PUNE RESEARCH DISCOVERY ISSN 2455-9202
AN INTERNATIONAL JOURNAL OF ADVANCED STUDIES VOL 9, ISSUE 4

24x7 WATER SUPPLY PROJECT AT BIDAR TOWN

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General Information

The North Karnataka Urban Sector Investment Programme aims at improved urban infrastructure and services resulting in overall improvement of quality of life in 25 Investment Programme ULBs, related increase in economic opportunities and growth in North Karnataka, and reduced imbalances between North Karnataka and the rest of the State. To achieve this impact, the Investment Program has helped the ULBs for rehabilitate existing urban infrastructure facilities and construct new ones, including 24x7 water supply, sewerage and drainage, along with urban transport improvements. The living environment of urban slums has improved with the provision of basic services. The Investment Programme also includes firefighting capacity improvements, tourism infrastructure improvements, and lake rehabilitation. The Investment Programme has supported the institutional reforms and training for ULB staff conducted under NKUSIP.

Introduction of 24x7 Water Supply

The Government of Karnataka (GOK) through Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) has prepared the North Karnataka Urban Sector

Investment Programme (NKUSIP). The goal of the programme is to improve the level, quality and stability of basic urban service in selected Urban local bodies (ULBs), contributing to improved quality of life among the urban poor. The NKUSIP is consistent with GoI's urban reform objectives for the Tenth Plan period in improving the quality of life among the urban poor. It entails a reform agenda to initiate the following process.

Improved basic urban services within the identified Investment Programme ULBs and the improved sustainable infrastructure services that may benefit the agriculture industry and Tourism sectors.

The Investment Programme like

(i) Improve urban services for at least 4.5million people living in the 25 selected ULBs towns.

(ii) Improve and sustain infrastructure services within Investment Programme ULBs, which, in turn, will benefit the agriculture, industry, and tourism sectors.

(iii) Promote PSP in selected sub sectors with the aim of bringing in a proper incentive framework for efficient and equitable service provision and of linking the private sector's financial liquidity with the large investment requirements in the urban sector.

The local bodies surrounding the city limit are rapidly getting urbanized by the migration and thereby **the local bodies are in urgent need of providing basic infrastructure one of which is 24x7 Water supply facilities.**

Getting pure water is the most important thing in life. Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Improved water supply and sanitation and better management of water resources, can boost countries' economic growth and can contribute greatly to poverty reduction.

In 2010, the UN General Assembly explicitly recognized the human right to water and sanitation. Everyone has the right to sufficient, continuous, safe, acceptable, physically accessible and affordable water for personal and domestic use.

Hence under Branches of NKUSIP 02BDR01, 02BDR01A and 04BDR01 of the Investment Programme, **Bidar ULB was been selected for 24x7 water supply project.**

Pre-24x 7 water supply scenarios

There was no water treatment facility was in Bidar Town since the water supply scheme was been commissioned in the year 1992. The existing water Supply system consists of intake works with pump house, raw water transmission mains, feeder mains, service reservoirs, distribution PVC pipes, valves etc.ThePre- 24x7 water supply system was highly insufficient water supply ranging over a brief duration of hardly 1-2 ½ hours once in 5-6 days, covering around 35% of the total population living in constructed residential areas. The situation was appalling throughout the year and the woes of the residents would only manifest in various degrees during summers.

The town was getting only 8 to 9 MLD of water was been produced in Bidar Town from Manjra source about 16 KM from City which use to serve only for old city. The old water supply system was evolved over a long period of time, even as management of water supply due to shortage of water availability from the existing sources and problems compounded by old, rusty and leakages in distribution network and main feeder, lack of unscientific O&M system and care-free attitude towards economic and efficient use of water by consumers in the absence of metering system had become difficult and strenuous task for this fast growing town. Around an unaccounted flow of 48% of precious water was flowing out waste, a matter of serious concern indeed.

- Absence of accurate information –existing utilities, networks data, customer data etc
- Absence of bulk water meters
- Absence customer meters
- House Service Connection without control taps
- 1 to 2 ½ hours water supply with low pressure once in every 5to 6 days.
- Supply of water at odd hours (during night) due to staggering of water supply timings.
- No reliable supply timings
- No Chlorine contamination in distribution water, only bleaching powder was been used
- Low water pressure in distribution network
- Very poor or limited customer service

- Low coverage; customers had alternate source.
- Poor quality of materials used; low quality PVC pipes, jointing materials etc.
- Use of un-scientific methods in O&M.
- No overall accountability to customers.

