

# Model Terms of Reference Implementing Zonal Management Approach to Urban Water Supplies



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## Model Terms of Reference

# Implementing Zonal Management Approach to Urban Water Supplies

### Abstract

#### RATIONALE

Some 700 million people in the Asia and Pacific region still lacks access to improved water supply.

People who are not connected often spend 15% of their household income for water. They buy their water from neighbours at inflated costs, or get it from standpipes or stand-posts, where access to water is only available for short durations.

The core issue is getting connected to piped water promptly and on affordable terms, especially for the poor. Once connected, people are likely to pay only 1–2% of their household income for piped water.

Unfortunately, it is not so easy to improve operational performance of the whole distribution network.

A possible solution would be to sub-divide the network into smaller, more manageable hydraulically isolated zones. This would enable operators to focus resources and efforts within each zone, thereby increasing the chances of improved performance, reduced levels of NRW, increased water conservation through effective consumer revenue metering, and more. The savings resulting from these service efficiencies could be directed to adjacent zones and the process progressively repeated until the whole network has been covered and overall performance improved.

This is the “zonal approach” to urban water supplies.

#### OBJECTIVES

The zonal approach’s main objectives can be summarized as follows:

- 24 hour piped water to all
- Affordable water
- Conservation of resources
- Sustainability of service
- Speedy Implementation of development

#### SCOPE

The zonal approach should not be implemented in isolation but must always be part of an integrated package that includes:

- **Policy and the Political Enabling Environment**  
Government endorsed and civil society informed policy on service levels, tariffs, tariff revisions, subsidies, private sector participation, etc.
- **Technical, Financial and Organizational Analysis**  
Covers water source and hydraulic zone selection, water audit, and assessment of financial viability, organizational and social aspects, and environmental impact.
- **Project Management and Procurement**  
Project and utility management covering the development of people through leadership and strong management, with managers free to manage without political interference, as well as the procurement of services.
- **Operational Management**  
Based on management at the lowest practicable level, for example sub-zone caretakers.

## A. Background

1. In the Asia and Pacific region, some 570 million people still need to receive improved water supply and about 1,820 million people still need to receive access to improved sanitation to reach the Millennium Development Goals (MDGs).<sup>1</sup> To achieve the MDG targets by 2015, many developing member countries (DMCs) acknowledge that it is important to reach Target 10 on water and sanitation by 2010, because the economic impact of improved piped water supply on health and education is significant.<sup>2</sup> While ADB-supported projects in some DMCs, for example Phnom Penh in Cambodia and Dalian in the PRC, have achieved 24-hour water supply, many utilities in other DMCs have low levels of coverage. At five persons per connection, the effective water supply coverage with piped connections in 2013 was 10% in Dhaka, 32% in Ho Chi Minh City, 31% in Jakarta, 32% in Manila, and 46% in Delhi. People who are not connected often pay water vendors about 15% of their household income for delivery of water, buying water from their neighbours at inflated cost, or getting water from standpipes or stand-posts where they only have access to water for a very short time each day and have difficulty transporting it to their homes. In all cases, the core issue is getting connected to piped water promptly and on terms affordable to those living in peri-urban areas, especially the poor. Once connected, people are likely to pay only 1–2% of their household income for piped water.

2. The main issues in urban water supply in developing countries may be summarized as:

- **High non revenue water (NRW).** Levels are typically 40-60% of production and often NRW cannot even be measured. Problems usually include leakage from old pipes and poorly constructed connections, illegal connections, illegal sale of water to vendors, poor metering / reading / billing, and wastage from standpipes.
- **Intermittent supply.** In most of South Asia, intermittent supply (such as 2 hours of piped water per day) is the norm. When asked why, the typical answer is “there is not enough water”. The example of Male in Maldives, where there is 24 hour piped supply at an average consumption of only 6m<sup>3</sup> per household per month, proves that this is not a valid answer.

- **Low piped water coverage.** Typically, direct piped water connections to consumer houses in Asian cities only cover around 35% of the population, with the remainder relying on standpipes and water vendors, etc.
- **High price and limited access to water for the poor.** Typically the poor pay around \$20 per month for about 6m<sup>3</sup> of water per month from vendors, or travel long distances each day to collect water from a standpipe but even then they may not get water. Typically the rich pay \$4 per month for 30m<sup>3</sup> / month for piped water. High connection charges also discriminate against the poor who cannot afford to pay them in advance unless, for instance, there are facilities for payment by installments.
- **Deterioration of water sources.** Groundwater levels in some cities are falling fast with groundwater quality becoming increasingly saline in some places. Where surface waters are polluted by industry, it is expensive to find more remote good quality alternative sources and to transport this good quality water to cities.
- **Long implementation periods for projects.** ADB and World Bank funded water supply projects typically take 8-10 years to fully implement, whereas NGOs, the private sector, or local authorities may take as little as one year for a similar but smaller project. Time is of the essence if the MDG targets are to be achieved.

