



24 x 7 Water Supply System and Consumer Satisfaction

**Submission for
United Nations Public Service Awards 2019**

**Category – Delivering inclusive and equitable services
to leave no one behind
(in alignment with the 2030 Agenda – Goal no.6)**

**Hydraulic Department
Surat Municipal Corporation
Surat - 395 003
Gujarat**

Executive Summary

Surat Municipal Corporation (SMC) is a local self government which has come into being under the Bombay Provincial Municipal Act, 1949. It carries out all the the obligatory functions and discretionary functions entrusted by the BPMC Act,1949 with the following mission:

“To make Surat a dynamic, vibrant, beautiful, self-reliant and sustainable city with all basic amenities, to provide a better quality of life”

Surat is a city located on the western part of India in the state of Gujarat. It is one of the most dynamic city of India with one of the fastest growth rate due to immigration from various part of Gujarat and other states of India. SMC caters various municipal services to the citizens of Surat City. In terms of population and area under the jurisdiction of Municipal Corporation, it is 2nd Largest in Gujarat. Population being served is more than 5.8 Million presently under the jurisdiction of SMC with total geographical area of 326.525 sq.km. Surat Municipal Corporation perceives its role as the principal facilitator and provider of services to provide a better quality of life

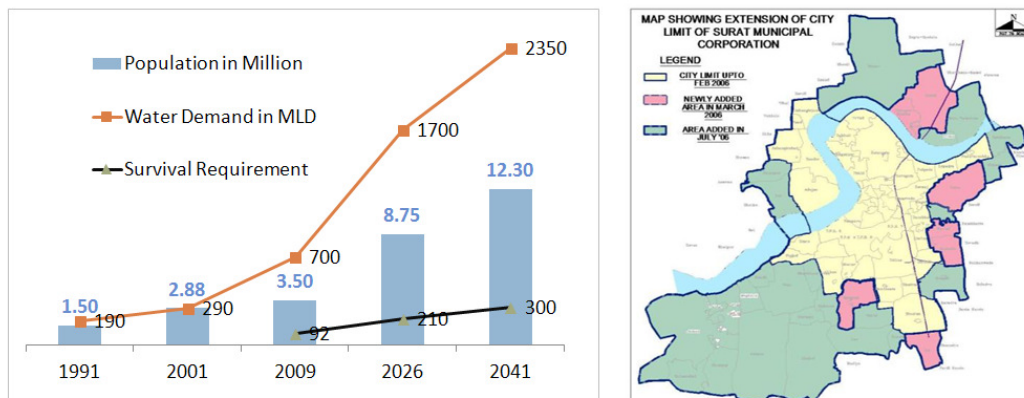
Surat City is located on the bank of River Tapti and near Arabian sea. The City has been declared as a city which is vulnerable to the effects of climate change and therefore, in 2008, under Asian Cities Climate Change Resilience Network (ACCCRN) program city has been selected to assess the potential effects of Climate Change. Various sector study were conducted including water, flood, environment, health and energy. Moreover, based on study conducted for individual sectors, City Resilience Strategies were prepared for its implementation in short term and in long term.

Water Supply, being a critical municipal service amongst all, various measures as envisaged under City Resilience Strategies, is being implemented so that overall objective of supplying life line water supply in any eventuality can be satisfied.

Water Supply Master plan is prepared in consideration to the population of Surat City in 2041 and water demand thereby. All major projects are implemented / being implemented in accordance to

the requirement so as to meet the water demand in 2041

Projected Water Supply Demand



Year	2026	2041
Population	87.48 Lac	123.04 Lac
Water Demand	1682.63 MLD	2331.67 MLD

Surat Municipal Corporation has started implementing 24 x 7 Water Supply Scheme with 100% consumer metering in the extended area of Surat City. Identified area of it is made operational with 24 x 7 water supply scheme which has resulted in enhancing the satisfaction level of citizens. Door to door survey is made to ensure the satisfaction level of consumer and service delivery. For the same, academic institute has made survey and concluded that the citizens are much satisfied with the implementation of 24 x 7 water supply schemes. Moreover, with the implementation of 24x7 water supply scheme in extend area has resulted in water loss well within the Service Level Benchmark norms. Having realized the benefits of implementation of 24 x 7 water supply scheme, same is being replicated in other area of Surat City