The Bidar town is a fast growing city. Potable water was essential for its growth. Water shortage in most of area was common scenario in Bidar CMC area. The management of water supply was very difficult and strenuous task in earlier.

- Water storage capacity was inadequate.
- Low water pressure or inadequate water supply was a cause of concern in certain areas.
- Old, Rusty and leaking distribution network and feeder main at varies places.
- Tap connections are not having controls.
- Water metering system is non-existent.
- Contamination of water in the storage/poor distribution system.

Introduction of 24x7 Water Supply and Basic Data

Under Branches of NKUSIP 02BDR01 and 04BDR01 of the Investment Programme, **Bidar ULB was been selected for 24x7 water supply project**

Bidar City Municipal Council is one of the urban local bodies in North East Karnataka State in Bidar District. The local bodies around the city are rapidly getting urbanized by the migration and settlement of the people from the rural areas on the outskirts of the city. Hence, the local bodies are in urgent need of providing basic infrastructure facilities like water supply, sewerage system, storm water drain, road, street light and solid waste management

Bidar CMC draws water earlier from the old Manjra Water Supply Scheme of 16 MLD is presently defunct. Hence, presently water supply is only from the Karanja River from Karanja Dam and new Karanja scheme is of present 28 MLD capacity, the filtration plant of the scheme has a treatment capacity of 46mld. The maximum production of water in Bidar City is 28mld at present. Actual production and availability of water is less due to the following reasons:

a) Due to abounded of Manjara Source supplying quantity of 16 MLD defunct during the year 2014 from Janawada IPS for Old city 6 zones, this shortage of bulk supply overloads to Naubad IPS which is designed for 13 OHT's in 28 MLD.

b) WTP is designed 28 MLD for Intermediate stage for the year 2026& 59 MLD is designed for ultimate stage for the year 2041.

c) Due to inadequate of pumping machineries installed at Jackwell, WTP, Naubad IPS, the required bulk quantities of 42mld at the rate of 135 lpcd unable to draw at present due to reduction of efficiencies of pumps.

Surface Water of Karanja Dam

Karanja dam and reservoir is located at a distance of 22 Km from Bidar City. Karanja River is a tributary of Manjra River, which joined river Godavari and adequate amount of water is available for 24 x 7 water supply to Bidar. The Water is drawn from Karanja Reservoir from Intake Channel of 510 m length provided from lowest level of 574.00 mts in reservoir to Jackwell. A Jack well cum pump house is constructed on the bank of the reservoir near the Existing Lift irrigation Jack well.

Ground water source

Ground water in Bidar Town occurs mostly under water table (phreatic or unconfined) conditions in major part of the Town while in very limited part, In Bidar City, ground water is drawn through 29 open wells and 220 bore wells fitted with hand pumps.

Total supply is estimated at 1.90 MLD. it is likely to be under sub-confined conditions created by the presence of discontinuous thin beds of clays which act as confining bed and keep the water in the underlying sand, gravel and boulder horizons under pressure. As these clays are not continuous all over the area and occur at different depths in the form of lenses, the ground water basin behaves as water table or unconfined aquifer system.

Population Projection

Per capita water demand of 135 LPCD with 15% losses considered for the demand projection. The demand projection used under NKUSIP project is considered for the preparation or DPR. The projected demands for various horizon years are as follows.

Demand	Per capita water demand of 135 lpcd with 15% losses has been considered for the demand projections.

	Year 2011 (Base year)		Year 2026 (Intermediate Year)		Year 2041 (Ultimate year)	
	Population	Demand (mld)	Population	Demand (mld)	Population	Demand (mld)
Water demand including 15% losses	245105	28.18	368355	42.36	519332	59.72

24X7 Water Supply Source

Karanja River is considered as a dependable source under ongoing NKUSIP project. The Karanja River is a tributary of the Manjira River; the river basin is up to 2,422 km.sq.

