SUPREME AUDIT INSTITUTION OF INDIA
लोकहितार्थ सत्यनिष्ठा
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Report of the Comptroller and Auditor General of India on Functioning of Delhi Jal Board for the year ended 31 March 2022

Government of National Capital Territory of Delhi
Report No. 3 of 2025
(Performance Audit - Civil)

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Comptroller and Auditor General of India
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PREFACE

This Report of the Comptroller and Auditor General of India has been prepared for submission to the Lieutenant Governor of National Capital Territory of Delhi under Section 48 of the Government of National Capital Territory of Delhi Act, 1991 for being laid before the Legislative Assembly of the National Capital Territory of Delhi. The report has been prepared in accordance with the Performance Auditing Guidelines, 2014 and Regulations on Audit and Accounts, 2020 of the Comptroller and Auditor General of India.

The report of the Comptroller and Auditor General of India contains the results of Performance Audit of Functioning of Delhi Jal Board covering the period from 2017-2022.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Audit acknowledges the cooperation received from the Urban Development Department, Government of National Capital Territory of Delhi along with their field functionaries in conducting the Performance Audit.

Executive Summary

EXECUTIVE SUMMARY

Why was the audit undertaken?

In Delhi, responsibility for water supply, sewerage, sewage disposal and drainage system vests with the Delhi Jal Board (DJB). In view of the shortage in water supply and inadequacy of sewerage facilities in Delhi, a Performance Audit was conducted covering the period from 2017-18 to 2021-22 to assess whether: (i) consistent and reliable water supply to all residents of Delhi was ensured by DJB (ii) the sewerage facilities were available to all localities in Delhi and whether sewage was treated and disposed off efficiently to reduce the disposal of untreated sewage into water bodies and (iii) the DJB managed its resources in an efficient and effective manner.

What were the audit findings?

- For Delhi's projected population of approximately 28 million by March 2041, Delhi Jal Board (DJB) assessed requirement of 1680 million gallons per day (MGD) of water. The shortage in availability of raw water against the assessed requirement increased from 22 *per cent* (2017-18) to 24 *per cent* (2021-22) whereas the shortage in potable water against the assessed requirement increased from 24.2 *per cent* to 25.79 *per cent*. Main reason for the gap between demand and supply of water was inadequacy of raw water sources, its treatment capacity and failure to augment its supply.

(Paragraphs 2.1 and 2.3.1)

- Despite lapse of more than 29 years since signing of MoU, the work could not start to build Renuka, Lakhwar and Kishau dams in order to utilize untapped flow of the river during monsoon, thus aggravating the scarcity issues.

(Paragraph 2.3.1)

- The Government has not framed a Water Policy or constituted a Water Consultative Council to advise the Board on policy matters and for formulation of annual and five years plans etc.

(Paragraph 2.2)

- In the absence of the flow meters at Water Treatment Plants (WTPs), Reservoirs, water emergencies and borewells, the quantity of water treated at WTPs/extracted from borewells, transmitted to Reservoirs and supplied to consumers could not be measured accurately.

(Paragraph 2.4)

- During 2017-22, the transmission loss of water distributed from Under Ground Reservoirs (UGRs)/ Service Reservoirs (SRs) increased from 16 *per cent* to 21 *per cent*. The situation was further aggravated by inequitable supply of potable water at zonal level. The per capita availability of potable water was less than 20 GPCD in four zones and less than 40 gallon per capita per day (GPCD) in eight zones against the requirement of 60 GPCD.

(Paragraph 3.1)

- There was shortage of staff and equipment in DJB testing labs. Testing of water was not being done as per BIS norms. There was continued use of carcinogenic Polyelectrolytes at private–run Water Treatment Plants (WTPs) and recycling plants despite a memorandum banning their usage.

(Paragraph 2.5)

- Due to non-enactment of Delhi Water Board (Amendment) Bill, 2011, there was no authority under the Delhi Government or DJB which has powers to effectively plan to regulate, control and develop groundwater resources. Out of 16,234 samples of ground water tested, 8,933 samples (55 *per cent*) were found unfit for potable purposes.

(Paragraphs 2.6.1.1 and 2.6.1.2)

- Non-Revenue Water (NRW) component was in the range of 51 *per cent* to 53 *per cent* of the average quantity of the water supplied per day during the period 2017-22, except for the year 2019-20. The estimated amount of revenue not realised by DJB during the said period on account of NRW was ₹ 4,988 crore.

