ANNEX X – WATER SUPPLY AND SANITATION

A. INTRODUCTION

1. The needs assessment team, which consists of JBIC, JICA, the World Bank and ADB, held consultations with personnel from the government ministries/agencies, projects at various levels, who served as a base in formulating the initial damage and needs assessment report. The team also consulted with numerous affected people, NGOs, donors assisting the management of temporary refugee camps. The team visited Hambantota, Batticaloa and Trincomalee by air for a general overview, and then to the eastern coast by land. The latter involved detailed discussions with the above stakeholders in the district capitals of Ampara, Batticaloa and Trincomalee with site inspections covering such areas as Pottuvil, Tirukkovil, Akkaraipattu, Kalmunai, Paddiruppu, Kattankudi, Passikudah and Kinniyai.

2. In the water and sanitation sector, the tsunami disaster affected 14 districts in the Northern, Eastern and Southern Provinces, mostly in the areas where dependency on wells was high. Due to the water resource scarcity and the water deliver system damaged by the conflict, most of the tsunami-affected areas had suffered water shortage even before the tsunami. Although the detailed surveys on water situation in the affected areas are being undertaken, it is estimated that more than 60,000 of wells were abandoned or damaged by salinity or high infiltration of sea water. Quick repair works on the damaged distribution system and water delivery through tankers has been initiated by NWSDB & donors to meet daily water requirements. However, the delivery of water has been hindered due to lack of access in some camps. In short term, restoration of services should be needed through rehabilitation of the damaged water distribution network. This needs to be accompanied by sanitation improvement and hygiene education programs. Over the medium to long term, water supply service needs to be expanded in the affected area as water demand grows.

B. DAMAGE OVERVIEW

3. ***Institutional Framework for the WSS Sector.*** The Ministry of Urban Development and Water Supply (MUDWS) is responsible for the WSS sector at the national level, while local authorities are mandated under the Local Government Act to ensure that all citizens have adequate and safe water and sanitation facilities. Technical guidance and approval of household sanitation, particularly in urban areas is the responsibility of Ministry of Health.

4. The National Water Supply and Drainage Board (NWSDB) is the key agency under MUDWS with overall mandate to 'develop, provide, operate and control water supply and sewerage services'. To operate within a specified area, the NWSDB has to legally declare (through Gazette notification) such an area 'under its authority, for the provision of water supply and/or sewerage services' on behalf of a local authority. NWSDB has a decentralized system of six regional offices, each covering from one to three provinces.

5. The Rural Water Supply and Sanitation Unit (RWSSU), which was set up directly under the MUDWS, to implement policy and provide monitoring oversight in the

implementation of rural community systems through a decentralized community-based approach, with technical assistance provided by NWSDB.

6. The World Bank, ADB, JBIC and several other bilateral agencies have supported the sector through sector/multi-sector investment projects implemented through NWSDB or directory through Provincial/District level authorities.

7. The sector has two distinct areas of service delivery: (i) pipe-borne systems, mostly operated by NWSDB; and (ii) household/community systems – small systems operated by communities, and individual household wells and latrines.

Table1: Summary of Damage to Water & Sanitation Sector (mil LKR)

District	Damage to Structure (Replacement Cost)			Indirect Loss			Total Damage Cost
_	Pipe-System	Dug-well	Sanitation	Equip	W/S to camps	Survey	_
Puttalam	_	0.4	0.3	0.1	0.1	0.0	0.9
Gampaha	2.7	5.6	3.6	0.9	1.8	0.2	14.6
Colombo	6.5	79.3	50.8	12.6	25.2	2.4	176.7
Kalutara	1.3	59.0	37.7	9.3	18.7	1.8	127.9
Galle	30.2	102.8	65.8	16.3	32.6	3.2	250.9
Matara	39	136.7	87.5	21.7	43.4	4.2	332.4
Hambantota	15.2	43.8	28.0	6.9	13.9	1.3	109.2
Ampara	67.2	553.4	354.2	87.7	175.5	17.0	1,255.0
Batticaloa	53	303.1	194.0	48.1	96.1	9.3	703.7
Trincomalee	104.8	113.6	72.7	18.0	36.0	3.5	348.7
Mulativ	_	201.3	128.9	31.9	63.8	6.2	432.1
Killinochchi	_	64.7	41.4	10.3	20.5	2.0	138.8
Jaffna	_	228.2	146.1	36.2	72.4	7.0	489.9
Total	319.9	1,892	1,211	300	600	58 US$ 39.8Mil	4,380.9

Note: *The above cost is based on NWSDB's estimate. Damage cost is calculated as the repair cost of the damaged portion of the existing water supply and sewerage systems.*

8. ***Pipe-borne Water Supply and Sewerage Systems.*** The physical damage to the existing water supply schemes by the Tsunami is principally restricted to the distribution networks adjacent to the shoreline. In order to respond to the urgent need to supply water, temporary measures to restore the water supply service delivery have been made by repairing of some damaged pipelines, water delivery through tankers, etc. Nine systems are reported to have been damaged (see Table 2).