The Karanja river is perennial river. It flows over a distance of 74 km with Karanja reservoir being major water source.

At present there is one Water Treatment Plant constructed under KUIDFC in Bidar City, Water Treatment Plant (WTP) of capacity of 28 MLD for the intermediate design period (2026) is constructed at Nirmanahalli Tanda. However design has been done for 56mld to meet the future demand. The WTP is designed and constructed for ultimate design period. The location of the water treatment plant is decided in such a way that gravity flow is possible from the clear water reservoir of the water treatment plant to Bidar City (Naubad IPS). From naubad IPS water pumped to 13 Zones using Pumpset 400HP x 355 LPS x 54m head (M/s WPIL Ltd) & from Janawada IPS water distributed to ESR's by using Pumpset of 170Hp X 238 lps X 52 m head for 6 zones (1,2,3,4,17,18). which is in working condition. The capacity of the existing treatment plant(14.50MLD) commissioned and executed in 2015 is capable of meeting the demand of the projected population for the year 2041 and the same is being utilized for 24X7 water supply system.

There are 19 ELSR's and as per demand (59.75mld) the total SR capacity required is 18.67 ml. In Bidar seven (7) Nos. of Elevated Service Reservoirs are constructed under NKUSIP Tranche II. The constructed ESR's are located at Pratapnagar, Chidri, Lalwadi, Ambedkar colony, Gumpa, ManiyarTaleem and Mailur. Balance 12 OHT's in which KUWS&DB constructed 5 ESR's are located at Auto nagar, Shivnagar, KHB, Fort, Choubara and CMC constructed 7 ESR's are located at Janwada, Mangal pet, Mohan Market, Devi Colony, Gandhi Gunj, Basavanagar & Lidkar Colony.

The CMC area has been divided in to 19 zones with each Service Reservoir covering each zone and out of 19 zones 14 zones are covered by NKUSIP- 24x7 works and 5 zones are covered by KUWS&DB- 24X7 works. Which serves the particular areas, now it was ascertained that KUWS&DB did 78.43Km of distribution system with 1700 numbers of house service connections. The distribution network consists of HDPE/PE-100/PN-6 Pipes of diameters ranging from 63mm to 355mm. The total length of distribution network under KUIDFC Package II & IV is 287.00 Km + Under KUWSDB 78.00 = Overall at present 365.00 Kms.

Benefits and importance of preserving water and 24x7 water supply

The 24x7 water supply system is essentially a service level bench mark for all such institutions/agencies engaged in providing water to the citizens as observed by the **Union Ministry of Urban Development**. The system ensures every consumer access to pure, safe and continuous water at full pressure 24 hours a day, seven days a week.

IMPROVEMENTS IN SERVICE LEVEL			
SLNO.	**BENCH MARK**	**BEFORE**	**AFTER**
1	Per capita water supply	Average55 LPCD	Average 135 LPCD
2	Supply Frequency	1-2 hrs in 4 to 5 days.	Present 24X7 water supply in Zone nos-9&15
3	Non Revenue Water (NRW)	48%	Avg 36.00% maintained
4	Pressure at Consumer end	Below GL	Min of 7mpressure maintained in 4 Zones (ZoneNos.6,9,14 & 15)
5	Quality of water	Not assessed Periodically	Assessed dailyand third party test twice in month
6	Redressal of complaint	No time limit	24 hrs
7	Public tap	655	No public tap
8	Coverage	40%	100%
9	Metering	No meter	100% metered
10	Billing & collection	Flat rate	Volumetric
11	Collection	9.83%	22%
12	Customer Satisfaction	Not satisfied	Moderate Satisfied
13	Unauthorized connections	40%	less

Operation & Management

Safe drinking water becomes a scarce resource and the wastage of water has to be minimized at all levels. In view of the water conservation & management, minimize the loss, assured pressurized 24x7 Water supply and customer complaint redressal, it was decided to entrust the operation & management of 24x7 water supply to a private experienced agency which can perform all the above tasks. Whenever there is a newly constructed household engaged in fetching water from far and nearby sources no more miss their school.

