947
Impasugong	Urban	35	415	340	790	1,093	356	558	102	1,016	321	143		464
	Rural		1,510	121	1,631	4,328	325	2,434	487	3,246	325	924	366	1,615
	Total	35	1,925	461	1,631	5,421	681	2,992	589	4,262	646	1,067	366	2,079
Kadingilan	Urban		951		951	1,056	344	540	98	982	344		98	442
	Rural		600	1,792	2,392	4,710		3,003	530	3,533		2,403		2,403
	Total		1,551	1,792	2,392	5,766	344	3,543	628	4,515	344	2,403	98	2,845
Kalilangan	Urban	522	1,800	594	2,916	3,689	1,201	1,887	343	3,431	679	87		766
	Rural		1,200	265	1,465	2,385	179	1,342	268	1,789	179	142	3	324
	Total	522	3,000	859	1,465	6,074	1,380	3,229	611	5,220	858	229	3	1,090
Kibawe	Urban	579	257		836	913	297	467	85	849		210	85	295
	Rural		2,000	456	2,456	5,833	369	3,350	656	4,375	369	1,350	200	1,919
	Total	579	2,257	456	2,456	6,746	666	3,817	741	5,224	369	1,560	285	2,214
Kitaotao	Urban		2,039		2,039	2,322	756	1,187	216	2,159	756		216	972
	Rural		1,728	1,971	3,699	6,652		4,241	748	4,989		2,513		2,513
	Total		3,767	1,971	3,699	8,974	756	5,428	964	7,148	756	2,513	216	3,485
Lantapan	Urban	150	2,467		2,617	2,935	956	1,501	273	2,730	806		273	1,079
	Rural		1,000		1,000	4,807	361	2,703	541	3,605	361	1,703	541	2,605
	Total	150	3,467		1,000	7,742	1,317	4,204	814	6,335	1,167	1,703	814	3,684

Table 8.5.4 Additional Number of Households to be Served in Phase I (Household Toilets) (cont'd.)

Name of Municipality	Area	No. of Household Served in the Based Year				Phase I Coverage (2003)							
						Total No. of HHs	Household Coverage				Additional No. of HHs to be Served			
		Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total
Libona	Urban	75	359		434	474	154	243	44	441	79		44	123
	Rural	28	4,792	172	4,992	6,025	28	4,215	749	4,992			577	577
	Total	103	5,151	172	4,992	6,499	182	4,458	793	5,433	79		621	700
Malaybalay (Capital)	Urban	4,168	1,018		5,186	6,471	2,106	3,310	602	6,018		2,292	602	2,894
	Rural	1,190	3,061	755	5,006	20,458	1,534	11,508	2,302	15,344	344	8,447	1,547	10,338
	Total	5,358	4,079	755	5,006	26,929	3,640	14,818	2,904	21,362	344	10,739	2,149	13,232
Malitbog	Urban	10	455		465	592	151	345	55	551	141		55	196
	Rural		1,524	439	1,963	3,014		1,922	339	2,261		398		398
	Total	10	1,979	439	1,963	3,606	151	2,267	394	2,812	141	398	55	594
Manolo Fortich	Urban	1,005	53		1,058	1,185	386	606	110	1,102		553	110	663
	Rural	2,938	2,150	708	5,796	12,988	974	7,306	1,461	9,741		5,156	753	5,909
	Total	3,943	2,203	708	5,796	14,173	1,360	7,912	1,571	10,843		5,709	863	6,572
Maramag	Urban	1,208	4,259	3,259	8,726	11,520	3,750	5,893	1,071	10,714	2,542	1,634		4,176
	Rural	105	1,264	211	1,580	2,817	211	1,585	317	2,113	106	321	106	533
	Total	1,313	5,523	3,470	1,580	14,337	3,961	7,478	1,388	12,827	2,648	1,955	106	4,709
Pangantucan	Urban	219	2,000	992	3,211	4,587	1,493	2,346	427	4,266	1,274	346		1,620
	Rural		1,600		1,600	3,318		2,116	373	2,489		516	373	889
	Total	219	3,600	992	1,600	7,905	1,493	4,462	800	6,755	1,274	862	373	2,509
Quezon	Urban	1,440	881		2,321	2,895	942	1,481	269	2,692		600	269	869
	Rural	353	9,470		9,823	12,131	353	7,997	1,473	9,823			1,473	1,473
	Total	1,793	10,351		9,823	15,026	1,295	9,478	1,742	12,515		600	1,742	2,342
San Fernando	Urban	27	2,513		2,540	3,099	1,009	1,585	288	2,882	982		288	1,270
	Rural		1,809	1,385	3,194	5,357		3,415	603	4,018		1,606		1,606
	Total	27	4,322	1,385	3,194	8,456	1,009	5,000	891	6,900	982	1,606	288	2,876
Sumilao	Urban	60	422	420	902	2,332	759	1,193	217	2,169	699	771		1,470
	Rural		318		318	1,237		789	139	928		471	139	610
	Total	60	740	420	318	3,569	759	1,982	356	3,097	699	1,242	139	2,080
Talakag	Urban	75	1,000		1,075	1,222	398	624	114	1,136	323		114	437
	Rural		2,282	2,500	4,782	7,476		4,766	841	5,607		2,484		2,484
	Total	75	3,282	2,500	4,782	8,698	398	5,390	955	6,743	323	2,484	114	2,921
Valencia	Urban	320	5,753	287	6,360	7,790	2,536	3,984	725	7,245	2,216		438	2,654
	Rural	101	13,223	2,305	15,629	20,890	1,567	11,751	2,350	15,668	1,466		45	1,511
	Total	421	18,976	2,592	15,629	28,680	4,103	15,735	3,075	22,913	3,682		483	4,165
Provincial Total	Urban	10,609	30,218	7,044	47,871	62,932	20,444	32,229	5,853	58,526	13,296	7,846	2,857	23,999
	Rural	5,759	52,201	17,697	75,657	145,904	7,431	86,605	16,593	110,629	3,636	37,926	6,793	48,355
	Total	16,368	82,419	24,741	123,528	208,836	27,875	118,834	22,446	169,155	16,932	45,772	9,650	72,354

Table 8.5.5 Additional Number of Households to be Served in Phase II (Household Toilets)