(Paragraph 3.3)

- The quantity of sewage generated, estimated on the basis of water supplied in Delhi, was 594 MGD, out of which, 545 MGD was treated by 35 Sewage Treatment Plants (STPs). Apart from this, as per a Delhi Pollution Control Committee (DPCC) Report of March 2022, 212.59 MGD sewerage generated by 1080 unauthorised colonies was dumped into storm water drains in untreated form.

(Paragraphs 4.1 and 4.2.1)

- Treated affluent released by 25 STPs into Yamuna did not meet the norms prescribed by DPCC. There was also no mechanism to monitor Faecal Coliform (FC) bacteria levels in the treated effluent.

(Paragraphs 4.3.2 and 4.3.3)

- There was lack of effective grievance redressal mechanism in DJB. In a case, for example, DJB had to pay ₹ 25 lakh to Central Pollution Control Board (CPCB) on account of penalty imposed by National Green Tribunal (NGT) for delay, which could have been avoided through early action.

(Paragraph 4.3.4)

- There were deficiencies in conceptualisation and planning stages in the selected projects of sewerage and water supply. This led to delay in rehabilitation of Chandrawal WTP and its command area and withdrawal of financing ₹ 2,243 crore by Asian Development Bank (ADB) for rehabilitation of Wazirabad WTP and its Command areas under Delhi Water Supply Improvement Investment Programme.

(Paragraph 5.1)

- Cases of irregularities at estimation, awarding and in execution of works were seen during audit showing violation of NIT conditions and provisions of CPWD Manual.

(Paragraphs 5.2, 5.3 and 5.4)

- DJB has submitted accounts for Statutory audit only up to the year 2021-22 and Separate Audit Reports (SARs) on them have opined that the accounts of DJB do not depict 'a true and fair picture' of the affairs of DJB. (***Paragraph 6.1)***

- There were shortfalls in revenue receipts over budget ranging between 11.28 *per cent* and 41.71 *per cent*. DJB was unable to meet its revenue expenditure commitments from its revenue receipts. The excess expenditure over income incurred by DJB (except in 2020-21) was met from earnest money, security deposit withheld and unspent balance of capital funds. DJB incurred more than 50 *per cent* of its revenue expenditure on payment of salaries to its staff leaving the organization with lesser resources for development expenditure.

(Paragraph 6.2)

- The total outstanding loan of DJB and interest to be paid stood at ₹ 66,595 crore (March 2022).

(Paragraph 6.3.2)

- During 2021-22, DJB had billed only 371 MGD (40 *per cent*) of potable water produced. Further, out of 371 MGD, only 244 MGD (66 *per cent*) was billed based on meter readings.

(Paragraph 6.3.3)

- IT based Revenue Management System implemented to simplify payment and application procedures for all types of services was marred with functional deficiencies viz. delay in rollout, absence of validation checks and facility of reconciliation of revenue received, and non-digitalisation of records.

(Paragraph 6.4)

- There was a mismatch of 3057 staff in IFMS figures and the figures of Persons in position maintained in different wings of DJB.

(Paragraph 7.1)

- During 2017-18 to 2021-22 shortage of regular staff had continuously increased from 23.09 *per cent* to 32.12 *per cent*.

(Paragraph 7.2)

- There were cases of irregular appointments in DJB violating codal provisions coupled with inadequately planned trainings and failure in implementation of transfer policy.

(Paragraphs 7.4, 7.5 and 7.6)

What do we recommend?

1. Formulation of a water policy and perspective plan for ensuring adequacy of water commensurate with the trend of growth in population of Delhi.
2. Installation of regularly calibrated flow meters at inlet/outlet points of all WTPs, UGRs and Tube wells and conducting water audit to plug water loss and revenue leakage.
3. Strengthen quality testing laboratories to ensure water quality testing as per all the prescribed parameters.
4. Prescribing schedule for maintenance and upgradation of essential infrastructure for water and sewerage, including GPS trackers on water tankers.
5. Expedite collection of outstanding dues with emphasis on large and institutional consumers so as to improve financial position.
6. Immediate action to address the serious shortage of staff in DJB.

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Chapter - 1
Introduction

Chapter 1

Introduction

The Delhi Jal Board (DJB) was established under the Delhi Jal Board Act, 1998 to discharge the functions of water supply, sewerage and sewage disposal and drainage within the National Capital Territory of Delhi and for matters connected therewith. DJB is primarily responsible for production and distribution of drinking water as well as for collection, treatment, and disposal of domestic sewage.