3. Typical situations for the urban poor and those living in peri-urban areas are: (i) utility piped water is not close and communities rely on small-scale water providers (SSWPs) or develop their own sources; (ii) the utility only serves the area through standpipes/stand-posts, limiting per capita water availability and increasing inconvenience; (iii) the utility can serve the community but the cost of a connection is so high and the terms so inflexible that only a few can afford to connect to piped water.

4. Improved operational performance of the distribution system would lead to real benefits not only for existing consumers through improved service levels and greater cost-efficiencies, but would also enable people who currently are not connected to the network to be supplied with water from direct connections. Improved operational efficiency and an increased customer

base would also encourage the utility to reduce connection fees. Targeting the poor for such new connections would materially assist in the achievement of the MDG water sector targets.

5. It is notoriously difficult to improve operational performance of the whole distribution network at the same time, but by sub-dividing it into smaller, more manageable hydraulically isolated zones and systematically focussing resources and efforts within each zone to improve performance can increase the chances of success and yield significant improvements in a short timescale. Benefits and savings in a zone can then be directed to adjacent zones and the process progressively repeated until the whole network has been covered and overall performance improved. This philosophy is termed the “zonal approach” to urban water supplies.

6. Further source development may not be needed or could be deferred if NRW can be reduced to a more reasonable level, say to 20% of water entering the zone. Zones could cover up to 1 million people, with caretakers appointed to be totally responsible for all services inside each sub-zone (<10,000 people) and who would also be accountable for improvements such as 100% metering, 100% collection efficiency, leak repairs and identifying all illegal connections. Caretakers could also enter every property to help with wastage/leakage on the premises.

7. Poor people already pay more for one unit of water than the rich, so affordability is not an issue. In any case, a tariff based on a lifeline block and a sliding scale of charges for water consumption can be designed to cushion the poor who are connected. It has also been demonstrated that when the need for a policy based on full cost recovery from tariffs, as well as the need for automatic tariff adjustments, is explained to politicians they generally endorse it. In the case of the zonal approach, politicians need to endorse the principle that those enjoying a 24 hour supply should pay more than those on an intermittent supply. If this leads to claims of financial hardship then consumers still have the option of reducing their consumption to minimize water bills. If they choose to maintain their consumption level and pay the higher charges, then the extra revenue generated can finance further improvements in the zone. As well as technical service improvements the

zonal approach therefore provides an opportunity to introduce differential tariffs that reflect the level of service provided. 24 hour supply would be introduced in one sub-zone at a time, with higher tariffs and strict metering and revenue collection enforced. Water would be conserved not only through reductions in NRW and avoidance of wastage, but also through the impact of higher tariffs on consumption.

8. Rapid implementation must be a pre-condition of success, for instance 3 years maximum to effect 24 hour supply in a zone of, say, one million people. It is unreasonable to expect people to wait longer than that, or indeed indefinitely before they experience improvements, especially if others are clearly seen to be benefiting in the meantime.

## B. Objectives

9. By implementing the zonal approach to reduce levels of NRW and to encourage water conservation through effective consumer revenue metering, service levels such as continuity of supply and system pressures can be progressively improved within each zone. Savings can be used to supply new consumers within the zone and also improve the water supply to adjacent zones within which the zonal approach can then be implemented. Improved efficiencies will also reduce costs, leading to more affordable water supply.

10. The main objectives may be summarized as follows:

- 24 hour piped water to all
- Affordable water
- Conservation of resources
- Sustainability of service
- Speedy Implementation of development

## C. Scope

11. The zonal approach should not be implemented in isolation but must always be part of an integrated package which includes:

- **Policy and the Political Enabling Environment** - Government endorsed and civil society

informed policy on service levels, tariffs, tariff revisions, subsidies, PSP, etc.

- **Technical, Financial and Organizational Analysis:**
  - **Water Source and Hydraulic Zone Selection** – data collection on water sources, system coverage and characteristics of the distribution system from existing utility records, followed by analysis to identify the selected special zone.
  - **Water Audit** - how many are served by house connection, stand-post, tanker, tricycle, pushcart, bottled water supplier? What amounts do they receive, how much does it cost them and what is the water quality? What is the role of small scale water providers (SSWPs) in connecting people to piped water through small piped water networks (SPWNs)?
  - **Financial Viability** - differential tariffs, automatic tariff revisions based on policy implementation, 100% collection efficiency, etc.
  - **Organizational and Social Aspects** – allocation of appropriate staff to the special zone and arrangements for stakeholder liaison.
  - **Environmental Impact** – projected impact on sanitation and wastewater disposal.
- **Project Management and Procurement** – project and utility management covering the development of people through leadership and strong management, with managers free to manage without political interference, as well as the procurement of services.
- **Operational Management:** - based on management at the lowest practicable level, for example sub-zone caretakers.

