# NRW REDUCTION STRATEGY

Water Supply Department

PIMPRI CHINCHWAD MUNICIPAL CORPORATION

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### 1. PREAMBLE :

Potable water is becoming scarcer; often making it more energy intensive to procure. More energy is required to pump water to greater distances and from deeper depth in the ground. This alarming situation and ever increasing population has cautioned everybody to conserve the available water resources and adapt oneself to optimum use of available water. The water supply, as an essential commodity, has to be looked upon from demand side as well as supply side. The urban local bodies, which form the supply side, will have to play a vital role in managing this often-scarce resource. As global urbanization continues, they have the complex task of cost effectively providing water to keep cities functioning. Further in the process of improving overall water system efficiency, energy & water consumption have to be viewed as linked inputs rather than viewing them as separate and unrelated. On the other hand, the demand side which consists of consumers have to be made aware of the present situation of the available water resources, necessary habitual changes required to be made by adopting various means of water conservation, optimal use of available water, re-use and re-circulation of waste water for some activities, frequent inspection and rectification of home appliances to reduce leak & wastage, restricted use of appliances requiring more water, etc.

## 2. PCMC's EXISTING WATER SUPPLY SYSTEM :

- The existing water supply to the Pimpri-Chinchwad city is managed by Pimpri-Chinchwad Municipal Corporation (PCMC). Main source of the Pimpri-Chinchwad water supply system is Pawana dam which is 35 kilometers away from the city and is in the West direction. There is a pick up weir (Ravet-Punavale) on downstream side of the dam.
- Water is pumped from the pickup weir at Ravet-Punavale dam and conveyed to water treatment plant by three mild steel (MS) pipe pumping mains (1053 mm for 228 MLD, 1165 mm for 100 MLD and 1400 mm 100 MLD). Treated water is pumped to Master Balancing Reservoirs (MBR) at WTP site and then transmitted by pumping/gravity through the transmission mains of 188 kms to more than 85 Elevated Service Reservoirs (ESR's) in the city.
- This water from the ESR's is distributed through the distribution network of length of 1800 km. The system presently covers almost 100% of the developed areas including the slums. The newly added areas are currently being catered to by tanker supply. The distribution system in the city is based on both gravity and pumping.
- The distribution system in the city is based on the division of the entire city into two distinct parts on the basis of its topography, created by the ridge running in the east-west direction. Gravity Zone, comprising areas south of the ridge and sloping towards Pawana river. Pumping Zone, comprising areas north of the ridge and sloping towards the Indrayani river.
- There are total 1,41,716 service connections in entire PCMC area as per details shown in Table below;

**Table No 1. Details of House Connections**

| Category | Number |
|---|---|
| Total Connections | 1,41,235 |
| Metered Connections | 1,31,516 |
| Un-metered Connections | 2,862 |
| Slum Connections | 6,857 |
| Non Domestic Connections | 4,003 |

## 3. NON REVENUE WATER (NRW) :

- **What is Non-Revenue Water (NRW)?**

  The difference between the amount of water put into the distribution system and the amount of water billed to customers is known as Non-Revenue Water (NRW). NRW is made up of real losses and apparent losses. Real losses occur in distribution systems, service connections, bursts and storage tanks (including overflow). Apparent loss includes meter and record inaccuracies and unauthorized water uses such as theft and unauthorized connections authorized unmetered uses can also be considered as one of the components of NRW.

- The service level benchmark for NRW is 20%. There is considerable scope for reduction of NRW in almost all cities of the country. Though reduction of NRW is a very big challenge, there have been examples of successful reduction of NRW.

- **Different Elements of NRW Reduction Strategy identified are :-**
  - Water Audit & Water Balance
  - 24x7 Water Supply
  - District Metered Area (DMA)
  - Supervisory Control & Data Acquisition (SCADA)
  - Network Mapping
  - Leakage Mapping
  - Regularization of Public Stand Posts (PSP)
  - NRW Cell
  - Capacity Building
  - Tariff Structure

## 4. PCMC's NRW REDUCTION STRATEGY :

- **24 X 7 Continuous Pressurized Water Supply Project**

  Pimpri Chinchwad Municipal Corporation has planned to undertake the prestigious project of Converting existing Intermittent Water Supply System to Continuous Pressurized 24x7 Water Supply System for the entire city.