9. NWSDB has to date completed immediate repairs to all the systems to restore them to operable levels. However, supplies are restricted due to i) only partial repairs having been done at some intake works, ii) higher demand arising from density of displaced persons in some areas, and iii) some distribution networks requiring major

replacement. The total cost for restoring the existing systems is in the region of $2.9 million. However, with the restoration of communities inland from the shoreline, some systems would need to be expanded inland, with parts of existing networks becoming redundant. In addition, some new systems would be required.

Table 2: Damage to Pipe-borne Systems

District	Extent of Damage
Gampaha	3 pipelines at bridge crossings
Colombo	Distribution network in coastal areas; sewage pump house
Kalutara	Pipeline at bridge crossing; pump house
Galle	Distribution networks
Matara	1 pumping main; distribution network
Hambantota	Pipeline at bridge crossing; distribution network
Ampara	3 distribution networks
Batticaloa	Intake works; pump house and pumping main
Trincomalee	1 distribution network (office building, billing system, computer, vehicles, etc)
Sub-total	LKR 319 million **($2.9 mil)** (for repair to existing systems)

10. ***Household/Community Systems.*** Portable water is currently provided through bowser supply to the areas where pipe-borne systems are not in operation and wells are yet to be cleaned. An estimated number of dug wells affected by the tsunami is 62,000 wells, out of which at least 12,000 wells (and probably more) need to be cleaned. So far around 850 have been cleaned to date.

11. Some wells have been found to be beyond recovery, with high pollution of the aquifer and/or irrecoverable physical damage due to changed topography. There is an urgent need to assess the physical damage to wells and water quality of wells in affected areas including privately-owned wells. Some of the wells are recoverable by extraction of saline water although a careful attention should be paid not to over-extract as it may cause further penetration from sea water. Other wells contaminated heavily by sea water should be abandoned and an alternate water resource, (in some cases through new pipe-borne systems) should be secured. But it is noted that the well supply will not be a significant water resource in the coastal area of the Southern region. Damage to sanitation facilities include latrines in abandoned individual households.

13. Sewerage pump house at Mt. Lavinia, which is part of the Colombo sewerage system, is damaged. Other than Colombo sewerage system, sewage throughout the affected areas was disposed through household systems. A few housing schemes have their own sewage treatment systems. That are operated mostly by private parties.

14. A large number of low income families who lived on the coastal belt did not have proper sanitary facilities prior to the disaster. This has necessitated the inclusion of hygiene education with the installation of sanitary latrines in the welfare camps. An estimated number of 30,000 latrines (including 16,000 in transit camps) will need to be repaired/replaced.

15. ***Urgently Needed Items/Equipment***. Water bowsers, Gully emptiers, water meter, crew cabs, polyethylene pipes, water disinfection kits, generators, water quality testing kits, water purification kits, sludge pumps, water pumps, electric gears, etc.

C. RECOVERY AND RECONSTRUCTION NEEDS

16. ***Short-term Priority (3-12 months).*** Generally, the population has moved out of the tsunami affected areas to live with relatives or into many small scattered emergency camps established inland. The water demand of the emergency camps is principally being supplied to small storage tanks by water bowsers. There is a scarcity of water supply to those camps and areas where access is limited due to the bad road condition.

17. In the immediate aftermath of the disaster, NWSDB played the lead role in organizing a response system for the WSS sector, i.e. coordinating and/or directly setting up temporary water supply and sanitation systems in the welfare camps; cleaning of wells and disinfection; and immediate repairs to the pipe-borne systems to bring them to operating status.

18. UNICEF has been working closely with NWSDB in collating information and coordinating current activities, which includes interventions by various local and international NGOs, and private sector agencies (more than 20 partners). The World Bank and ADB-supported ongoing projects, and other bilateral and aid organizations have provided materials and equipment (tanks, pumps etc) for the welfare camps and for well cleaning. Around 850 wells have been cleaned and disinfected to date (7%).
Currently, aid agencies directly supporting projects being implemented through the decentralized administration, particularly in the North and East (ADB, World Bank and others), have sanctioned the use of ongoing project funds for the procurement of materials and equipment for the immediate needs in the North and East. The most difficult area to address during the relief phase has been the provision of adequate sanitation facilities. Around 8,000 toilet units are required for the welfare camps. UNICEF has ordered 8,000 squatting pans, of which 3,000 have been delivered and 500 installed. In addition, about 20 gully emptiers have been assigned for sewage collection.

19. Provision of temporary/semi-permanent water supply and sanitation systems in assigned transit camps with possible continued use of water supply and sewage disposal bowsers in some camps should continue.