#### **Policy and the Political Enabling Environment:**

12. A clear understanding of policy on service levels, tariffs, tariff revisions, subsidies, and PSP is an essential pre-requisite. In addition, nothing should be attempted unless the zonal approach and its objectives are first endorsed at the highest political level in the country as well as at the highest local authority level. There should also be a guarantee of no political interference at any stage in the consulting, procurement, contracting or management processes. Transparency must play a key part in this and so it may be appropriate to invite a strong independent organization such as a

well-respected NGO as well as the media and academics to give implementation of the zonal approach a high public profile at all times.

#### **Technical, Financial and Organizational Analysis:**

13. **Water Source Analysis:** The quantity, quality, reliability and sustainability of existing sources of water for the whole city should be assessed, including private and public dug wells, tubewells with hand-pumps, and motor driven pumped tubewells. If a city-wide assessment is not viable then it should be undertaken in potential special zones as part of the hydraulic analysis.

14. **Hydraulic Analysis:** The hydraulic analysis seeks to identify where hydraulically isolated zones already exist or can be readily developed. Ideally each zone should be served by a reservoir or can be monitored by a limited number of cross-boundary zonal meters. Existing data, however poor, will be the basis of the initial hydraulic analysis to determine how to divide the city into appropriate hydraulic zones of, for example, about one million people. As further data is obtained during project implementation the hydraulic analysis can be refined. It is sensible for the first zone selected for attention to be adjacent to any existing 24 hour service area. When a suitable zone has been identified then good maps and plans of it will be needed, and if not available should be prepared step by step in the subject zone. In addition, data on the age, size, material and condition of pipes, valves and meters is desirable.

15. **Water Audit:** Data collection and analysis of water services begins with a comprehensive water audit. Ideally this should be carried out for the whole city, but if this is impracticable then it should be focused on the special zone. The objective of the audit is to ascertain how many people are served by piped connection to their home, whether from the utility or some SSWP or home association, and how those not served by piped networks obtain their water supply. ADB has already prepared a model TOR for this activity, including questionnaires.

16. **Financial Analysis:** This element of the analysis is important because it evaluates the projected financial impact of implementing technical measures and adopting a new tariff for 24 hour supply based on the new service levels,

improved collection efficiency, reduced NRW level, and expanded customer base within the special zone. The analysis also includes the cost of projected capital investments in pipes, meters, valves etc., as well as operational costs.

17. **Organization Analysis:** An assessment of the institutional organization is necessary to determine and agree with the utility which staff will work in the special zone, how they will be paid and for how long. Utility staff would effectively be seconded, and once under the full control of the special zone management, revised remuneration and rules of work would apply. The objective would be to develop people seconded from the utility and thereby encourage sustainability.

18. **Social Analysis:** It is important that people inside the special zone are represented during the project, possibly through an NGO, home owner association or local authority. The revised role of water vendors and SSWPs, consumer costs, consumer service levels, etc., will all need to be assessed and the proposed improvements explained to these community representatives so residents are kept fully informed at all times. In general, it is important that the zone represents a large number of people not currently served by a piped water system to their home.

19. **Sanitation, Wastewater and Environment Analysis:** Consideration must also be given to the existing environmental situation, including sanitation and wastewater facilities, and specifically the impact that the increased customer base and changed consumption patterns will have on sewerage and wastewater collection, treatment and disposal within the special zone. For instance the volume of sullage water may increase or the demand for water-borne sewerage may rise as people are connected to the piped water supply network. Policies and design principles therefore need to be agreed and various options studied. Wherever possible, the treatment, disposal or re-use of wastewater within the zone should be adopted as a good principle to follow.

#### **Project Management and Procurement:**

20. The critical parameter for success of the zonal approach is that **time is of the essence**. This may necessitate having new rules for recruitment of consultants, procurement, contracting and

management so that decisions can be delegated and contract disbursements made quickly.

21. **Transparency and competition** are also vital, as there will be a need for parallel developments to take place with different contractors in a competitive environment. Provided there is transparency in the contract award process and there is seen to be real competition among contractors, then this should help to eliminate delays and corruption.