Name of Municipality	Area	No. households Served in 2003				Phase II Coverage (2010)							
						Total No. of HHs	Household Coverage				Additional No. of HHs to be Served			
		Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total
Baungon	Urban	351	552	100	1,003	2,636	1,292	1,191	100	2,583	941	639		1,580
	Rural	1,032	1,634	471	3,137	4,746	1,032	2,911	471	4,414		1,277		1,277
	Total	1,383	2,186	571	4,140	7,382	2,324	4,102	571	6,997	941	1,916		2,857
Cabanglasan	Urban	263	413	75	751	2,992	1,466	1,391	75	2,932	1,203	978		2,181
	Rural	12	3,506	621	4,139	7,947	12	6,758	621	7,391		3,252		3,252
	Total	275	3,919	696	4,890	10,939	1,478	8,149	696	10,323	1,203	4,230		5,433
Damulog	Urban	284	446	81	811	1,147	562	481	81	1,124	278	35		313
	Rural		1,644	290	1,934	3,490		2,956	290	3,246		1,312		1,312
	Total	284	2,090	371	2,745	4,637	562	3,437	371	4,370	278	1,347		1,625
Dangcagan	Urban	314	493	90	897	1,510	740	650	90	1,480	426	157		583
	Rural		1,731	305	2,036	3,811		3,239	305	3,544		1,508		1,508
	Total	314	2,224	395	2,933	5,321	740	3,889	395	5,024	426	1,665		2,091
Don Carlos	Urban	1,638	2,575	468	4,681	7,807	3,826	3,357	468	7,651	2,188	782		2,970
	Rural	486	3,647	729	4,862	9,094	1,503	6,225	729	8,457	1,017	2,578		3,595
	Total	2,124	6,222	1,197	9,543	16,901	5,329	9,582	1,197	16,108	3,205	3,360		6,565
Impasugong	Urban	356	558	102	1,016	3,149	1,543	1,441	102	3,086	1,187	883		2,070
	Rural	325	2,434	487	3,246	6,318	728	4,661	487	5,876	403	2,227		2,630
	Total	681	2,992	589	4,262	9,467	2,271	6,102	589	8,962	1,590	3,110		4,700
Kadingilan	Urban	344	540	98	982	1,331	652	554	98	1,304	308	14		322
	Rural		3,003	530	3,533	6,325		5,352	530	5,882		2,349		2,349
	Total	344	3,543	628	4,515	7,656	652	5,906	628	7,186	308	2,363		2,671
Kalilangan	Urban	1,201	1,887	343	3,431	5,361	2,627	2,284	343	5,254	1,426	397		1,823
	Rural	179	1,342	268	1,789	3,718	193	2,997	268	3,458	14	1,655		1,669
	Total	1,380	3,229	611	5,220	9,079	2,820	5,281	611	8,712	1,440	2,052		3,492
Kibawe	Urban	297	467	85	849	1,187	582	496	85	1,163	285	29		314
	Rural	369	3,350	656	4,375	7,837	369	6,263	656	7,288		2,913		2,913
	Total	666	3,817	741	5,224	9,024	951	6,759	741	8,451	285	2,942		3,227
Kitaotao	Urban	756	1,187	216	2,159	2,815	1,380	1,163	216	2,759	624			624
	Rural		4,241	748	4,989	8,904		7,533	748	8,281		3,292		3,292
	Total	756	5,428	964	7,148	11,719	1,380	8,696	964	11,040	624	3,292		3,916
Lantapan	Urban	956	1,501	273	2,730	4,283	2,099	1,825	273	4,197	1,143	324		1,467
	Rural	361	2,703	541	3,605	8,772	667	6,950	541	8,158	306	4,247		4,553
	Total	1,317	4,204	814	6,335	13,055	2,766	8,775	814	12,355	1,449	4,571		6,020
Libona	Urban	154	243	44	441	632	310	265	44	619	156	22		178
	Rural	28	4,215	749	4,992	9,804	1,824	6,545	749	9,118	1,796	2,330		4,126
	Total	182	4,458	793	5,433	10,436	2,134	6,810	793	9,737	1,952	2,352		4,304

Table 8.5.5 Additional Number of Households to be Served in Phase II (Household Toilets) (cont'd.)

Name of Municipality	Area	No. households Served in 2003				Phase II Coverage (2010)							
						Total No. of HHs	Household Coverage				Additional No. of HHs to be Served			
		Flush	Pour Flush	VIP/Dry	Total		Flush	Pour Flush	VIP/Dry	Total	Flush	Pour Flush	VIP/Dry	Total
Malaybalay (Capital)	Urban	2,106	3,310	602	6,018	10,743	5,264	4,662	602	10,528	3,158	1,352		4,510
	Rural	1,534	11,508	2,302	15,344	35,491	4,072	26,633	2,302	33,007	2,538	15,125		17,663
	Total	3,640	14,818	2,904	21,362	46,234	9,336	31,295	2,904	43,535	5,696	16,477		22,173
Malitbog	Urban	151	345	55	551	909	446	390	55	891	295	45		340
	Rural		1,922	339	2,261	4,191		3,559	339	3,898		1,637		1,637
	Total	151	2,267	394	2,812	5,100	446	3,949	394	4,789	295	1,682		1,977
Manolo Fortich	Urban	386	606	110	1,102	3,584	1,756	1,646	110	3,512	1,370	1,040		2,410
	Rural	974	7,306	1,461	9,741	19,735	3,671	13,222	1,461	18,354	2,697	5,916		8,613
	Total	1,360	7,912	1,571	10,843	23,319	5,427	14,868	1,571	21,866	4,067	6,956		11,023
Maramag	Urban	3,750	5,893	1,071	10,714	19,675	9,641	8,570	1,071	19,282	5,891	2,677		8,568
	Rural	211	1,585	317	2,113	3,755	558	2,617	317	3,492	347	1,032		1,379
	Total	3,961	7,478	1,388	12,827	23,430	10,199	11,187	1,388	22,774	6,238	3,709		9,947
Pangantucan	Urban	1,493	2,346	427	4,266	7,075	3,467	3,040	427	6,934	1,974	694		2,668
	Rural		2,116	373	2,489	4,405		3,724	373	4,097		1,608		1,608
	Total	1,493	4,462	800	6,755	11,480	3,467	6,764	800	11,031	1,974	2,302		4,276
Quezon	Urban	942	1,481	269	2,692	5,598	2,743	2,474	269	5,486	1,801	993		2,794
	Rural	353	7,997	1,473	9,823	15,102	1,889	10,683	1,473	14,045	1,536	2,686		4,222
	Total	1,295	9,478	1,742	12,515	20,700	4,632	13,157	1,742	19,531	3,337	3,679		7,016
San Fernando	Urban	1,009	1,585	288	2,882	4,216	2,066	1,778	288	4,132	1,057	193		1,250
	Rural		3,415	603	4,018	7,901		6,745	603	7,348		3,330		3,330
	Total	1,009	5,000	891	6,900	12,117	2,066	8,523	891	11,480	1,057	3,523		4,580
Sumilao	Urban	759	1,193	217	2,169	4,600	2,254	2,037	217	4,508	1,495	844		2,339
	Rural		789	139	928	1,639		1,385	139	1,524		596		596
	Total	759	1,982	356	3,097	6,239	2,254	3,422	356	6,032	1,495	1,440		2,935
Talakag	Urban	398	624	114	1,136	1,610	789	675	114	1,578	391	51		442
	Rural		4,766	841	5,607	12,088		10,401	841	11,242		5,635		5,635
	Total	398	5,390	955	6,743	13,698	789	11,076	955	12,820	391	5,686		6,077
Valencia	Urban	2,536	3,984	725	7,245	23,146	11,342	10,616	725	22,683	8,806	6,632		15,438
	Rural	1,567	11,751	2,350	15,668	21,380	3,977	13,556	2,350	19,883	2,410	1,805		4,215
	Total	4,103	15,735	3,075	22,913	44,526	15,319	24,172	3,075	42,566	11,216	8,437		19,653
Provincial Total	Urban	20,444	32,229	5,853	58,526	116,006	56,847	50,986	5,853	113,686	36,403	18,781		55,184
	Rural	7,431	86,605	16,593	110,629	206,453	20,495	154,915	16,593	192,003	13,064	68,310		81,374
	Total	27,875	118,834	22,446	169,155	322,459	77,342	205,901	22,446	305,689	49,467	87,091		136,558

Table 8.5.6 Additional Number of Public School Students to be Served in Phases I and II (School Toilets)

Name of Municipality	Std. No. of Public School Student that can be Served in the Base Year (1997)	Projected No. of Public School Student in 2003	Phase I Coverage (2003)		Projected Number of Public School Students in 2010	Phase II Coverage (2010)	
			Public School Students Coverage	Additional No. of Public School Student to be Served		Public School Students Coverage	Additional No. of Public School Students to be Served
Baungon	880	5,478	3,287	2,407	6,153	5,538	2,251
Cabanglasan	3,520	8,160	4,896	1,376	10,295	9,266	4,370
Damulog	1,440	4,186	2,512	1,072	4,181	3,763	1,251
Dangcagan	1,920	4,199	2,519	599	4,711	4,240	1,721
Don Carlos	3,800	13,041	7,825	4,025	15,353	13,818	5,993
Impasugong	1,680	7,394	4,436	2,756	9,173	8,256	3,820
Kadingilan	2,880	6,542	3,925	1,045	7,069	6,362	2,437
Kalilangan	840	7,857	4,714	3,874	8,271	7,444	2,730
Kibawe	5,560	7,072	4,243		8,296	7,466	3,223
Kitaotao	4,240	9,817	5,890	1,650	10,674	9,607	3,717
Lantapan	4,200	9,383	5,630	1,430	12,056	10,850	5,220
Libona	1,200	8,698	5,219	4,019	10,690	9,621	4,402
Malaybalay (Capital)	10,120	31,873	19,124	9,004	42,348	38,113	18,989
Malitbog	1,680	4,615	2,769	1,089	4,931	4,438	1,669
Manolo Fortich	9,280	18,132	10,879	1,599	22,845	20,561	9,682
Maramag	920	17,004	10,202	9,282	22,098	19,888	9,686
Pangantucan	960	9,636	5,782	4,822	10,882	9,794	4,012
Quezon	9,160	17,939	10,763	1,603	19,600	17,640	6,877
San Fernando	1,440	10,621	6,373	4,933	11,507	10,356	3,983
Sumilao	80	4,723	2,834	2,754	6,281	5,653	2,819
Talakag	3,600	10,246	6,148	2,548	12,718	11,446	5,298
Valencia	5,840	31,012	18,607	12,767	38,734	34,861	16,254
Provincial Total	75,240	247,628	148,577	74,654	298,866	268,981	120,404

