

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

Outline For Consulting Services



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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). 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 access to water may only be for a very short time each day and there is difficulty transporting it home. The core issue is getting connected to piped water promptly and on terms affordable to those living in urban and peri-urban areas, especially the poor. Once connected, people are likely to pay only 1–2% of their household income for piped water.

2. 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 the chances of success can be increased 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.

3. 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.

4. Poor people already pay more for one unit of water than the rich, so affordability is not an issue. As well as technical service improvements the zonal approach 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.

B. Objectives

5. 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. 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

6. 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 (SPVNs)?

- **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.

D. Methodology

D1. Policy and the Political Enabling Environment

7. 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 discuss technical options. Sensitivity needs to be exercised as there could be strong political resistance to providing water services to illegally established areas within the city. 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 therefore critical to the success of the zonal approach.

D2. Technical, Financial and Organizational Analysis

8. The consultant will collect data from all existing databases, reports, maps and drawings of the distribution network and will undertake supplementary surveys to obtain sufficient information to enable a **hydraulic analysis and zone selection** to be undertaken 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, the number of unserved poor in the zone, etc. The consultant will develop a set of selection criteria and a weighting system to prioritise selection of the special zone.

9. The **audit survey** will be undertaken after obtaining formal permission from the local government. *Enumerators* will undertake 5% sample surveys of water consumers in the target areas within the city, and will also survey all bottled water suppliers and water vendors operating in their zone. *Domestic consultants* will supervise the enumerator surveys, and themselves survey all small piped water operators. They will then summarize the results of all the surveys and organize a stakeholder consultation. An *international consultant* will survey the water utility, and analyze and summarise the results of the surveys, including the size of the market and the capacity of SSWPs to meet the unsatisfied demand. A *domestic facilitator* will convene a one-day **stakeholder consultation** to discuss the findings of the water assessment and identify the preferred option to provide piped water supply to the community. Sample questionnaires for all the surveys will be pre-tested by the domestic consultants before use.

10. **Licensing** will provide formal recognition of the SSWP 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. This will provide security of tenure and enable the SSWP to plan with confidence and price his services to obtain an appropriate return on capital during the period of tenure. At the end of the license term the

assets will be transferred to the formal utility. The license will detail 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 and appointment of an independent ombudsman, the license duration, periodic license reviews (if appropriate), exit strategies including ultimately the transfer of responsibility for service provision to the formal utility or extension options at the conclusion of the license period. A reasonable license fee could be charged to cover administration costs. 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 (typically less onerous than those imposed on the formal utility and reflecting local conditions), provision of a bulk water supply if appropriate (if licensed by the Municipality, the SSWP would have legal status and could become a legitimate bulk consumer of the formal utility) and covering maximum/minimum daily volumes, tariff, metering details, remedial actions in the event of supply deficiencies, periodic reviews (if appropriate), etc. The license would be a relatively simple document, with bureaucracy kept to a minimum.

11. The consultant will develop a simple Excel spreadsheet model to assess the **financial viability** of the special zone by simulating the current status of water supply 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. Different scenarios will be studied and recommendations made regarding the optimal strategy to implement the zonal approach in the special zone. 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. 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.

12. The selection and allocation of appropriate staff from the utility to work exclusively with the consultant in the special zone will be undertaken as part of an **organizational review**, 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 modules 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. The strategy will also define lines of communication, operational responsibilities and reporting procedures, and arrangements for liaison with all stakeholders.

13. 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 undertake a **social study** to 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.

14. The consultant will assess the **environmental impact** of improved service levels and an increased customer base on 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 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.

D3. Project Management and Procurement

15. The consultant will be fully responsible for the detailed planning and management of the project as well as 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. Construction supervision duties will include checking and reviewing requests for payments by contractors, and undertaking periodic inspections to identify defective work. The consultant will also issue Substantial Completion and Taking-Over Certificates, etc., and ensure that record drawings have been prepared and are accurate.

16. 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 the consultant will propose appropriate 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 eliminate delays and corruption.

17. The consultant will be responsible for packaging the work required into contracts that encourage more local suppliers and contractors to bid. Where appropriate, work will be split into packages such that smaller contractors can be contracted on the same negotiated price basis to encourage competition, mobilize and develop local resources and speed up the contracting process and service delivery. There will be close liaison with local authorities concerning the excavation, reinstatement and resurfacing of roads. 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.

D4. Operational Management

18. Operational management of the special zone will be based on 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. All operational activities such as valve operations will be the responsibility of utility personnel, and not the consultant or contractors. 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.

19. 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.

20. 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, with 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, and to identify unacceptable increases in demand that would trigger more detailed surveys and leakage detection and repair programs. Adequate resources should be made available to each sub-zone to repair leaks, replace meters, etc., in order to progressively improve sub-zones so that 24 hour supply is established one sub-zone at a time.

E. Implementation Schedule (total 36 months)

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 stakeholder consultation period)	1.0 months
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

F. 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. 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.