22. **Project management and utility management** are both key ingredients to the success of the zonal approach but are not the same thing. There is little sense in developing utility staff to manage a project, as it is more efficient and practical to appoint consultants to do that and be responsible for all design work and contract documentation, bid evaluation, construction supervision and recommend approval of payments, providing effective continuity for implementation in other zones. However, the Project Manager would be answerable to the Zone Utility Manager, who ideally would have extensive experience in the management of utility operations but also have a private sector background. The Zone Utility Manager would be supported by competent staff in personnel, accounting, commercial operations, engineering, social development, public relations, and environmental affairs. Close co-ordination between the Project Manager and the Zone Utility Manager will be essential at all times.

23. No large **procurement** packages or civil works contracts are envisaged. If large quantities of pipe or other materials and equipment are to be procured then at least two suppliers should be contracted on the same negotiated price basis. Appropriately sized and packaged pipe-laying and fittings installation contracts would be awarded to contractors who would work in parallel for the same negotiated contract rates. Close **Local Authority liaison** over the excavation, reinstatement and resurfacing of roads would need to be well co-ordinated. Public notices would clearly specify to all concerned stakeholders what is happening, when and why. Procurement, as well as covering the installation of replacement and additional pipes and valves, etc., may also include the appointment of specialist companies, for example, to undertake leakage detection surveys on a performance

contract basis, or repair leaks or replace meters under a schedule of rates contract.

### **Operational Management:**

24. A good surrogate performance indicator for the effectiveness of a city water supply is the percentage of the population receiving 24 hour piped water to the home. Thus in the special zone the objective will be to connect nearly everyone to a piped water supply. Apart from the utility providing direct connections, SSWPs can play a major role here by obtaining a bulk supply from the existing utility distribution system and provide piped water to those using standpipes or water vendors by constructing SPWNs. However, this should be seen as an interim measure only until the utility can extend its network and take over the SPWN. SSWPs should therefore be represented in the staffing structure of the special zone.

25. As well as the special zone itself, each sub-zone must be capable of hydraulic isolation, with all inflows and outflows monitored by introducing a District Metering System. All consumers would be provided with new water meters, which would be read regularly by the sub-zone caretakers and bills issued simultaneously every month. Payment of water bills would be made easy with no-one having to go further than one kilometre to pay their water bill. Utility staff would computerize all billings and cash payments, and analyse the results for each sub-zone. Any excessive or low usage would be investigated. Adequate resources would be available to each sub-zone to repair leaks, replace meters, etc. Sub-zone improvements would be progressive so that 24 hour supply is established one sub-zone at a time. Where appropriate, elevated tanks would be constructed to provide adequate pressure and a 24 hour supply. Regular analysis of the district and consumer meters would enable NRW to be calculated. Where it is considered to be high, inspections and leak detection exercises would be performed in the sub-zone to control it so that the NRW of each sub-zone is of the order of 20%.

26. Operational management of the special zone should be based on the devolution of zone management to the lowest practicable level, for example to the sub-zone caretaker level. All caretakers will be accountable to District Managers who will report to Area Managers and who in turn

will be accountable to the Zone Utility Manager. If there are not many sub-zones, then the roles of District Manager and Area Manager can be combined. All operational activities such as valve operations would be the responsibility of utility personnel, and not the consultant or contractors. A weekly report will be prepared by all managers at each level detailing achievements made against targets. The Utility Manager will issue a weekly summary report for the whole zone, as well as a monthly report for public access on the internet. An annual Development and Performance Report will be prepared for each Special Zone, so that within three years one special zone has been developed covering up to one million people with everyone connected to a 24 hour piped water supply and NRW at 20% or less. Work on a second special zone should commence two years after the start of the first one.

## **D. Methodology**

### **D1. Policy and the Political Enabling Environment**

27. The consultant will hold discussions with authorized representatives of national and local government to clearly define policy on service levels, tariffs, tariff revisions, subsidies, and PSP. In particular, the consultant will seek firm guarantees of no political interference in the process, and reach agreement on government monitoring and approvals requirements. Process transparency is essential to establish credibility and so the dissemination of information on policy and the enabling environment should be fed into the stakeholder consultations to be held during the analysis stage to discuss technical options and to give implementation of the zonal approach a high public profile.

28. Sensitivity needs to be exercised in these consultations as there could be strong political resistance to providing water services to illegally established areas within the city, especially if viewed as being at the apparent expense of improving service levels for existing consumers. Inevitably there could also be resistance from those currently benefiting from an ample supply of water at minimal cost if they see such costs likely to rise or their supply curtailed. Political buy-in and support at the highest levels is critical to the success of the zonal approach, and without it

progression to the project implementation stage should be deferred.