Table 8.5.7 Additional Number of Public Utilities with Sanitary Toilets in Phase I and II

Name of Municipality	Type	Coverage in Base Year (1997)		Phase I Coverage (2003)			Phase I Coverage (2010)		
		No. of PU with Toilets Facilities	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets
Baungon	Public Market	2	2	2		2	2		2
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	4	4	4		4	4		4
Cabanglasan	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	2	2	2		2	2		2
Damulog	Public Market	2	2	2		2	2		2
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	4	4	4		4	4		4
Dangcagan	Public Market	2	2	2		2	2		2
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	4	4	4		4	4		4
Don Carlos	Public Market	4	4	4		4	4		4
	Bus/Jeepney Terminal	4	4	4		4	4		4
	Parks/Playground								
	Total	8	8	8		8	8		8
Impasugong	Public Market								
	Bus/Jeepney Terminal								
	Parks/Playground								
	Total								
Kadingilan	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	2	2	2		2	2		2
Kalilangan	Public Market	2	1	2	1	2	2		2
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	3	2	3	1	3	3		3
Kibawe	Public Market	4	4	4		4	4		4
	Bus/Jeepney Terminal	4	4	4		4	4		4
	Parks/Playground	1	1	1		1	1		1
	Total	9	9	9		9	9		9
Kitaotao	Public Market	2	2	2		2	2		2
	Bus/Jeepney Terminal								
	Parks/Playground								
	Total	2	2	2		2	2		2
Lantapan	Public Market	6	4	6	2	6	6		6
	Bus/Jeepney Terminal	4	4	4		4	4		4
	Parks/Playground								
	Total	10	8	10	2	10	10		10

Table 8.5.7 Additional Number of Public Utilities with Sanitary Toilets in Phase I and II (cont'd.)

Name of Municipality	Type	Coverage in Base Year (1997)		Phase I Coverage (2003)			Phase I Coverage (2010)		
		No. of PU with Toilets Facilities	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets	No. of PU with Toilets Facilities	Add'l. No. of Public Utilities with Sanitary Toilets	No. of PU with Sanitary Toilets
Libona	Public Market								
	Bus/Jeepney Terminal								
	Parks/Playground								
	Total								
Malaybalay (Capital)	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground	1	1	1		1	1		1
	Total	4	4	4		4	4		4
Malitbog	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	2	2	2		2	2		2
Manolo Fortich	Public Market	5	5	5		5	5		5
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground	1	1	1		1	1		1
	Total	7	7	7		7	7		7
Maramag	Public Market	6	6	6		6	6		6
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	8	8	8		8	8		8
Pangantucan	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	3	3	3		3	3		3
Quezon	Public Market	2	2	2		2	2		2
	Bus/Jeepney Terminal	2	2	2		2	2		2
	Parks/Playground								
	Total	4	4	4		4	4		4
San Fernando	Public Market								
	Bus/Jeepney Terminal								
	Parks/Playground								
	Total								
Sumilao	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal								
	Parks/Playground								
	Total	1	1	1		1	1		1
Talakag	Public Market	1	1	1		1	1		1
	Bus/Jeepney Terminal	1	1	1		1	1		1
	Parks/Playground								
	Total	2	2	2		2	2		2
Valencia	Public Market	5	5	5		5	5		5
	Bus/Jeepney Terminal	5	5	5		5	5		5
	Parks/Playground								
	Total	10	10	10		10	10		10
Provincial Total	Public Market	49	46	49	3	49	49		49
	Bus/Jeepney Terminal	37	37	37		37	37		37
	Parks/Playground	3	3	3		3	3		3
	Total	89	86	89	3	89	89		89

8.6 Facilities, Equipment and Rehabilitation Required to Meet the Target Services

8.6.1 Water Supply

(1) Required water supply facilities

Urban water supply:

Urban water supply facilities required by target year shown in Table 8.6.1 were estimated as the required number of house connections based on the additional service coverage.

As reference, the following requirements were also estimated:

- daily average water demand at 100 lpcd consumption rate, and
- number of deep wells to meet the daily maximum water demand based on the groundwater productivity.
  (daily maximum water demand = 1.3 x daily average water demand)

Information pertaining to the expansion plan of Level III systems was arranged and indicated in Table 8.6.1 and the details are presented in Table 8.6.2 (the required data however, were not available during this PW4SP preparation).

Rural water supply:

Rural water supply facilities required by target year shown in Table 8.6.3(a) were estimated as the number of Level II systems with the number of communal faucets and the number of Level I wells broken-down to deep and shallow wells. Seventy three (73) untapped springs suitable for Level II system were confirmed during this PW4SP preparation.

(2) Required well drilling and rehabilitation equipment

Currently, the Waterworks Division of the province has rotary type drilling rig and the DPWH-DEO have 4 units of percussion type drilling rigs (2 units are necessary for overhaul) and 1 rotary type drilling rig applicable for more than 8" bore hole diameter.

Taking into account the maximum utilization of existing equipment, the additional number of required equipment is estimated as described below.

Applicable type of well drilling equipment is determined considering the geological formation of the province and the easiness to operate technically. Both types of rigs are suitable for soft and hard formations, but compared with the latter, the percussion type can be easily operated and maintained without special training to drillers. Also, it is very useful to bore in boulders or cobbles formations. Thus, the percussion type drilling equipment is recommended to be selected in the PW4SP preparation.

Table 8.6.1 Urban Water Supply Facilities Required by Target Year

Name of Municipality	Reference on Expansion of Existing Level III System						Phase I (2003) Requirements				Phase II (2010) Requirements			
	Name of Operating Body	Area	Coverage in 1997		Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well
			No. of Barangay Served	Served Population										
Baungon	MIWS-LGU	Urban	1	1,032	DW/SP	No	718	133	72	1	8,265	2,066	827	2
		Rural												
		Total	1	1,032										
Cabanglasan	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	374	66	37	1	10,994	2,749	1,099	2
		Rural	N.A.	N.A.										
		Total												
Damulog	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	911	182	91	1	3,446	862	345	1
		Rural	N.A.	N.A.										
		Total												
Dangcagan	Pobacion	Urban	1	867	SP	No	156	29	16	1	4,714	1,179	471	1
		Rural												
		Total	1	867										
Don Carlos	Don Carlos WD	Urban	1	2,133	DW/Surf	No	7,272	1,388	727	1	20,261	5,065	2,026	3
		Rural	2	1,503										
		Total	3	3,636										
Impasug-Ong	Capitan Buyong	Urban			SP	No	538	94	54	1	9,097	2,274	910	2
		Rural	1	532										
		Total	1	532										
	La Fortuna WWA	Urban	1	2,329	SP	No								
		Rural	1	196										
		Total	2	2,525										
	Municipal Total	Urban	1	2,329										
		Rural	2	728										
		Total	3	3,057										
Kadingilan	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,402	278	140	1	3,655	914	366	1
		Rural	N.A.	N.A.										
		Total												
Kalilangan	Kalilangan WS	Urban	2	1,156	SP	No	2,797	518	280	1	16,419	4,105	1,642	3
		Rural	1	193										
		Total	3	1,349										
Kibawe	Kibawe WD	Urban	3	2,772	DW	No	973	187	97	1	764	191	76	1
		Rural	2	369										
		Total	5	3,141										
Kitaotao	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	2,199	453	220	1	8,498	2,125	850	2
		Rural	N.A.	N.A.										
		Total												
Lantapan	Lantapan WWS	Urban	2	1,015	SP	No	870	154	87	1	14,391	3,598	1,439	2
		Rural	3	667										
		Total	5	1,682										

Table 8.6.1 Urban Water Supply Facilities Required by Target Year (cont'd.)