1.1 Functions of Delhi Jal Board (DJB)

Under Section 9 of the Delhi Jal Board Act 1998, the following functions inter alia have been laid down for DJB:

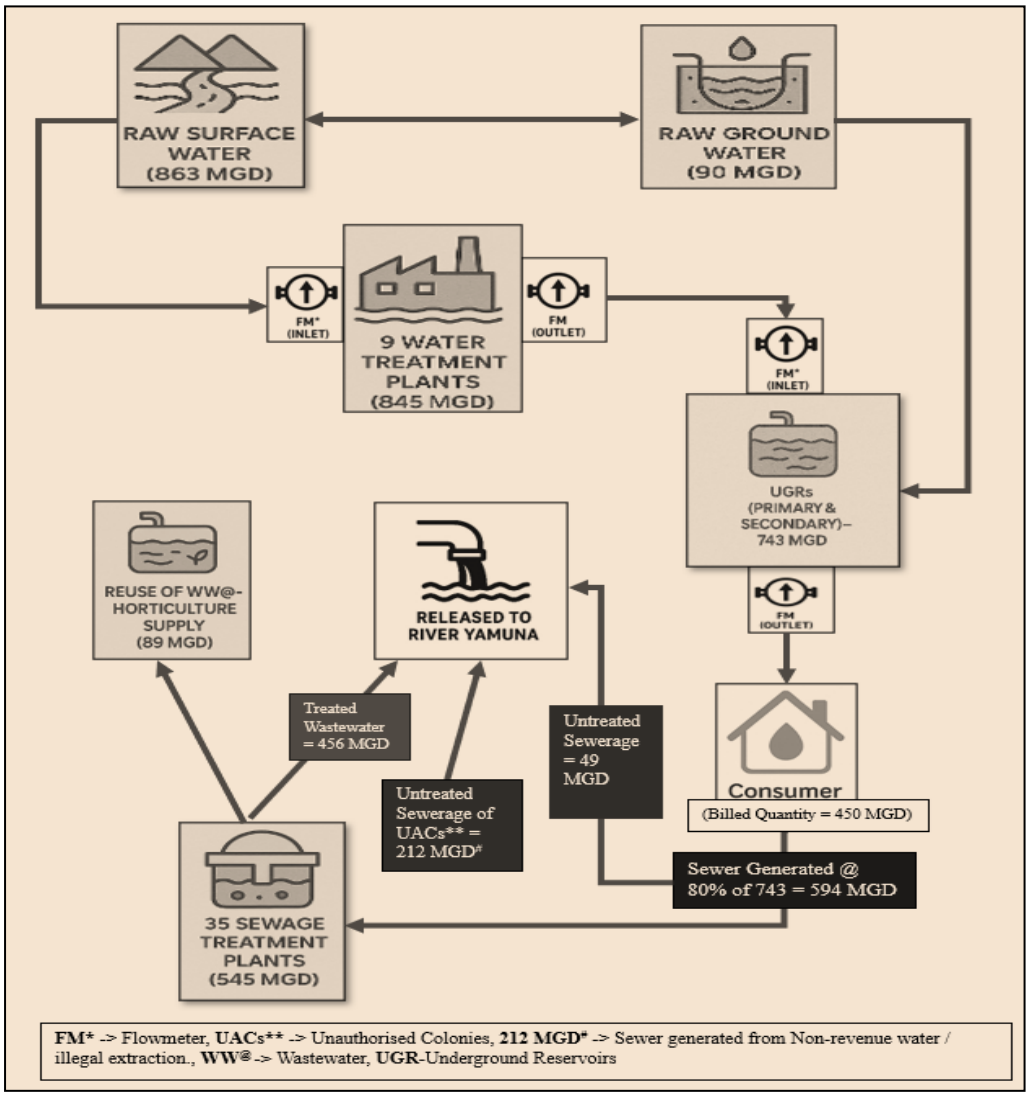
(i) Treat, supply and distribute water for household consumption or other purposes to those parts of Delhi where there are houses, whether through pipes or by other means;

(ii) Collect, treat and dispose-off sewage from any part of Delhi and carry out works connected with sewerage, sewage treatment and sewage disposal including the planning, design, construction, operation and maintenance of works relating thereto; and

(iii) Plan for, regulate and manage the exploitation of ground water in Delhi in consultation with Central Ground Water Authority and also give advice in this regard to the New Delhi Municipal Council, the Delhi Cantonment Board or any other local authority, except with the prior approval of the Central Government.