## D2. Technical, Financial and Organizational Analysis

### (i) Water Source and Hydraulic Zone Selection

29. The consultant will collect data from all existing databases, reports, maps and drawings of the distribution network to obtain as comprehensive an understanding as possible of the supply situation concerning water sources, system coverage, as well as characteristics of the distribution system. Where records are poor or non-existent the consultant will undertake supplementary surveys to obtain sufficient information to enable an analysis to be undertaken of the system in order to identify the location and size of potential special zones. Potential zones will be prioritised in terms of the ease and cost of hydraulic isolation and monitoring, proximity to existing 24 hour supply areas (indicative of the adequacy of water resources), the number of unserved poor in the zone, etc. The consultant will develop a set of selection criteria and a weighting system acceptable to the relevant authorities to prioritise selection of the special zone.

### (ii) Water Audit

30. The water audit will utilize existing data already gathered, supplemented by surveys undertaken by the consultant in the potential special zones. The main steps in the audit process are:

- (i) **Undertake surveys** of the water utility, SSWPs and consumers in the potential zones, and **analyze the results** to assess the size and location of the target market and the capacity of existing SSWPs to meet the unfulfilled demand.
- (ii) **Hold stakeholder consultation** with the target communities, the utility, SSWPs, local government representatives, NGOs, etc., and **develop appropriate SSWP registration procedures**, including time-bound licenses and Memoranda of Agreement with the Municipalities and formal utility leading to ultimate transfer of responsibility for service provision to them.

31. The surveys will be undertaken by **domestic consultants** who will be responsible for the survey logistics and supervising the enumerators (these could be students) undertaking the surveys in the separate geographic areas in the city. The domestic consultants will pre-test the sample questionnaires for all the surveys before use by the enumerators. The domestic consultants will also be responsible for interviewing all existing SSWP piped water network operators. **Enumerators** will undertake 5% sample consumer surveys in each target community within a zone, as well as interviewing SSWP water vendors and bottled water suppliers operating in each of their areas. Formal permission to survey will be obtained from the local government by the domestic consultants and a copy provided to each enumerator, who will also as a matter of courtesy introduce themselves to the leader of each community in which they operate. **An international consultant** will have overall responsibility for the surveys, will interview the water utility company, analyze all results and make recommendations.

32. The domestic consultants will brief the enumerators regarding (i) location, (ii) how to sample for interview, (iii) who to interview, (iv) length of interview, (v) number of interviews per day, (vi) transport, (vii) total time to complete interviews, (viii) payment for work, (ix) clarifications, (x) testing of survey, (xi) permit to survey and (xii) the questionnaire. Enumerators will also document any anecdotal information given to them about the water industry, and which may not correspond to any question asked.

33. Quality control on the surveys will be maintained by random field checks undertaken by both the domestic and the international consultants. The name of the person being interviewed, their address and the name of the person undertaking the interview and the date of the interview must be recorded on each questionnaire completed. If an enumerator is found to be falsifying results they will not be paid and all work already undertaken by them will be repeated by a new enumerator interviewing different people.

34. Questionnaires will be prepared as listed below and will be translated into the local language by the domestic consultant: ADB has already prepared a model TOR for this activity

including questionnaires (see **Appendices 1 to 5** for example questionnaire templates).

35. **Questionnaire – Water Utility (Appendix 1).** Apart from details of individual customers this will identify the recipients of bulk sales including SSWPs, sub-divisions, homeowner associations, etc. Its focus will be on identifying the water source and for each type of customer (non-domestic, house service connection, standpipe, etc.) the total number of connections, the volume sold per month and the revenue gained per month. It will provide information on production volume versus consumption volume to determine NRW, and will note the extent of 24-hour piped water coverage. The international consultant will carry out the interview.

36. **Questionnaire – SSWP Piped Water Network Operators (Appendix 2).** The domestic consultant will carry out interviews with every SSWP in each survey area. The questionnaire will seek essentially the same information as for the utility except the quality of the service to the customer such as direct connection or hose and drums will be determined. The method and frequency of payment is an important output from this interview.

37. **Questionnaire – SSPWP Water Vendor (Appendix 3).** If water vendors operate in a survey zone, then at least three different vendors of each type (water tanker, motorized tricycle, pedaled tricycle, rickshaw, pushcart, etc.) should be interviewed by the enumerator to estimate the total number of vendors of each type operating in that zone. Pertinent information sought includes their source of water (to be visually checked), means of transport of water, number and type of customers, average distance transported, volume sold and revenue gained. It is important to establish how much the vendor pays at source for the water and to whom it is paid.

38. **Questionnaire – SSPWP Bottled Water Supplier (Appendix 4).** The enumerator will interview at least five different bottled water suppliers in his/her survey zone and estimate the total number of bottled water suppliers and type (for example mixed goods shop, sole purpose bottled water shop, treatment and sale on site, deliveries of bottled water, etc.) in that zone. The focus of the interview is to obtain information

about the source of water, type of treatment provided, volume of water sold per month, price paid and the total revenue.