Name of Municipality	Reference on Expansion of Existing Level III System						Phase I (2003) Requirements				Phase II (2010) Requirements			
	Name of Operating Body	Area	Coverage in 1997		Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well
			No. of Barangay Served	Served Population										
Libona	Crossing WWA	Urban												
		Rural	1	2,100	DW	No	753	141	75	1	715	179	72	1
		Total	1	2,100										
	Laturan WWA	Urban												
		Rural	1	1,032	DW	No								
		Total	1	1,032										
	Pongol WWA	Urban												
		Rural	1	582	DW	No								
		Total	1	582										
	San Jose WWA	Urban												
		Rural	1	870	DW	No								
		Total	1	870										
	Water Task Force Ass.	Urban	1	935										
		Rural			DW	No								
		Total	1	935										
	Municipal Total	Urban	1	935										
		Rural	4	4,584										
		Total	5	5,519										
Malaybalay (Capital)	Aglayan WS	Urban												
		Rural	1	660	DW	No	2,953	542	295	1	12,610	3,153	1,261	2
		Total	1	660										
	Bangcud WS	Urban												
		Rural	1	120	DW	No								
		Total	1	120										
	Malaybalay WD	Urban	13	25,261										
		Rural	1	1,792	DW/Surf	No								
		Total	14	27,053										
	San Jose WS	Urban												
		Rural	1	300	DW	No								
		Total	1	300										
	San Martin WS	Urban												
		Rural	1	1,200	SP	No								
		Total	1	1,200										
	Municipal Total	Urban	13	25,261										
		Rural	5	4,072										
		Total	18	29,333										
Malitbog	Not Applicable	Urban	N.A.	N.A.										
		Rural	N.A.	N.A.	N.A.	N.A.	151	29	15	1	3,304	826	330	1
		Total												

Table 8.6.1 Urban Water Supply Facilities Required by Target Year (cont'd.)

Name of Municipality	Reference on Expansion of Existing Level III System						Phase I (2003) Requirements				Phase II (2010) Requirements			
	Name of Operating Body	Area	Coverage in 1997		Type of Water Source	Plan for Expansion	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (m^3/day)	Number of Spring Dev't./ Deep Well
			No. of Barangay Served	Served Population										
Manolo Fortich	Del Monte Phil. Inc.	Urban			DW	No					9,338	2,335	934	2
		Rural	1	7,967										
		Total	1	7,967										
Maramag	Maramag WD	Urban	2	5,879	SP	No	28,304	5,310	2,830	4	40,583	10,146	4,058	6
		Rural	1	558										
		Total	3	6,437										
Pangantucan	Malipayon WS	Urban	1	1,200	SP	No	995	182	100	1	24,688	6,172	2,469	4
		Rural												
		Total	1	1,200										
Quezon	LGU-Quezon	Urban	2	7,639	SP	No					13,634	3,409	1,363	2
		Rural	3	1,889										
		Total	5	9,528										
San Fernando	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	2,297	444	230	1	13,724	3,431	1,372	2
		Rural	N.A.	N.A.										
		Total												
Sumilao	Kisolon WS	Urban	3	3,881	SP	No					13,597	3,399	1,360	2
		Rural												
		Total	3	3,881										
Talakag	San Antonio WS	Urban	5	4,800	SP	No	100	19	10	1	1,218	305	122	1
		Rural												
		Total	5	4,800										
Valencia	Laligan RWSA	Urban			SP	No					67,402	16,851	6,740	9
		Rural	1	1,501										
		Total	1	1,501										
	Lurugan RWSA	Urban			SP	No								
		Rural	1	3,021										
		Total	1	3,021										
	Guinoyoran RWSA	Urban	1	2,376	SP	No								
		Rural												
		Total	1	2,376										
	Sinawayan	Urban			DW	No								
		Rural	1	264										
		Total	1	264										
	Valencia WD	Urban	1	18,176	DW/SP	No								
		Rural	4	6,267										
		Total	5	24,443										
	Municipal Total	Urban	2	20,552										
		Rural	7	11,053										
		Total	9	31,605										
Provincial Total		Urban	41	85,732			53,763	10,149	5,376	21	301,317	75,334	30,132	52
		Rural	37	45,251										
		Total	78	130,983										

Table 8.6.2 Plan for Expansion of Existing Level III Systems

Name of Municipality	Name of Operating Body	Additional Areas Barangay to be Covered	Additional Population to be Served	Additional Water Sources	
				Type	Capacity (m^3/day)
Baungon	MIWS-LGU				
Dangcagan	Pobacion				
Don Carlos	Don Carlos WD				
Impasugong	Capitan Buyong				
	La Fortuna WWA				
	Municipal Total				
Kalilangan	Kalilangan WS				
Kibawe	Kibawe WD				
Lantapan	Lantapan WWS				
Libona	Crossing WWA				
	Laturan WWA				
	Pongol WWA				
	San Jose WWA				
	Water Task Force Ass.				
	Municipal Total				
Malaybalay (Capital)	Aglayan WS				
	Bangcud WS				
	Malaybalay WD				
	San Jose WS				
	San Martin WS				
	Municipal Total				
Manolo Fortich	Del Monte Phil. Inc.				
	Manolo Fortich WW				
	Municipal Total				
Maramag	Maramag WD				
Pangantucan	Malipayon WS				
Quezon	LGU-Quezon				
Sumilao	Kisolon WS				
Talakag	San Antonio WS				
Valencia	Laligan RWSA				
	Lurugan RWSA				
	Guinoyoran RWSA				
	Sinawayan				
	Valencia WD				
	Municipal Total				

Table 8.6.3(a) Rural Water Supply Facilities Required by Target Year

Name of Municipality	Phase I (2003) Requirements								Phase II (2010) Requirements					
	Level II		Level I						Level I					
	Number of System	No. of Communal Faucets	Number of Deep Wells				No. of Shallow Wells	Total	Number of Deep Wells				No. of Shallow Wells	Total
			40 m	80 m	120 m	Sub-total			40 m	80 m	120 m	Sub-total		
Baungon	3	60		17		17	6	23						
Cabanglasan	3	60											66	66
Damulog				1		1		1		29		29		29
Dangcagan	1	20		80		80	34	114		19		19	7	26
Don Carlos	1	20		124		124		124		77		77		77
Impasugong	10	200								20		20	29	49
Kadingilan	3	60		67		67		67		43		43		43
Kalilangan				14		14	53	67		10		10	40	50
Kibawe	8	160								51		51	12	63
Kitaotao	5	100	28			28	28	56	33			33	32	65
Lantapan				13		13	5	18		119		119	50	169
Libona				87		87	21	108		109		109	27	136
Malaybalay (Capital)				160		160	371	531		184		184	429	613
Malitbog	10	200								27		27	6	33
Manolo Fortich				4		4		4		181		181	20	201
Maramag	4	80		33		33	21	54		13		13	8	21
Pangantucan	6	120		3		3	4	7		6		6	14	20
Quezon	17													
San Fernando	10	200											84	84
Sumilao	6	120								6		6		6
Talakag	3	60		25		25	6	31		144		144	35	179
Valencia														
Provincial Total	90	1,460	28	628		656	549	1,205	33	1,038		1,071	859	1,930