1.	Brief Overview of the project
	<p>After the expansion of city limit under the jurisdiction of Surat Municipal Corporation, area of Surat City has become 326 sq. km. and out of which, old city area with area of 112 sq.km. is having piped water supply scheme with intermittent water supply duration. With city limit extension, area merged in city limit was having age old Tube well / Bore well based water supply scheme with inadequate quantity and quality of water. Out of total newly merged area, this initiative highlights the efforts made by Surat Municipal Corporation toward the implementation of 24 x 7 water supply scheme in areas called “New North Zone” of Surat City for satisfying the drinking water demand in year 2026 and 2041.</p> <div> <p>SURAT CITY-NORTH ZONE</p> <p>AREAS INCLUDED:-</p> <ul style="list-style-type: none"> ✓ MOTA VARACHHA ✓ UTRAN ✓ AMROLI ✓ CHHAPRABHATHA ✓ KOSAD ✓ VARIIV </div> <p>Details of Area</p> <ul style="list-style-type: none"> • Total Residential Area - 1955.38 Ha. • Population - <ul style="list-style-type: none"> ○ 4 Lac (Year 2013) – Base year of implementation of Scheme ○ 6.54 Lac (Year 2026) – Future population ○ 10.47 Lac (Year 2041) - Future population • Water Demand - <ul style="list-style-type: none"> ○ 72 MLD – Base year ○ 118 MLD – Year 2026 ○ 188 MLD – Year 2041 <p>In year 2006, jurisdiction of Surat Municipal Corporation has expanded to 326.515 sq.km. With such expansion, need has been realized to augment the existing water supply system in old city area of</p>

	112.28 sq.km and to prepare Blue Print for the new area in consideration to the population and water demand in year 2026 and 2041. Blue Print is prepared and planning is done in consideration to the 24 x 7 water supply in future instead of present intermittent supply. City Development Plan (CDP) has been prepared as per JnNURM guidelines based on the water supply Master Plan. <u>Special focus has been given to cover urban poor under water supply network and with a mission that Poor of the poorest gets safe & reliable drinking water on 24 x 7 basis</u>
2.	Challenges faced before deployment of the project
	<p>Prior 2006, area merged under City limit under the jurisdiction of Surat Municipal Corporation was having age old intermittent and worst kind of water supply system. The source of supply was bore well. So, after city limit expansion, it was a challenge to cater water supply even on intermittent basis through available infrastructure.</p> <p>There was no clear source of water for them, distribution network which was being maintained were of PVC network. Supply duration was not sure.</p> <p>Hence, area based master planning was done in consideration to the population upto year 2041 and water demand thereby. The project design made for the area is 24 x 7 water supply scheme with 100% metering</p>
3.	The objectives of the project
	Supply of potable water on round the clock basis based on 24 x 7 pressurized water supply system to each and every consumer and with 100% metered connections
4.	Description of the solution implemented. Please describe the governance practice involved
	<ul style="list-style-type: none"> • Detailed Project Report worth Rs.160 Crore got sanctioned for execution of 24 x 7 water supply scheme exclusively for New North Zone area of Surat City. The scheme got sanctioned under JnNURM • All infrastructure components got designed for meeting water demand for population in year 2026 and 2041 • Detailed survey has been made to assess and evaluate the water demand, forecast population, area development etc. • Consumers falling in extended area were having bore well / tube well water supply

network. Since water was available with the old system, willingness of consumer to switchover to new 24 x 7 water supply system was major challenge.