Benefits to ULB after the 24/7 WS

- After implementation of 24X7 water supply scheme, the ULB is expected to have considerable savings every year.
- 24/7 water supply reduces the wastage of water by the consumer. Consumer will stop storing water and a common practice under 24x7 water supply regime. It results in reduction of non-revenue water. This should result in saving of potable water.
- The concept of user pay will be systematically implemented.
- Complaints of consumers will be redressed then and there.
- Quality of water supply will be improved post 24/7.
- Economic growth of the city and improvement in public health.

Details about the present system –OHT's, Distribution Systems:

Service Reservoirs

There are 19 ELSR's and as per demand (59.75mld) the total SR capacity required is 18.67 ml. In Bidar seven (7) Nos. of Elevated Service Reservoirs are constructed under NKUSIP Tranche II. The constructed ESR's are located at Pratapnagar, Chidri, Lalwadi, Ambedkar colony, Gumpa, Maniyar Taleem and Mailur. Balance 12 OHT's in which KUWS&DB constructed 5 ESR's are located at Auto nagar, Shivnagar, KHB, Fort, Choubara and CMC constructed 7 ESR's are located at Janwada, Mangal pet, Mohan Market, Devi Colony, Gandhi Gunj, Basavanagar & Lidkar Colony.

Distribution System

The CMC area has been divided in to 19 zones with each Service Reservoir covering each zone and out of 19 zones 14 zones are covered by NKUSIP- 24x7 works and 5 zones are covered by KUWS&DB- 24X7 works. Which serves the particular areas, now it was

ascertained that KUWS&DB did 78.43Km of distribution system with 1700 numbers of house service connections. The distribution network consists of HDPE/PE-100/PN-6 Pipes of diameters ranging from 63mm to 355mm. The total length of distribution network under KUIDFC Package II & IV is 292.00 Km + Under KUWSDB 78.00 = Overall at present 370.00 Kms.

Following details of distribution network for Bidar 24x7 WSS executed under NKUSIP package no.04BDR01

Nominal Dia in mm	**Material**	**Total in (km)**
63	PE-100	78.81
90	PE-100	43.01
110	PE-100	3.22
125	PE-100	1.32
140	PE-100	2.46
160	PE-100	3.93
180	PE-100	-
200	PE-100	9.0
225	PE-100	0.27
250	PE-100	1.93
280	PE-100	0.07
300	PE-100	-
350	PE-100	-
400	PE-100	0.05
Total		**135.97 KM**

Distribution details of 24x7 Water supply for CMC Bidar

The Distribution system has been revised and increased to 292kms which consists of HDPE pipes. Distribution system work completed as given below:

Zone No.	**Zone Name**	**24x7 (BOQ) + Additional work (Executed by VEPL)**	**Executed by MEGHA Eng & Infra.**	**Total Pipeline**
		Pipeline(m)	**Pipeline(m)**	**Length in Mtr**
1	Janwada	6498.35	9869.9	16368.25
2	Fort	18888.8		18888.8
3	Maniyar Taleem	26128.7		26128.7
4	Mangalpeth	1932	6445.4	8377.4

5	Lalwadi	8048	11042	19090
6	Basavanagar	6230.50	15149	21379.5
7	Gumpa	15801.50	14687	30488.5
8	Mailoor	14742.80	22201	36943.8
9	Ambedkar colony	3366.50	4612	7978.5
10	Lidkar Colony	6322.10	7473	13795.1
11	Chidri	7426.70	15301	22727.7
12	Mohan Market	7113.10	10954	18067.1
13	Devi Colony	6001.05	18575	24576.05
14	Pratapnagar (A)	6311.50	19712	26023.5
15	Auto Nagar	490		490
16	Shivanagar	168		168
17	KHB	64		64
18	Chowbara	37		347
19	Gandhi Gunj	93		93
	Total	**135973.60**	**156021.30**	**291994.90**

Accessories related to pipeline

The accessories related to pipeline may be sluice valves, pressure control valves, bulk meters & data logger, scour valves, air valves etc the accessories installed to Bidar town for serving the customers in Bidar to achieve the performance targets stipulated in the contract are below.