Table 8.6.3(b) Rural Water Supply Facilities Required by Target Year

Name of Municipality	Phase I (2003) Requirements								Phase II (2010) Requirements							
	Percenatge Allocated to Public Facility (10%)								Percenatge Allocated to Public Facility (10%)							
	Percentage Allocated for Public Wells (70%) and Percentage Allocated for Public Spring Development (30%)								Percentage Allocated for Public Wells (70%) and Percentage Allocated for Public Spring Development (30%)							
	Number of Deep Wells				No. of Shallow Wells	Total	No. of Spring Dev.	Grand Total	Number of Deep Wells				No. of Shallow Wells	Total	No. of Spring Dev.	Grand Total
	40 m	80 m	120 m	Sub-total					40 m	80 m	120 m	Sub-total				
Baungon		1		1		1	1	2					5	5	2	7
Cabanglasan										2		2		2	1	3
Damulog		6		6	2	8	3	11		2		2		2	1	3
Dangcagan		8		8		8	4	12		6		6		6	2	8
Don Carlos										2		2	1	3	2	5
Impasugong		5		5		5	2	7		3		3		3	1	4
Kadingilan		1		1	4	5	2	7		1		1	2	3	2	5
Kalilangan										4		4		4	2	6
Kibawe	2			2	2	4	2	6	3			3	2	5	2	7
Kitaotao		1		1		1	1	2		9		9	3	12	5	17
Lantapan		7		7	1	8	3	11		8		8	2	10	4	14
Libona		12		12	25	37	16	53		13		13	30	43	18	61
Malaybalay (Capital)										2		2		2	1	3
Malitbog										13		13	1	14	6	20
Manolo Fortich		2		2	1	3	2	5		1		1		1	1	2
Maramag		1		1		1		1		1		1		1	1	2
Pangantucan																
Quezon													6	6	2	8
San Fernando										1		1		1		1
Sumilao		2		2		2	1	3		11		11	2	13	5	18
Talakag																
Valencia																
Provincial Total	2	46		48	35	83	37	120	3	79		82	54	136	58	194

Medium size percusion drilling rig (truck-mounted type for deep well):

Average performance

- 1 well/30 days (5 m/day of drilling rate with finishing work)

Annual accomplishment

- 9 wells/year (365 days/year ÷ 30 days/well x 0.75)

Required number

- 1 sets for the total 48 deep wells

Well rehabilitation equipment:

Average performance

- 1 well/7 days (well redevelopment and finishing work

Annual accomplishment

- 39 wells/year (365 days/year ÷7 days/well x 0.75)

Required number

- 1 set for 10% of 48 Level I deep wells

Support vehicle:

Type - pick-up truck with winch, double cab

Required number

- 1 unit for well rehabilitation

Considering the utilization of the existing percussion/rotary drilling rigs, it is enough for the province to procure 1 unit medium-size percussion rig for the long-term development plan. However, the following equipment shall be considered for the medium-term plan to accomplish the physical targets:

- 1 set of well rehabilitation equipment for 10% of deep wells (at least 1 set shall be held by the provincial government); and
- 1 unit of support vehicle for well rehabilitation.

In addition to the above, 1 unit service truck equipped with crane is required for the percussion rig for hauling drilling tools and water for the long-term plan.

Table 8.6.4 Urban Household Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements								Phase II (2010) Requirements							
	Additional HHs to be Served				No. of HHs to be Served				Additional HHs to be Served				No. of HHs to be Served			
	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total
Baungon	179		100	279	179		100	279	941	639		1,580	941	639		1,580
Cabanglasan	263	98	75	436	263	98	75	436	1,203	978		2,181	1,203	978		2,181
Damulog	284	416		700	284	416		700	278	35		313	278	35		313
Dangcagan	290		90	380	290		90	380	426	157		583	426	157		583
Don Carlos	1,118	696		1,814	1,118	696		1,814	2,188	782		2,970	2,188	782		2,970
Impasugong	321	143		464	321	143		464	1,187	883		2,070	1,187	883		2,070
Kadingilan	344		98	442	344		98	442	308	14		322	308	14		322
Kalilangan	679	87		766	679	87		766	1,426	397		1,823	1,426	397		1,823
Kibawe		210	85	295		210	85	295	285	29		314	285	29		314
Kitaotao	756		216	972	756		216	972	624			624	624			624
Lantapan	806		273	1,079	806		273	1,079	1,143	324		1,467	1,143	324		1,467
Libona	79		44	123	79		44	123	156	22		178	156	22		178
Malaybalay (Capital)		2,292	602	2,894		2,292	602	2,894	3,158	1,352		4,510	3,158	1,352		4,510
Malitbog	141		55	196	141		55	196	295	45		340	295	45		340
Manolo Fortich		553	110	663		553	110	663	1,370	1,040		2,410	1,370	1,040		2,410
Maramag	2,542	1,634		4,176	2,542	1,634		4,176	5,891	2,677		8,568	5,891	2,677		8,568
Pangantucan	1,274	346		1,620	1,274	346		1,620	1,974	694		2,668	1,974	694		2,668
Quezon		600	269	869		600	269	869	1,801	993		2,794	1,801	993		2,794
San Fernando	982		288	1,270	982		288	1,270	1,057	193		1,250	1,057	193		1,250
Sumilao	699	771		1,470	699	771		1,470	1,495	844		2,339	1,495	844		2,339
Talakag	323		114	437	323		114	437	391	51		442	391	51		442
Valencia	2,216		438	2,654	2,216		438	2,654	8,806	6,632		15,438	8,806	6,632		15,438
Provincial Total	13,296	7,846	2,857	23,999	13,296	7,846	2,857	23,999	36,403	18,781		55,184	36,403	18,781		55,184

Table 8.6.5 Rural Household Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements								Phase II (2010) Requirements							
	Additional HHs to be Served				No. of HHs to be Served				Additional HHs to be Served				No. of HHs to be Served			
	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total	Flush	Pour Flush	VIP/ Dry	Total
Baungon		1,634	471	2,105		1,634	471	2,105		1,277		1,277		1,277		1,277
Cabanglasan		3,461		3,461		3,461		3,461		3,252		3,252		3,252		3,252
Damulog		1,644		1,644		1,644		1,644		1,312		1,312		1,312		1,312
Dangcagan		106	199	305		106	199	305		1,508		1,508		1,508		1,508
Don Carlos	486	2,647		3,133	486	2,647		3,133	1,017	2,578		3,595	1,017	2,578		3,595
Impasugong	325	924	366	1,615	325	924	366	1,615	403	2,227		2,630	403	2,227		2,630
Kadingilan		2,403		2,403		2,403		2,403		2,349		2,349		2,349		2,349
Kalilangan	179	142	3	324	179	142	3	324	14	1,655		1,669	14	1,655		1,669
Kibawe	369	1,350	200	1,919	369	1,350	200	1,919		2,913		2,913		2,913		2,913
Kitaotao		2,513		2,513		2,513		2,513		3,292		3,292		3,292		3,292
Lantapan	361	1,703	541	2,605	361	1,703	541	2,605	306	4,247		4,553	306	4,247		4,553
Libona			577	577			577	577	1,796	2,330		4,126	1,796	2,330		4,126
Malaybalay (Capital)	344	8,447	1,547	10,338	344	8,447	1,547	10,338	2,538	15,125		17,663	2,538	15,125		17,663
Malitbog		398		398		398		398		1,637		1,637		1,637		1,637
Manolo Fortich		5,156	753	5,909		5,156	753	5,909	2,697	5,916		8,613	2,697	5,916		8,613
Maramag	106	321	106	533	106	321	106	533	347	1,032		1,379	347	1,032		1,379
Pangantucan		516	373	889		516	373	889		1,608		1,608		1,608		1,608
Quezon			1,473	1,473			1,473	1,473	1,536	2,686		4,222	1,536	2,686		4,222
San Fernando		1,606		1,606		1,606		1,606		3,330		3,330		3,330		3,330
Sumilao		471	139	610		471	139	610		596		596		596		596
Talakag		2,484		2,484		2,484		2,484		5,635		5,635		5,635		5,635
Valencia	1,466		45	1,511	1,466		45	1,511	2,410	1,805		4,215	2,410	1,805		4,215
Provincial Total	3,636	37,926	6,793	48,355	3,636	37,926	6,793	48,355	13,064	68,310		81,374	13,064	68,310		81,374