39. **Questionnaire – Water Consumer (Appendix 5).** The enumerator must obtain a 5% representative sample of all water users in his/her zone, identifying those served by the utility and by SSWPs, and surveying them in numbers proportional to their prevalence. The focus will be on water source (consumers may get water from more than one source), access to water, water quality, reliability of supply, availability of supply, volume consumed per month and cost per month. It is important to record the number of persons in each household. This survey must include a representative number of non-domestic consumers, especially industrial users.

40. **Analysis of results** will be preceded by obtaining any clarifications required from the domestic consultant and the enumerators. The domestic consultant will also collate and summarize answers to all the questions. The international consultant will then consider the points of interest, deriving the following basic data from the summary of results:

- Coverage % with 24 hour supply to individual house connection by utility
- Coverage % with individual house connection by the utility
- Coverage % including all utility domestic connections and standpipes.
- Coverage % with piped water in home (all water providers).
- Average household consumption per month by different sources of supply
- Average household cost per month by different sources of supply.
- Total monies paid by SSWPs at source per month.
- Average price of utility water.
- Average prices of SSWP water (network operator, vendor, water bottler).
- Revenue turnover (a) utility, (b) SSWPs (network operator, vendor, bottled water supplier).
- Volume of sales (a) utility, (b) SSWPs (network operator, vendor, bottled water supplier).
- Official NRW figure from utility.
- Comparison of cost and consumption - piped water versus non-piped water

- Proportion of utility water volume sold to non-domestic consumers
- Proportion of utility water revenue derived from non-domestic consumers
- Comparison of average tariff for utility water: domestic versus non-domestic
- Proportion of all piped water where utility maintains the reticulation
- Rating of customer satisfaction with utility.

41. The main purpose of the assessment is to focus on those not served with piped water and to assess the costs and benefits to them of switching to a piped water supply, as well as the feasibility of doing so through an SSWP contract. The findings would be presented and discussed at a stakeholder consultation to guide the zonal approach program, enhance cost recovery and institutional development to promote service sustainability, encourage water conservation (including reduction of NRW), and ensure that as far as possible the urban poor are connected to piped water services within their ability to pay.

42. Following completion of the analysis, key findings will be disseminated to all stakeholders. About two weeks later, a one-day **stakeholder consultation** will be convened for all stakeholders. The morning would be devoted to presentation of results, analysis of the surveys and discussion of the findings, concluding with an overview of options for the way forward. The afternoon would be devoted to discussion of those options and to developing a consensus on the preferred way forward. The stakeholder consultation will be facilitated by a domestic consultant skilled in such work, or by a well respected and capable local person.

43. In cases where the formal utility decides for economic or technical reasons not to extend its services into some areas within the zone, the potential for SSPWPs to provide the service in the interim will be explored. ADB has prepared a model PPTA ToR for mainstreaming SSPWPs which can be used if this approach to serve those areas is adopted. The following is a summary of the process to formally recognise the SSPWP by the municipal authorities and also the formal utility to ensure that the area will not be re-developed or the water services network extended into it for a specified number of years. Formal recognition will provide security of tenure to the SSPWP and enable

plans to be developed with confidence and services priced to obtain an appropriate return on capital during the period of tenure and enable the maximum number of poor to be connected. This could be achieved through a simple **registration procedure**, such as issuing a license detailing the area of license jurisdiction, the obligations of each party, reporting requirements and their frequency, periodic audits, remedies for failure to conform to the license, an appeals process, the license duration, periodic license reviews, exit strategies or extension options at the conclusion of the license period. At the end of the license term the assets will be transferred to the formal utility. A reasonable license fee could be charged to cover administration costs. The terms of the license would also have to be approved by the formal utility. A separate Memorandum of Agreement should be drawn up between the SSWP and the formal utility to cover such issues as: appropriate technical standards and materials, provision of a bulk water supply, maximum/minimum daily volumes, tariff, metering details, remedial actions in the event of supply deficiencies, periodic reviews, etc. The municipal license and the utility agreement would also safeguard the position of the SSWP in the event of a regulatory body being subsequently set up to control the sector.

44. The license and Memorandum of Agreement should be relatively simple documents, with bureaucracy kept to a minimum. The local consultant, with support from the international consultant, will develop an appropriate license format and a Memorandum of Understanding acceptable to the Municipality and the formal utility following consultation with existing SSPWPs.