Various stages involved in treatment of water, its supply to consumers, collection, conveyance and treatment of sewage and disposal of effluent is depicted in **Diagram 1.1**. The data given in the Diagram pertains to the year 2021-22.

Diagram 1.1: Processes in treatment of water, its usage and sewage

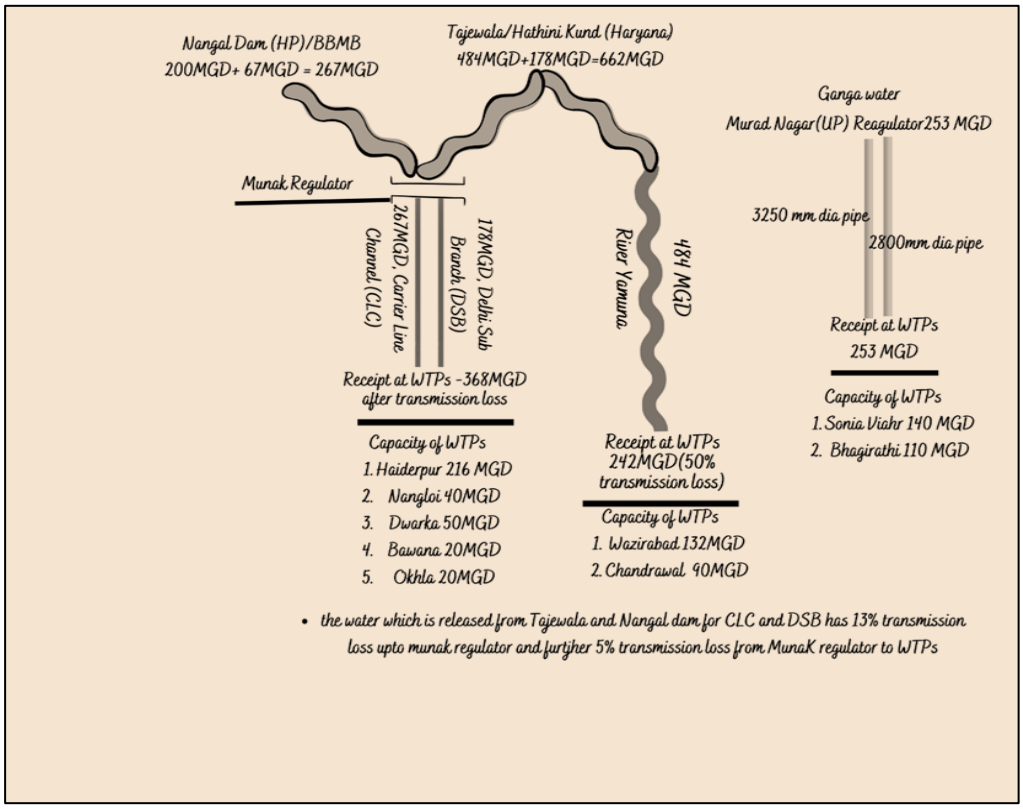


1.1.1 Water Supply in Delhi

As per Central Public Health and Environment Engineering Organization (CPHEEO) norms (May, 1999), Delhi requires 1260 MGD (Million Gallons per Day)[1] of water, against which DJB supplies only 935 MGD of treated/potable water, to 93 *per cent* households in Delhi. DJB sources its raw water from Yamuna River, Bhakhra - Beas storages (610 MGD), Upper Ganga canal (253 MGD) and ground water from Ranney wells and tube wells (90 MGD). The major sources of raw water for Delhi are shown in **Chart 1.1**.

[1] As per Perspective Infrastructure Plan, 2041 of DJB for 21 million population @60 GPCD.

Chart 1.1: Major sources of raw water



During 2021-22, nine Water Treatment Plants (WTPs) of DJB produced 845 MGD of treated water against the installed capacity of 818 MGD. The remaining 90 MGD ground water was supplied untreated. Details of WTPs are depicted in **Chart 1.1**.

Delhi has a network of about 15,383 Km of water supply mains and supplies water to 26.59 lakh active consumers through this network. To meet the water demand from areas yet to be connected with a piped supply or where piped water supply is deficient, 1243 tankers per day on average were used in 2021-22.

1.1.2 Sewerage Management System

Delhi Jal Board has a network of branching, peripheral and trunk sewers of about 9200 kms with an estimated sewage generation (2021-22) of 594 MGD[2] (based on piped water supplied). Against this, DJB had an installed capacity to treat 697 MGD at its 35 functional Sewage Treatment Plants (STPs), however only 545 MGD of the installed capacity (78 *per cent*) was being utilised with the remaining *estimated* sewage generated (eight *per cent*) flowing into the river Yamuna untreated.