Table 8.6.6 Public School Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements			Phase II (2010) Requirements		
	Additional Public School Students to be Served	No. of Toilet Unit	No. of Toilet Facilities	Additional Public School Students to be Served	No. of Toilet Unit	No. of Toilet Facilities
Baungon	2,407	61	13	2,251	57	12
Cabanglasan	1,376	35	7	4,370	110	22
Damulog	1,072	27	6	1,251	32	7
Dangcagan	599	15	3	1,721	44	9
Don Carlos	4,025	101	21	5,993	150	30
Impasugong	2,756	69	14	3,820	96	20
Kadingilan	1,045	27	6	2,437	61	13
Kalilangan	3,874	97	20	2,730	69	14
Kibawe				3,223	81	17
Kitaotao	1,650	42	9	3,717	93	19
Lantapan	1,430	36	8	5,220	131	27
Libona	4,019	101	21	4,402	111	23
Malaybalay (Capital)	9,004	226	46	18,989	475	95
Malitbog	1,089	28	6	1,669	42	9
Manolo Fortich	1,599	40	8	9,682	243	49
Maramag	9,282	233	47	9,686	243	49
Pangantucan	4,822	121	25	4,012	101	21
Quezon	1,603	41	9	6,877	172	35
San Fernando	4,933	124	25	3,983	100	20
Sumilao	2,754	69	14	2,819	71	15
Talakag	2,548	64	13	5,298	133	27
Valencia	12,767	320	64	16,254	407	82
Provincial Total	74,654	1,877	385	120,404	3,022	615

Table 8.6.7 Public Toilets Required by Target Year

Name of Municipality	Phase I (2003) Requirements				Phase II (2010) Requirements			
	Number of Public Toilets				Number of Public Toilets			
	Public Market	Bus/Jeepney Terminal	Parks/ Playground	Total	Public Market	Bus/Jeepney Terminal	Parks/ Playground	Total
Baungon								
Cabanglasan								
Damulog								
Dangcagan								
Don Carlos								
Impasugong								
Kadingilan								
Kalilangan	1			1				
Kibawe								
Kitaotao								
Lantapan	2			2				
Libona								
Malaybalay (Capital)								
Malitbog								
Manolo Fortich								
Maramag								
Pangantucan								
Quezon								
San Fernando								
Sumilao								
Talakag								
Valencia								
Provincial Total	3			3				

SECTOR IMPLEMENTATION ARRANGEMENTS

C

9. SECTOR MANAGEMENT FOR MEDIUM-TERM DEVELOPMENT

9.2 Sector Management

Accessing ODA Funds for Level III Systems

When considering sources of financing for new Level III systems or for existing Level III systems that are expanding, LGUs may tap their IRA or they may borrow funds from commercial or ODA institutions. In the case of LGUs that have formed a Water District to operate their system, a ready source of loan funds is the LWUA.

This section discusses how an LGU can access funds from an ODA agency in order to develop its Level III water system. It is presumed that the proposed Level III project has gone through the Project Development process stipulated by the NEDA in Rule 7, Articles 24 – 26 of its IRR of Board Resolution No. 4 (Series of 1994), Clause (G). Specifically, the proposed Level III project must be consistent with the Provincial/City/Municipal Water Supply, Sewerage and Sanitation Sector Plan that has been prepared and annually updated by their respective Planning and Development Office(s). On the basis of these local council approved sector plans, water supply investments will have been identified and developed into a local investment program that includes an appropriate financing plan.

It is worthwhile to reiterate the following NEDA prescriptions regarding project identification:

- "proposed investments shall .be developed according to a demand-driven approach that would allow beneficiaries to select from among cost-effective technical options and from financing options. The LGUs may avail of technical assistance from the DILG in the preparation of these project packages (Rule 5)."
- "LGU systems shall be constructed on the basis of choosing among technical options that are affordable through the financial resources made available by users, communities and LGUs. The process of determining demand for a particular service delivery shall be concluded through a negotiated agreement between the LGU, water utility and the users, on how the costs will be shared at the town, barangay, and household levels."
- "for any Level III service, at least two technical options shall be explored: those of an inter-LGU service delivery organization involving amalgamation of service areas and of single LGU management systems."

(1) Project Initiation Stage

Based on their respective approved water sector plans, the province/municipality proposes a specific Level III water system following the NEDA guidelines on project identification. The provinces and component municipalities may submit their respective project proposals for ODA funding to the DILG. The DILG examines such requests and ensures that they are in conformity with the NEDA's Medium Term Public Investment Program (MTPIP), a master list of projects from which ODA agencies can select specific projects that they can fund. From the MTPIP, the ODA loan agency prepares its own short list of potential province and municipality beneficiaries/ grantees of its loan program. The ODA loan agency then proceeds to conduct its own feasibility study concerning its loan program and discusses this extensively with both the NEDA and the DILG (since the DILG will be the implementing agency for the ODA loan).

While the DILG is designated as the implementing agency for the ODA loan program, a domestic lending institution (e.g. the Development Bank of the Philippines or DBP) can be contracted to administer the loan package and on-lend ODA funds to specific LGUs. [Note that the LWUA has served and continues to serve as a conduit for loans to Water Districts.] Under such a working arrangement, the DILG, the ODA agency, and the domestic lending institution affix their signatures on the ODA program loan documents.

The DILG now pre-screens LGUs who have expressed intent to borrow funds from the ODA loan facility. Together with consultants from the ODA agency, the DILG conducts briefings on the loan conditions to make sure that the province/municipality fully understands the financial and institutional commitments they have to make once they contract the loan. The respective local councils (e.g. Sanggunians) deliberate whether they are able to and will partake of the loan. Should the Sanggunian decide that they can meet the loan commitments, they submit an official letter of interest (LOI) to the DILG. The DILG, with assistance provided by the ODA agency, evaluates the various LOIs from different LGUs and selects which specific projects will be eligible to borrow from the ODA loan facility.

(2) Project Implementation Stage

At this point, the province/municipality with the Level III system project can now sign the loan documents with the designated local on-lending institution. For the construction of the Level III water system, the LGU itself (or the LGU company formed to undertake the project) is expected to bid out the job to contractors from the private sector. The bidding process should be a transparent one with a public announcement of the bidding,

publication of pre-qualified construction companies, and a well-documented decision by the bids and awards committee. During the construction of the Level III water system, the LGU unit tasked to monitor the construction activity should carry out periodic inspections. Final inspection is done upon completion of the construction contract. Throughout the period of the bidding process and actual construction, the DILG can be tapped by the LGU for assistance on various technical and institutional-building matters.

The private sector contractor submits its periodic billings to the LGU. After the necessary inspections are done, the LGU in turn forwards this bill to the domestic lending institution for payment. Given that all documents are in order, the domestic lending institution requests for fund remittance from the ODA agency. Once the funds are remitted, the domestic lending institution settles the bills with the private contractor.

As far as repayment of the loan is concerned, the LGU is responsible for paying the loan since it was the signatory of the loan. Through the operations of the completed Level III water system, the LGU is able to collect the corresponding tariffs from the different consumer households. From these revenues, the LGU re-pays the loan capital and interest to the domestic lending institution, which in turn remits these proceeds to the ODA loan agency. This process is repeated throughout the term of the loan.

9.4 Project Management Arrangements

9.4.1 Project Approach/Strategy

Integration of Waterworks

The province may also initiate the establishment of an Integrated Waterworks (IWW) facility that will merge the management operations of adjoining municipalities, which have existing or proposed Level III water systems. This may not necessarily involve the integration of the physical facilities because of the distance and sparse location of municipalities, but rather only the management aspect of it. Article 8 of the IRR of NEDA Board Resolution No. 4 (Series of 1994), Clause (G) states that: "An LGU may also consider amalgamating or consolidating its system with that of its neighboring LGUs in order to benefit from economies of scale that could expand water supply services to consumers at the lowest possible cost."