### (iii) Financial Viability

45. The consultant will develop a simple Excel spreadsheet financial model to simulate the current status of water supply in the special zone and to investigate projections of the impact of technical improvements such as reduced NRW, progressive achievement of 24 hour supply and the introduction of a new tariff, and the expanded piped water customer base. Estimates will be made for input into the model of the necessary capital and recurrent operational expenditures to deliver these projected new levels of service and to maintain them. Different scenarios will be studied by the consultant and recommendations made

regarding the optimal strategy to implement the zonal approach in the special zone. For instance, the selection of specific subzones that can yield early results and be used as demonstration areas would serve to promote the strategy and resolve any major issues.

46. A key factor to take into consideration will be the response of existing consumers to increased tariff levels in the 24 hour supply sub-zones. The consultant will investigate price elasticity and develop a strategy for linking service level improvements to progressive tariff increases, and will also make recommendations on the rate of such tariff increases. For instance, to avoid major customer dissatisfaction one strategy might be to only increase tariffs initially by a small margin above inflation so customers do not experience a sudden increase in their water bills, followed by a more rapid rate of annual tariff increases. Much will depend on existing tariff levels, and where tariffs are currently unsustainably low it will be difficult to increase them even by a reasonable amount if the increase represents a major proportion of the original tariff. A balance will have to be sought between moving towards a full cost-recovery tariff and the impact on customer attitudes and responses.

#### **(iv) Organizational and Social Aspects**

47. The selection and allocation of appropriate staff from the utility to work exclusively with the consultant in the special zone will have a major impact on the success of the zonal approach strategy, as they will have extensive detailed local information on the distribution network and its customers. The consultant will prepare a staffing strategy in consultation with the water utility for the secondment of selected staff and their integration into the project team. The strategy will also include a training programme and knowledge transfer plan to develop the skills of the secondees and also to ensure the long-term sustainability of the special zones and ultimately the whole network as the zonal approach is implemented. A key output of the strategy will be the development of people through leadership and strong management. The strategy will also define lines of communication, operational responsibilities and reporting procedures (for example decisions on valve operations, etc.), and arrangements for liaison with all stakeholders.

48. Stakeholder consultation and, in particular, the provision of information to and feed-back from local residents on what is happening and overall progress and achievements is very important and will require the consultant to develop strong links with the various stakeholders. The consultant will then develop a consultation strategy that promotes good co-ordination and liaison and that fully represents the views of people directly affected by the work. This could possibly be achieved through the appointment of an NGO, home owner association or the local authority to act as the representative of the local community.

#### **(v) Environmental Impact**

49. The consultant will assess the impact of improved service levels and an increased customer base on the environment of the zone. This will specifically include the impact of increased sullage or grey water and the potential for increased use of waterborne sewerage facilities on the existing sewerage, sanitation and drainage systems and the general environment within the zone. This should also include consideration of revised water consumption patterns and the potential for the removal of coping strategies for intermittent water supply, for example ground tanks, pumps and overhead tanks, etc. The consultant will also investigate appropriate solutions to any problems identified, and develop policies and design criteria to satisfactorily address them. Findings and recommendations will be discussed with the appropriate organizations responsible, and a report prepared detailing the proposed improvement strategy to up-grade the zonal environment and minimize potential detrimental impacts.

### **D3. Project Management and Procurement**

50. As the Project Manager, the consultant will be fully responsible for the detailed planning and management of the project as well as for all design work and the preparation of contract documentation. This will include the undertaking of feasibility studies, outline and detailed designs for contracts, preparation of contract documents as well as notices and adverts, bid evaluations including the development of evaluation criteria and weightings, construction supervision and commissioning. As part of his construction supervision duties the consultant will check and

review requests for payments by contractors and recommend approval of those payments, and undertake periodic inspections to identify defective work and subsequent inspections to ensure that remedial work has been completed satisfactorily. The consultant will also issue Substantial Completion and Taking-Over Certificates, etc., and ensure that record drawings have been prepared and are accurate.

51. The consultant will be answerable to, and will liaise closely with, the Zone Utility Manager, who should be free to manage without political interference and would be supported by a small core of competent staff with expertise in relevant disciplines, including commercial operations, engineering, public relations, and environmental affairs. Where existing contractor selection and appointment procedures are considered unnecessarily lengthy then the consultant will propose and agree with senior utility management appropriate new or revised rules and recruitment procedures so that decisions can be delegated, contract disbursements made quickly, and management streamlined. Any revised or new rules should promote transparency and competition, and should also help to eliminate delays and corruption.

52. The consultant will be responsible for packaging the work required into contracts that encourage more local suppliers and contractors to bid for the work. Where there are large procurement or construction requirements then the work will be split into packages such that smaller contractors can be contracted on the same negotiated price basis. This will encourage competition, mobilize and develop local resources and speed up the contracting process and service delivery. The consultant and contractors will liaise closely with local authorities concerning the excavation, reinstatement and resurfacing of roads.