  In the first phase, PCMC has proposed to convert intermittent water supply system to continuous (24x7) water supply system in the 40% area covering a population of about 8 lakhs. The improvement work will be executed under JnNURM sanctioned funding for indicative project cost of Rs. 143 Crore for the selected 40% project area of PCMC. The area is so selected that there is enough storage and no new tanks are required to be constructed. The project would aim at improving Technical & Commercial efficiencies and upgrading existing intermittent supply for continuous pressurized water supply & reduction in non revenue water & demand management to bring down the gross water consumption as per the norms. At present, the selection of Operator for the said project is in its final stages.

  In the second phase, a project under water supply for 100% Coverage and Reduce NRW has been sanctioned for PCMC under Central Government's AMRUT Mission. PCMC plans to undertake this project wherein the final objective of the project shall be to convert intermittent water supply system in the remaining 60% area of PCMC to continuous (24x7) water supply system. At present, Detailed Project Report for the said project is being prepared.

- **Components included in the 24x7 Water Supply Project (40% Area) for achieving NRW Reduction :**
  - Setting up correct zones for each ESR / GSR: Operational zones are demarcated with respect to ESR/ GSR's capacity and serviceability.
  - Setting up District Metering Areas (DMA): District Metering Areas are set up for each correct operational zone for the number of customers between

500 to 2000. These DMA's shall be made hydraulically discrete (isolated) by carrying out zero pressure tests. Flow into the each DMA shall be metered and continuously monitored. Also, Pressure Control Valve's (PRV's) shall be installed at more than one point as per the site requirements. Analysis of water flow and pressure, particularly in the night when most users are not drawing water will enable Leakage Specialists to identify leakages and calculate the level of leaks in that particular DMA.

- Detailed survey and investigations of transmission and distribution network shall be carried out. The entire Transmission and Distribution Network shall be mapped by using GIS Mapping tool and this shall facilitate to carry out effective and accurate Hydraullic Modelling of the entire system. Out of the total selected area of distribution pipe network, a few kilometers of pipeline shall be replaced. Thus, after replacement, NRW can be brought down considerably as the pipes will be new with good joint system.
- House service connections: All house service connections shall be replaced by using MDPE pipe. It is a known fact that more than 50% of the leaks appear from Service Connection, old discontinued connections and leaks at ferrule points. Also, the service connections are made of Galvanized Iron (GI) pipes which have effective life of less than 15 years depending upon the soil condition in which it is laid. The age of connections in the maximum PCMC area is more than 15 years which would mean that many of the service pipes have live their life and need replacement. Thus, this House Service Replacement program will amount to a huge NRW Reduction.
- Bulk and consumer metering: Bulk meters shall be installed with a provision of creating a graph of minimum net night flow V/s. hours by sending SMS to the control room.
- Leak identification: Identify the leakage areas by conducting step tests and gathering data from the data loggers. Exact location of leak spots shall be

then fixed using leakage identification instruments such as injection of helium gas, sounding rods, noise-corelator etc.

- NRW reduction: Once the commercial and physical losses are known, measures shall be taken up to bring them in accepted limit.
- Water Balance: Components of water balance such as authorized billed meter consumption, authorized billed unmetered consumption, unauthorized consumption due to thefts, metering inaccuracies, leakage in transmission mains, distribution house service connection shall be computed and water audit will be carried out.
- SCADA: PCMC has already installed SCADA system for its water supply monitoring and control purpose. The current SCADA system is installed upto ESR level. In the said project, PCMC plans to extend the SCADA beyond ESR levels, interface it with the existing & new instrumentation for distribution system management and integration with web enabled facility.

- Consumer Awareness Programs :
  - PCMC plans to undertake all measures which shall promote the benefits of project and create public awareness about 24x7 water supplies. A separate Public Relation team shall be appointed which will ensure cordial communication between Contractor, PCMC, Public Representatives, NGOs, consumer forum, Media, other Government Authorities, etc.
  - Public Campaigns for the project & water conservation while conversing DMA's in to 24x7 Water Supply shall be undertaken.
  - Internal water audit or leak test for consumers those having history of high consumption shall be conducted. A list of such consumers shall be identified and maintained.
  - Checklist of probable leak points to consumers of DMA's shall be provided as a part of awareness programme.
  - Residents Welfare Association (RWA) / notified societies shall be informed about time table for digging & restoration work within the colony.