The advantages of an IWW facility are as follows:

- Comprehensive water sector planning at the provincial level is facilitated. Investments in developing larger water sources and reservoirs can be considered at the planning stage (in the case of municipalities that are in close proximity with each other).
- The overhead cost involved in maintaining and operating a large waterworks system can be reduced since redundancies in equipment and manpower resources will be eliminated. Municipalities will no longer have to purchase and maintain their own waterworks construction equipment. As a result, there will be greater utilization of such equipment. Engineering and management staff that are currently needed to run the municipal waterworks system can be transferred to other functions.
- The province will be able to hire and retain professional engineering and management staff who will assume greater responsibilities and duties. This will eventually translate to a higher level of service to the communities served by the IWW facility.
- Access to loan funds (from both ODA and commercial sources) for the construction of the waterworks system will be easier since the lending institution will deal with a single entity. Lending institutions prefer such a set-up since the loan evaluation and the corresponding loan monitoring is simpler.
- The IWW facility will be more attractive to more reputable private sector corporations, both local and foreign. The province will be able to generate more interest from private sector players who may want to develop waterworks systems on a BOT/BO/BOO basis or jointly with the LGU. The LGU may also tap these same private sector players to operate and maintain the existing distribution network under any form of contract – service, management, lease, or concession.

The organizational structure of the IWW should contain, at the least, 5 sections – Administration, Finance, Engineering, Operations & Maintenance, and a Meter Reading and Tariff Collection unit. The Administration and Finance departments will handle matters related to human resources development, financial planning and control, and other related concerns. The Engineering section is expected to concentrate on water system planning and design. The Operations & Maintenance unit will ensure that the water system is operating efficiently (e.g. minimal system losses) and that water quality is always satisfactory by conducting strict monitoring activities. Any construction activity, including the installation of water meters, will be contracted out to the private sector so there will be no need for a large pool of both equipment and manpower. Water samples can be tested in existing private or government laboratories if the IWW will not maintain its own laboratory. The Meter Reading and Tariff Collection unit will be in charge of the all-important task of determining individual household consumption and collecting the corresponding tariff due. The actual conduct of these two activities can be contracted out to the private sector through a service contract.

The financial and operating condition of the IWW facility should be reported periodically to the provincial and municipal governments. In addition, the rates that the IWW will charge consumers will be set under the supervision of a regulatory authority and any proposed changes should first be presented and discussed in a public hearing.

The success of the IWW facility depends on the full support of the local governments of both the province and the component municipalities. Such support shall be in the form of strengthening the management and engineering capabilities of the IWW staff. Any loan needed by the IWW should be endorsed, and if possible guaranteed, by the LGUs concerned. Initial capital requirements can even be sourced from these LGUs.

9.4.2 Project Implementation Arrangements

Project Implementation Arrangement and Procedure

Together with the Figures (Figure 9.4.1 and 9.4.2), the following are the project implementation arrangement and procedure for Level I and sanitation from national level to barangay levels, which are designed to encourage active participation of implementers and beneficiaries in undertaking the project.

(1) National Government Level

Project Planning/Launching Workshop as start-up activity will be conducted to introduce and orient the implementers on the Project, define their roles, responsibilities and relationships among them and formulate provincial action plans. The Consultant, upon completion of the training needs assessment and development of appropriate training programs shall conduct capacity enhancement for the WSS-PMO Staff, NGOs, DPWH and DOH representatives. This activity aims to strengthen their competence in technical, managerial, training and community organizing and gender responsiveness. The trained members are responsible to facilitate the organization/reactivation of the PWSU and information dissemination for the provincial officials to secure their support and commitment to the Project. With the assistance from the Consultant, they will enhance the capacity of the PWSU, the MSLT and COs/NGOs in planning, implementing, monitoring and evaluating the project.

(2) Local Government Level

The PWSU shall assist the MSLT in each municipality and conduct information dissemination for the municipal officials to orient them on the project and obtain their support and commitment. With the PWSU assistance, the trained MSLT members shall select priority barangays, in coordination with the municipal development council. The Team will be responsible for facilitating barangay activities such as consultation meetings with barangay officials and community members, barangay survey and spot mapping, formation of BWSA/RWSA, pre-construction conference, and supervision of construction. Skills training will be conducted for the operating body in maintaining and managing the project. They shall also provide continuing assistance and monitor the activities of the beneficiaries and status of the project.

(3) Barangay Level

The barangay officials/development councils shall provide support to the PWSU and MSLT members in conducting activities and mobilizing resources in the barangay. Men and women volunteer shall conduct barangay survey and spot mapping to confirm their demand for the level of service, HH latrines and willingness to operate and maintain the facilities and counterpart. The community members decide on the operating body, tap existing community-based organization or organize a BWSA/RWSA. They have also to agree on the monthly water fees and provide labor and local materials during the construction of facilities. The BOD/Officers, Bookkeeper and Caretaker of the operating body shall attend skills training to develop their competence in performing their jobs. The beneficiaries shall provide information and request assistance from the PWSU/MSLT members, if necessary.