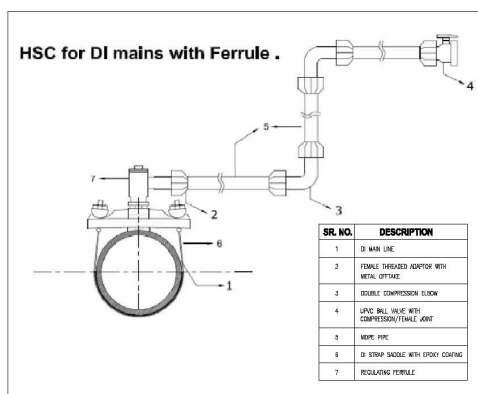
- Also, once executed, operation and maintenance of entire water supply scheme was major challenge since no major recruitment was done in water supply department since the area expansion. Hence, decision was taken to outsource the entire water supply scheme for O&M of scheme. Operator requires issuing the bill according to the consumption of water, collection of bill, reading of meters, maintenance works etc. Water Tariff is decided by Surat Municipal Corporation.

Sr. No.	Components	Capacity / Number
i.	Source of Water Supply	Surface water of River Tapti
ii.	Intake well	200 MLD (executed in consideration to the water demand of year 2041)
iii.	Water Treatment Plant	90 MLD + 32 Million Liters per Day (MLD) (Two WTPs) – Executed in consider to the water demand of year 2026
iv.	Water Distribution Stations	4 (Four) Storage – 32.6 ML
v.	Elevated Service Reservoirs (ESRs)	15 (Fifteen) Storage Capacity – 29.1 ML
vi.	Length of Distribution Network	210 Km.
vii.	Consumer connections	More than 20243
viii.	Major consumers	Residential with 0.5” size connections

Major Infrastructure components like Water Treatment Plants, Distribution Stations, UGSRs, ESRs, Transmission and Distribution Network etc. under 24 x 7 Water Supply Scheme is implemented in all manners in year 2013. Except Intake well, all other components are constructed in consideration to the water demand of year 2026.



Consumer connections are given with consumer metering is implemented as soon as distribution network completed. House Service Connection (HSC) with HDPE pipe material is installed at house hold level.



5. Details of coverage of the targeted population

- Total population of the city presently under the jurisdiction of Surat Municipal Corporation is around 55 Lac.
- Percentage coverage of population under piped water supply network as per Service Level Benchmark of 2015-16 is 95%
- Total population covered under this project for catering 24 x 7 water supply – Around 6 Lac presently
- Major consumers – Residential
- Also, city was having pocket of urban poor who were residing on the bank of river Tapti. They were shifted in this area and given house under EWS scheme (executed by