1.2 Organisational set up

The Chief Minister, Government of NCTD (GNCTD) is the Chairperson of Delhi Jal Board who is assisted by a Vice Chairperson. Under the Vice

[2] As per the Economic Survey of Delhi 2021-22, total estimated sewage generation was 594.25 MGD @ 80 *per cent* of water supplied through pipelines (742.81 MGD).

Chairperson, there is the Chief Executive Officer (CEO), Non-official Members and Ex. Official Members. The CEO is assisted by four members viz Member (Administration), Member (Finance), Member (Water Supply), Member (Drainage), and a Chief Vigilance Officer and the Secretary, DJB. Organisational Chart of DJB is given in **Annexure 1.1**.

The DJB is divided into 41 Zonal Offices for revenue management and the water supply and drainage related works are executed by various divisions.

To carry out its functions, DJB had a sanctioned staff strength of 24,093 against which 16,354 officers/officials were in position as on 31 March 2022.

1.3 Financials of DJB

The total receipts and revenue of the DJB for the year 2021-22 was ₹ 4772.20 crore. The comparative position of expenditure and revenue of DJB for the financial years 2017-18 and 2021-22 is given in **Table 1.1**.

Table 1.1: Comparative Position of Expenditure and Revenue

(₹ in crore)

Sl. No.	Component	2017-18		2021-22	
		Expenditure	%age of total expenditure	Expenditure	%age of total expenditure
Expenditure					
Capital					
1	Water Sector	883.88	21.50	1243.80	21.50
2	Sewerage & Sanitation	645.46	15.70	1441.21	24.91
Revenue					
3	Payments to staff	1669.38	40.60	1888.41	32.63
4	Power	604.18	14.70	694.66	12.00
5	Other expenses	308.51	7.50	518.48	8.96
Total Expenditure		**4111.41**	**100**	**5786.56**	**100**
Total Receipts					
1	Revenue of DJB	2236.19	55.87	2805.33	58.79
2	GIA and Loan from GNCTD& GoI	1766.37	44.13	1966.77	41.21
Total revenue		**4002.56**	**100**	**4772.10**	**100**

The gap between annual receipts and expenditure of DJB during the review period has increased by around 10-fold during the period under review. The gap is being filled by earnest money, security deposit withheld and unspent balance of capital funds. Staff salary constitutes the biggest component of DJB's expenditure.

1.4 Audit objectives

The main objectives of this Performance Audit were to assess:

1. Whether consistent and reliable water supply to all residents of Delhi was ensured by DJB?

2. Whether the sewerage facilities were available to all localities in Delhi and whether sewage was treated and disposed off efficiently to reduce disposal of untreated sewage into water bodies?

3. Whether the DJB managed its resources in an efficient and effective manner?

1.5 Audit criteria

The functioning of DJB was evaluated against criteria sourced from the following:

- Various Orders/judgements of the Hon'ble Supreme Court of India and National Green Tribunal.
- The Water (Prevention and Control of Pollution) Act, 1974, The Environment (Protection) Act, 1986, CPHEEO Manuals;
- Delhi Water Board Act, 1998 and Delhi Water Board Septage Management Regulations, 2018;
- Delhi Water & Sewer (Tariff and Metering) Regulations, 2012;
- Standards and various reports of the Delhi Pollution Control Committee (DPCC), the Central Pollution Control Board (CPCB) and the Yamuna Pollution Monitoring Committee (YPMC);
- River Rejuvenation Committee's (RRC) Action Plan, Sewerage Master Plan (SMP) for Delhi-2031, Drainage Master Plan for NCT of Delhi (DMP), Action Plan for use of treated wastewater from STPs;
- GFRs-2017, Receipt and Payment Rules, General Accounting Rules, CPWD Manual, General Conditions of Contracts and CVC guidelines.
- Research and study reports of National Institute of Hydrology, Roorkee (NIH) and other reports.

1.6 Audit scope and methodology

The present Performance Audit on the functioning of DJB was conducted from April 2022 to February 2023, covering a period of five years from 2017-18 to 2021-22. Apart from scrutiny of records and analysis of information available at DJB headquarters, field visits/Joint Inspections were also conducted to check functioning of WTPs/STPs, to assess the trapping status of various drains and to verify the physical progress of various sewerage and water projects.