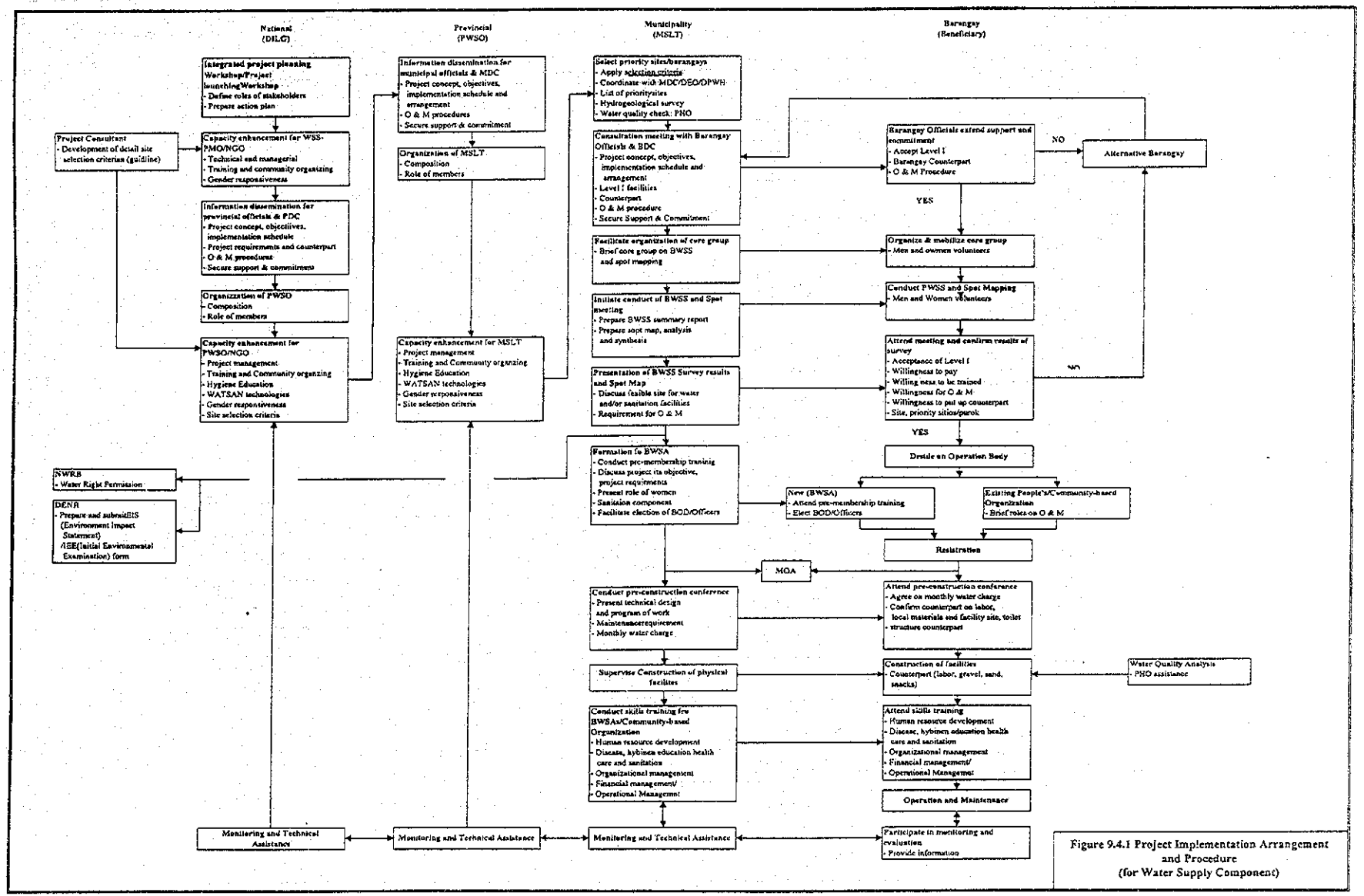
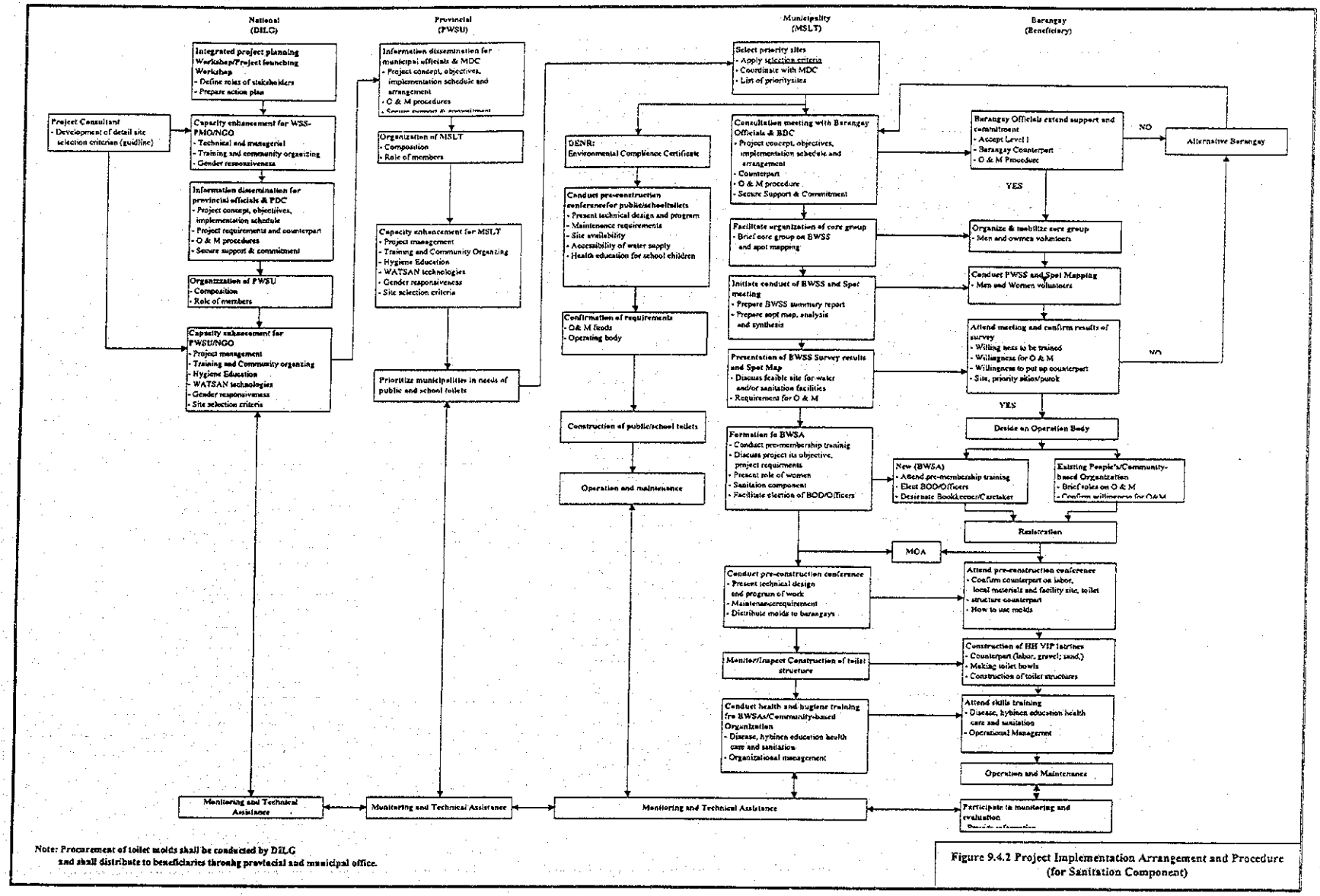


Figure 9.4.1 Project Implementation Arrangement and Procedure (for Water Supply Component)



Note: Procurement of toilet molds shall be conducted by DILG and shall distribute to beneficiaries throughg provincial and municipal office.

Figure 9.4.2 Project Implementation Arrangement and Procedure (for Sanitation Component)

Proposed Site Selection Criteria

Barangay: _____ Municipality: _____ Province: _____

(1). Required Items

Item No.	Description	Score
1.	No alternative water source except ground water	OK or Not
2.	Acceptance of Level I facility	OK or Not

(2) Technical & Socio Economical Requirements 60%

Item No.	Description	Score
1.	Water source availability (quality and quantity)	20%
2.	Incidence of water-borne disease	25%
3.	Accessibility of well drilling machine to water source	15%

(3) Community Interest and Involvement 40%

Item No.	Description	Score
1.	Willingness to assume responsibility for operating and maintenance of the facility/ies	10%
2.	Willingness to be trained on O&M	5%
3.	Willingness to pay for water fees	15%
4.	Willingness to put up counterpart	10%

(4) Total Score

Item No.	Description	Score
(1)	Required items	OK or Not
(2)	Physical requirements	
(3)	Community interest and involvement	
	Total Score	

Proposed Capacity Enhancement Program

Activity/Participants	Course Content
1. Project Planning/Launching Workshop DILG (WSS-PMO) DPWH, DOH,NWRB NEDA,DOF, OECF	1. Project Concept, Objective, Project requirements, Implementation schedule and arrangement 2. Role and responsibility of national government agencies, LGUs (province and municipalities and project beneficiaries) 3. Action Plan by province
2. Capacity Enhancement for WSS-PMO, NGOs DOH and DPWH	1. Project Concept (objectives, components, requirements, implementation arrangement, O&M systems and procedures, etc.) 2. Sector Development and existing Policies 3. Project Planning, Management and Control 4. Team Building Exercises 5. Presentation and Facilitating Skills 6. Methods of Instruction 7. Community Organization/Community Development 8. Barangay Surveys and Spot Mapping 9. Formation of BWSA 10. Health and Hygiene Education 11. Technical Training - Designing and Construction - Water Source Investigation 12. Skills Training for Operating Body - Organizational Management - Financial Management - Operational Management 13. Gender Responsiveness 14. Monitoring and Evaluation
3. Capacity Enhancement for LGUs (PWSU, MSLT, CO/NGOs)	1. Project Concept (objectives, components, requirements, implementation arrangement, O&M systems and procedures, etc) 2. Sector Development and Existing Policies 3. Project Planning, Management and Control 4. Team Building and Experiences 5. Methods of Institution 6. Presentation and Facilitating Skills 7. Community Organization/Community Development 8. Barangay Surveys and Spot Mapping 9. Formation of BWSA 10. Health and Hygiene Education 11. Technical Training - Designing and Construction of WATSAN facilities - Water source investigation 12. Skills training for Operating Body - Organizational Management - Financial Management - Operational Management 13. Gender Responsiveness 14. Monitoring and Evaluation

4. Capacity Enhancement for Operating body (BOD/Officers, Bookkeeper, Caretakers)	1. Project concept (objectives, components, requirements, implementation arrangement, O&M systems and procedures, etc.) 2. Human Resources Development (Team Building, Leadership and Value Formation) 3. Disease, Hygiene, Education, Health Care and Sanitation (Excreta, Liquid and Solid Waste Disposal) 4. Organizational Management (BWSA Management Skills) 5. Operational Management (Operation, repair and maintenance skills) 6. Financial Management (Simplified Bookkeeping Procedures) 7. Greater Participation of Women 8. Monitoring and Evaluation