	Surat Municipal Corporation) Around 18000 Units were occupied by Urban Poor in this area where 24 x 7 water supply scheme is made operational																																														
6.	Comparison of the pre-development scenario and post deployment benefits. Explain how the solution has helped.																																														
	Dedicated Consumer satisfaction survey has been carried out in this area to ensure the success of the water supply scheme and extent of satisfaction																																														
	<table border="1"> <thead> <tr> <th>Sr. No.</th><th>Parameters</th><th>Before implementation of scheme</th><th>After implementation of 24 x 7 water supply scheme</th></tr> </thead> <tbody> <tr> <td>i.</td><td>Source</td><td>Bore well (Ground water)</td><td>Surface water</td></tr> <tr> <td>ii.</td><td>Quality of water at consumer end</td><td>Worst (Muddy, Turbid having no Chlorine level)</td><td>Clear water with adequate chlorine level</td></tr> <tr> <td>iii.</td><td>Availability of water</td><td>Highly interrupted, unreliable</td><td>Round the clock – 24 x 7 basis</td></tr> <tr> <td>iv</td><td>Vulnerable to water borne diseases</td><td>High</td><td>Very low</td></tr> <tr> <td>v</td><td>Appreciation in property</td><td>No</td><td>High appreciation in property due to availability of 24 x 7 water</td></tr> <tr> <td>vi</td><td>Affordability</td><td>Very low reliable system</td><td>Affordable – Per month average bill is around Rs.90</td></tr> <tr> <td>vii</td><td>Satisfaction level of Male member</td><td>Low</td><td>Very high</td></tr> <tr> <td>viii</td><td>Satisfaction level of Female member</td><td>Low</td><td>Very high</td></tr> <tr> <td>x</td><td>Earning capacity</td><td>--</td><td>Have increased since all family members can now go for service / earning</td></tr> <tr> <td>xi</td><td>Requirement of storage</td><td>Always required since low assurance of supply</td><td>No need to store the water since water is available all the time.</td></tr> </tbody> </table>	Sr. No.	Parameters	Before implementation of scheme	After implementation of 24 x 7 water supply scheme	i.	Source	Bore well (Ground water)	Surface water	ii.	Quality of water at consumer end	Worst (Muddy, Turbid having no Chlorine level)	Clear water with adequate chlorine level	iii.	Availability of water	Highly interrupted, unreliable	Round the clock – 24 x 7 basis	iv	Vulnerable to water borne diseases	High	Very low	v	Appreciation in property	No	High appreciation in property due to availability of 24 x 7 water	vi	Affordability	Very low reliable system	Affordable – Per month average bill is around Rs.90	vii	Satisfaction level of Male member	Low	Very high	viii	Satisfaction level of Female member	Low	Very high	x	Earning capacity	--	Have increased since all family members can now go for service / earning	xi	Requirement of storage	Always required since low assurance of supply	No need to store the water since water is available all the time.	<p>Water Loss Monitoring 24 x 7 Water Supply is being operated and maintained by private operator for 5 years, wherein, crucial performance indicator is the monitoring of water loss from Source to Consumer and control over water loss with reference to Service Level Benchmark (SLB). Water meters are installed at Intake well, out let of Water Treatment Plant, out let of distribution stations / ESRs etc. This helps recording the water being dispatched from individual points. On monthly basis,</p>	
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water auditing is being done from source to consumer, wherein, it has been observed and realized that the total water losses from source to consumer is 14%

Satisfaction Level of Consumer

In order to find out the satisfaction level of 24 x 7 water supply scheme in New North Zone area of City, Department of Business and Industrial Management (DBIM), Veer Narmad South Gujarat University has been engaged. The objectives of the study were:

- i. To find out the practices of the consumers before and after the supply of 24X7 water distribution services of SMC
- ii. To find out the views of the consumers related to 24X7 water distribution services by SMC

The research approach adopted for the study was quantitative. The research method used was a survey method. The sample unit was the resident of the area where these facilities are available. The sample size for the study was 127 and the sampling procedure was non probability sampling technique. The instrument used was a structured- undisguised questionnaire. There were both male and female respondents. Institute tried to find out if there was a difference of opinion between the males and the female respondents.

The reliability of the instrument was measured using Cronbach alpha test. The Cronbach Alpha score was 0.897 signifying that the instrument is reliable.

Change in Practices after 24X7 Water Supply by SMC

- The 24 x 7 Water Supply by SMC has definitely affected the practices of the consumers regarding storing of water, throwing water filled earlier leading to conservation of water.
- Time saving is there as they do not have to waste time in standing in a queue for water filling.
- These services have also lead to better health of the consumers as evident from the responses.

Views related to 24X7 Water Supply by SMC

- The consumers feel that the major benefits that have emerged due to 24X7 water supply relate to time, as time is saved and this saved time could be used for productive purposes like earning more.
- The respondents are satisfied with the quality and quantity of water supplied.
- Ladies are more satisfied with the quality of water supplied by SMC.

Other benefits realized through the establishment of 24 x 7 water supply scheme.