#### D4. Operational Management

53. Operational management of the special zone will be based on the devolution of zone management to the lowest practicable level: the sub-zone caretaker. All caretakers will be accountable to District Managers, Area Managers and ultimately to the Zone Utility Manager. Weekly reports will be prepared by all managers detailing achievements made against targets. The Utility

Manager will issue a weekly summary report for the whole zone, as well as a monthly report for public access on the internet. An annual Development and Performance Report will also be prepared for each special zone.

54. Each sub-zone will be capable of hydraulic isolation, with all inflows and outflows monitored by a District Metering System. All consumers will be provided with new water meters, which will be read regularly by the sub-zone caretakers and bills issued simultaneously every month. Utility staff will computerize all billings and cash payments, and will analyse the results for each sub-zone, with any excessive or low usage investigated.

55. District and consumer meters will be analyzed regularly to determine NRW and to identify trends. Inspections and leak detection exercises will be performed in the sub-zone to determine the physical leakage component from night-time tests, followed by leakage detection surveys in areas where high leakage is occurring. The aim will be to progressively reduce NRW until it is at its lowest practicable level in each sub-zone, aiming for an overall level of no more than 20% in the special zone. Meter analysis and surveys will be undertaken regularly to determine base leakage levels, monitor the situation and identify unacceptable increases in demand that would trigger more detailed surveys and leakage detection and repair programs. Adequate resources should be available in each sub-zone to repair leaks, replace meters, etc., and progressively improve sub-zones so 24 hour supply is established one sub-zone at a time.

### E. Implementation Schedule

Review policy and the political enabling environment	0.5 months
Surveys of utility, consumers and SSWPs	1.0 months
Clarifications and preparation of water audit results	0.5 months
Hydraulic analysis and special zone selection report	1.0 months
Stakeholder consultation and report of findings	1.0 months
Development of registration/license procedures	0.5 months
Financial Analysis (during	1.0 months

stakeholder consultation period)	
Organizational and social analysis (during license development)	0.5 months
Environmental Impact (during stakeholder consultation period)	1.0 months
Project Management and Procurement	31.5 months
Operational Management	permanent
<b>Total Implementation Period</b>	<b>36.0 (thirty six) months</b>

## F. Human Resource Inputs

Enumerators (or students)	1 person month/community
Domestic water supply survey consultant	2 person months/community
Stakeholder consultation facilitator (inc. preparation)	1 person week/community
Domestic financial consultant	2 person months
Domestic water design consultants	12 person months
Domestic specification/contract drafting consultants	6 person months
Domestic sociologist/community liaison specialist	6 person months
Domestic water supply/resident engineers	36 person months
Leakage/metering specialist	12 person months
International consultant	24 person months

(Note: Seconded utility personnel and sub-zone caretakers not included)

## G. Financial Resources

Enumerators, consultants, facilitator	\$
Local transport	\$
Project office and facilities	\$
Stakeholder consultation	\$
Reports / communications	\$
<b>Total</b>	<b>\$</b>

## H. Reports and Deliverables:

### 1. Water Audit and Hydraulic Analysis Report for Zone \_\_\_\_\_

Date

### Part A. Summary of Results of Surveys (Domestic Consultants)

### Part B. Analysis of Results (International Consultant)

This two- part report will be due for completion not later than three months after the start of the assignment.

### 2. Financial Viability and Implementation Strategy Report for Zone \_\_\_\_\_

Date

Local/International Consultant

This report will be due not later than four months after the start of the assignment.

### 3. Environmental Impact Report for Zone \_\_\_\_\_

Date

Local/International Consultant

This report will be due not later than four months after the start of the assignment.

### 4. Report of Stakeholder Consultation on Water Supply in Zone \_\_\_\_\_

Date

International Consultant

This report will be due not later than four months after the start of the assignment.

### 5. SSWP License and Memorandum of Understanding for Community \_\_\_\_\_

Date

Local/International Consultant

The license and MoA will be due not later than four and one half months after the start of the assignment.

### 6. Staffing and Training Strategy Report for Zone \_\_\_\_\_

Date

Local/International Consultant

This report will be due not later than four and one half months after the start of the assignment.

### 7. Final Report for Zone \_\_\_\_\_

Date

Local/International Consultant

This report will be due in draft format one month before the end of the project, with the final report submitted 2 weeks after the receipt of comments.

## Appendices

1. Questionnaire for Water Utility (International Consultant)
2. Questionnaire for SSPWP Piped Water Operators (Domestic Consultants)
3. Questionnaire for SSPWP Water Vendors (Enumerators)
4. Questionnaire for Bottled Water Supplier (Enumerators)
5. Questionnaire for Consumer Survey (Enumerators)