20. ***Recovery phase (in one year).*** The recovery phase will cover (i) well cleaning/

Table 3 Short-term Needs for WSS Sector

Component	Cost Estimation Base	Estimate (mil LKR)
1) Project	Service Restoration (Hikkaduwa, Galle, Hambantota, Batticaloa, Potuvil, Trincomalee, Point Pedro, Mulaitivu, Kalutara, etc.)	6,600
2) Service to camps	Repair/construction of sanitary facilities in transit camps and returnee areas (appx. 20,000 latrines) and hygiene education	110
3) Study	Water situation assessment and water quality tests	(58:immediate relief)
	Feasibility studies on priority projects	-
		Total **LKR 6.7 bil ($61mil)**

repairs/new construction and provision of sanitation facilities in areas where communities can return to their homes, together with systematic water quality testing over a reasonable period; and (ii) rehabilitation of damaged water distribution networks and headworks. Physical rehabilitation works will be complemented by hygiene education programs, particularly in the transit camps.

21. ***Medium-term Priority (1-3 years).*** Due to the insufficient water delivery system damaged by the conflict or the lack of adequate water resource, most of the affected areas had suffered water shortage even before the Tsunami. NWSDB has planned a range of medium/long term measures to provide sustainable and reliable drinking water supply to affected areas and has carried out a quick assessment of the rehabilitation/augmentation requirements of existing systems, with a breakdown into 20 packages covering the Southern, Northern, Eastern and Western Provinces.

22. As medium- to long-term plan includes various water supply & sanitation development projects, the cost estimate is much higher than the Tsunami damage cost, because of the following reasons;

Some of the affected people depended on dug wells. Due to high contamination of seawater in some of the wells, an alternate water resource should be secured mainly through connecting to new pipe-borne water supply schemes.
Relocation policy by the Urban Development Authority will lead to more dense population in town areas where a dug well system is not recommended due to high possibility. This will require expansion and augmentation of the existing systems.
New water supply schemes will be needed to ensure minimum water requirement for the communities in the Northern, Eastern, and Southern provinces including the Tsunami affected areas.

23. It is recommended that GOSL develop a strategy for medium-to long –term development by assessing the water supply need to meet both the present and future demands, and in the context of new settlement developments in line with the on-going development initiative. Additionally, NWSDB has proposed the implementation of sewerage systems for critical areas near the coast, with a very tentative estimate of US$93 million. This component would possibly need to be considered for the far long-term and not as part of the emergency long-term package (1-3year). Taking into account the importance of the sanitation, it is recommended that NWSDB include the sanitation component at the preparation/design stage of water supply projects. However, considering the high density population in Galle, a piped sewer system can be taken up for the priority program to secure the good sanitation condition to the residents in Galle city including the affected people, together with the development of water supply system.

Table 4 Medium-term Needs for WSS Sector

Component	Estimate (LKR million)
1) Water supply (incl. household sanitation) (Galle W/S, Ampara W/S, Trincomalee W/S)	4,200
2) Sewerage (Galle piped sewer system)	1,300
Total	**SLR 5,500 mil (USD 50mil)**

D. OTHER OBSERVED IMPACTS

25. As NWSDB provides water to the displaced people free of charge, it is losing the revenue for the time being. In addition, it has lost the billing system in some areas. Due to the immediate need to maintain the relief work to provide water to affected people, NWSDB is operating the machinery and equipment procured or provided by donors. The additional operation cost for fuel, electricity, disinfectant arising from the relief work will give extra financial burden on NWSDB.

E. ENVIRONMENTAL AND SOCIAL ASPECTS

26. Together with preventive health care, sanitation will play an important part in the emergency program, which will not only involve human waste, sewage and solid waste disposal but also community education and mobilization. Proper planning in resettlements will need to be done to identify methods of and sites for treatment and disposal of waste.

27. *Lack of hygiene practices.* Many of the refugees in the camps who were originally living in coastal areas are not accustomed to sanitation facilities. It was observed in the camps, their hygiene practices are not satisfactory, and which may lead to health problems, such as skin diseases, vector- and water- born diseases. To prevent these problems hygiene education to ensure use of toilets, washing hands and cleaning of the living environment is necessary. Appropriate number of field workers should be trained so that they can visit each camp to instruct and monitor hygiene practices. In addition, materials such as posters and leaflets can reinforce the activities.

28. ***Gender and social issue.*** In some camps, the women feel embarrassed or unsafe to use the temporary latrines which are just covered by plastic sheets and without locks. They normally go to the neighboring houses to use the latrines. Nevertheless, this can also be another factor of embarrassment for the users and bother for the house residents. To make latrines women friendly, separate use of latrines between men and women is recommended. And a latrine for women should have a door and lock. If such structure is not available immediately, a signboard to indicate if the latrine is in use can improve the facilities. Likewise, bathing facilities should also have such separation by sex. There must be a consensus in a community to rule the use of sanitation and bathing facilities to protect the privacy of women.