- Improvement in the living conditions of the Community and appreciation in the value of properties in New North Zone area.
- Changes in the practices of consumer is observed for conservation of water and maintaining hygienic conditions.
- Socio-Economic pattern have changed drastically having realized the availability of 24 x 7 water on door step. Confidence built up in community, changes in behavioral attitude and responsibilities etc

Present performance

Sr. No.	Parameters	Performance
i.	Total Water Supply	45 Million Liters per Day
ii.	Total House hold connections covered under 24 x 7 water supply scheme as on date	20243
iii.	Total numbers of domestic consumer meters installed till date	20243
iv	Mode of Scheme operation	Through deployment of Private Operator for 24 x 7 water supply scheme operation and maintenance for 5 years
v	Scheme handed over for operation and maintenance in year	August 2013
vi.	Role of Private Operator under scheme	<ul style="list-style-type: none"> • Overall of operation and maintenance of scheme, • Water Loss measurement and reduction • Consumer connection, leakage repairing • Metering, meter reading, billing and collection • Water quality monitoring and control from source to consumer in adherence to IS 10500-2012
vii	Average water loss observed from source to consumer	13.68% (Average)
viii	Per month O&M expenditure (Rs./Month) – Oct. 2018	Rs.3.9 Million per Month (INR)
Ix	Revenue Collection (Rs./Month) – Oct.2018	Rs.5.5 Million per Month (INR)

Moreover, in order to create the awareness related to importance of Water and water

conservation, various IEC activities are being carried out along with the promotion of 24 x 7 water supply scheme. Presently, on world water day – 22nd March every, a workshop was organized with the subject of “Role of Women in Water Conservation”, wherein leading women personalities in Surat, all women councilors, NGOs / Activists are called to share their views related to Water Conservations. More than 150 women across the city have participated including the 1st lady of the Surat – Hon. Mayor Shri – Smt. Asmita Shiroya.



7.	Key learning from the project
	<ul style="list-style-type: none"> • Surat City is blessed with the availability of surface water of River Tapti. However, it is the need of the hour to conserve water and for the same every act and practices from source to consumer should help assessing the potential of conserving the water. Hence, from organization point of view the provision of 100% metering, water auditing should be made mandatory. • Also, acceptance level depends on the area where such scheme is being implemented. Surat City has got diversity in terms of development, economic activities and community too. Hence in order to make scheme / project successful, henceforth, department is targeting the area where development (infrastructure wise and with other essential services like roads, street light, sewerage facilities, etc.) is done in adequate manner • Surat Municipal Corporation functions as per BPMC Act and therefore, confidence level of ward councilors is mandatory to percolate the message and benefits to citizens.
8.	Note on the cost effectiveness of the project
	<ul style="list-style-type: none"> • The project of 24 x 7 water supply scheme is working satisfactorily since last more than 2.5 years and having surveyed the area to seek the opinion of the consumers, customers are satisfied with respect to the service delivery. • Consumer connections are 100% metered and as per the actual consumption of the water, consumers are billed. • Present cost recovery is 100%. • Extent of losses being observed is 13.68% presently, which is well within the Service Level Benchmark norms of 20% • Overall O&M cost from Source to Consumer is Rs.3.5 per KL which is less than the overall city level O&M cost of Rs.4.20 per KL • Assured quality of water in accordance to drinking water standard IS 10500-2012 in adequate quantity and without the need of storage at house hold level.

9.	<p>Future road map of the 24 x 7 water supply system in Surat City</p> <p>Total Area under the jurisdiction of Surat Municipal Corporation is 326.525 sq.km, out of which, Agricultural, river Tapti and alike area is 108 sq.km. Hence, there is total area of 218 sq.km. wherein water supply remains to be established. Out of this, Out of total 218 sq.km. area, 24 x 7 water supply components for</p> <ul style="list-style-type: none"> • 17 Sq. km (New North Zone) is commissioned in operation since last more than 2.5 years • 59 sq.km (Part – New North Zone, East / South East, Vesu-pal, Ved-dabholi, Ashwnikumar etc) which shall be commissioned by Mar.17 • 32.5 sq.km of area (Jahangirpura – Jahanigrabad) shall be made ready by Mar.18 • 21.0 sq.km of area (west / south west) under planning • 8.5 sq.km of area (Central Zone) under feasibility <p>Hence, Extended area of Surat City other than New North Zone is also ready with required infrastructure in accordance to 24 x 7 water supply and in same manner, old city area where intermittent water supply is being managed presently, is planned to convert in 24 x 7 water supply scheme in phased manner.</p>
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