Sl. No.	**Description**	**Total Qty**	**REMARKS**
a) Sluice valves	Existing valves Retained : Nil NKUSIP (T-2):196Nos. 24x7 (T-4) : 206 Nos.	402 No's	Life expectancy is 15 years.
b) Scour valves	NKUSIP (T-2):1 Nos. 24x7 (T-4) : 0 Nos.	01Nos	Life expectancy is 15 years.
c) PRV valves	NKUSIP(T-2):0 Nos. 24x7 (T-4) :30 Nos.	30 Nos	Life expectancy is 15 years
Total	Existing valves Retained : Nil NKUSIP (T-2):197 Nos. 24x7 (T-4) : 206 Nos.	433 Nos.	
Pressure Transducers (PT's)	NKUSIP (T-2): 00 Nos. 24x7 (T-4) : 68 Nos.	- 68 Nos.	Life expectancy is 15 years
Electromechanical bulk flow meters	NKUSIP (T-2):06 Nos. 24x7 (T-4) : 23 Nos.	29 Nos.	Life expectancy is 15 years

BENEFITS

Evaluation of the project for effective implemented benefits transfer to the public.In this study, cost-benefit analysis of Bidar city 24x7 water supply project was carried out considering current water supply infrastructure. The result indicates benefit-cost ratios ranging **0.74 paisa, meaning that there the return on a Rs 1 investment was in the range 0.74 paisain economic benefits.**When these low benefit-cost ratios are considered alongside the consistent and complete financial plans, it is clear that the current water supply project is not justified on an economic or financial basis. **The study revealed that investments in the current water supply project would not increase economic benefits.**

Benefits and importance of preserving water and 24x7 water Supply

The 24x7 water supply system is essentially a service level bench mark for all such institutions/agencies engaged in providing water to the citizens as observed by the **Union Ministry of Urban Development.** The system ensures every consumer access to pure, safe and continuous water at full pressure 24 hours a day, seven days a week. This further ensures saving of both time and money spent by the families to fetch and store water in constructed/readymade expensive tanks, usage of pump sets, usage of water tankers etc., on their maintenance.

During Operation & Management

Safe drinking water becomes a scarce resource and the wastage of water has to be minimized at all levels. In view of the water conservation & management, minimize the loss, assured pressurized 24x7 Water supply and customer complaint redressal it was decided to entrust the Operation &Management of 24x7 water supply to a private experienced agency which can perform all the above tasks. Whenever there is a newly constructed household engaged in fetching water from far and nearby sources no more miss their school.

Benefits to ULB after the 24/7 WS

- After implementation of 24X7 water supply scheme, the ULB is expected to have considerable savings every year.
- 24/7 water supply reduces the wastage of water by the consumer. Consumer will stop storing water and draining it the following day, a common practice under intermittent supply regime. It results in reduction of non-revenue water. This should result in saving of potable water.
- The concept of user pay will be systematically implemented.

- Complaints of consumers will be redressed then and there.
- Quality of water supply will be improved post 24/7.
- Economic growth of the city and improvement in public health.

CONCLUSION:

24x7 water supply system in Bidar is providing safe and wholesome water to consumers in sufficient quantities at convenient points and timings with a reasonable cost. efficient and **cost-effective** due to lower distribution losses leading to lower costs on electricity charges due to lower pumping of water. Technical defects and leakages can be fixed in shortest time which helps in checking loss of water effectively. It is long term benefits include when reduced operating costs. Since all connections are metered and the user pays only for the volume of water drawn from the tap, the financial health of the service provider also remains better for O&M works. The system has also made the residents responsible to manage their water consumption economically and efficiently, leading to improvement in the need for preservation of water. But, most importantly, every household is assured of pure water daily, which is most important for public health.

To bring 24x7 water supply several draw backs are faced during execution of system such as due to draught during the year 2018-2019 declared by Government in Bidar District, the employer has denied to give Bulk for 24x7 water supply demonstration by considering future requirement up to next monsoon. In this system, raw water is lifted from Intake channel at Karanja Reservoir in Halhalli Villageand pumped to WTP in at Nirmalahalli Thanda. The Bidar water supply scheme is based on the Karanja Reservoir, A Jackwell is constructed at a distance of about 20 km from the town & the pump house has Vertical turbine 400 HP 3Nos (2W+1S)x195Lps X 101 m Head. From here the raw water is being pumped to WTP of 28.00MLD capacity then pump to Naubad IPS from gravity pipe line.

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