For sample selection of water supply infrastructure, WTPs were divided into three categories based on treatment capacity, having capacity of 150 MGD and above, between 70 and 150 MGD and with less than 70 MGD and one WTP from each category was selected for detailed scrutiny (Haiderpur, Sonia Vihar and Dwarka WTPs). Selected sample covered 50 *per cent* of the treatment capacity of DJB. Further, records of selected E&M divisions, who were responsible for maintenance of Underground Water Reservoirs (UGRs), pipelines, and pumping stations downstream of the selected three WTPs were

scrutinized during audit.

Similarly, for sewerage infrastructure, all the three drainage zones having more than 100 MGD sewage generation (Shahdara, Okhla and Rohini-Rithala), three out of five drainage zones having sewage generation from 50 to 100 MGD (Coronation Pillar, Najafgarh and Kanjhawala- Bawana) and one out of four drainage zones (Outer South Delhi) having sewage generation less than 50 MGD were selected through Judgmental Sampling for detailed scrutiny. The works pertaining to laying and maintenance of the sewerage network in the selected drainage zones and DJB laboratories were also scrutinized.

The Revenue Wing of DJB manages the billing and collection of water/sewer charges through Zonal Revenue Offices (ZROs) under seven Circles. For the Performance Audit, ZROs with the minimum and maximum recovery rate in financial year 2021-22 from each Circle were selected[3].

An Entry Conference was held in August 2022 with the Chief Executive Officer, DJB to discuss audit methodology, scope, objectives, and criteria. The draft performance audit report was issued to the Government (27 July 2023) to confirm the facts and figures mentioned in the report. Further, an Exit Conference was held with the stakeholders on 7 December 2023 to discuss the audit findings. Replies received from DJB and views expressed in the Exit Conference have been suitably incorporated in the Report. However, reply from the Department/Government was awaited (April 2025).

1.7 Structure of the Report

The findings of the Performance Audit have been arranged in line with the audit objectives and are discussed in the following chapters.

Chapter 2: Raw water arrangement and treatment

Chapter 3: Water Supply and Distribution System

Chapter 4: Sewerage Management

Chapter 5: Projects/works execution by DJB

Chapter 6: Financial Management

Chapter 7: Human Resource Management

[3] The selected 14 Zonal Revenue Offices (ZROs) are Ashok Vihar, Burari, GTB Enclave, Kakrola More, Lajpat Nagar, MVV R K Puram, NWS Bhera Enclave, Punjabi Bagh, Pratap Nagar, Rohini, Rajendra Nagar, Saket, New Seelam Pur, and Vasant Kunz.

Chapter - 2
Raw Water Arrangement and Treatment

Chapter 2

Raw water arrangement and treatment

Water demand for residents of Delhi is projected to rise significantly from 1260 million gallons per day (MGD) to 1680 MGD by 2041. Despite sourcing water from rivers such as Yamuna, Ravi-Beas, and Ganga, DJB struggles to meet this escalating demand. Delayed approvals for critical projects like the Renukaji and Kishau dams aggravated the scarcity issues. Efforts to secure an extra supply from Himachal Pradesh have not fructified. DJB also failed to calibrate flow meters and install the required number of flow meters at different primary and secondary UGRs and to ensure that all the installed flow meters were functioning. DJB's failure to implement NEERI recommendations, apart from a shortage of DJB testing labs compromises water safety. The neglect in cleaning of reservoirs and underground storage tanks and challenges and rejuvenation of water bodies in Delhi further highlight systemic shortcomings.

2.1 Introduction

CPHEEO norms (May 1999) and the Perspective Infrastructure Plan, 2041 of Delhi Jal Board (DJB) assessed that Delhi requires 1260 Million gallons per day (MGD) of water based on a norm of 60 gallons per capita per day (GPCD) by March 2022 and 1680 MGD by March 2041, for the city's projected population of approximately 21 million and 28 million respectively.

As of March 2022, nine Water Treatment Plants (WTPs) produced 845 MGD of potable water with an additional 90 MGD being extracted and directly supplied by DJB. Thus, 935 MGD of potable water was supplied to the residents of Delhi against the requirement of 1260 MGD. Availability of water to the residents of Delhi was only 45 GPCD at the production level, instead of the norm of 60 GPCD.

2.2 Shortfalls in the Governance Structure for Water Management

2.2.1 Water Policy for Delhi not framed

Section 16.2 of the National Water Policy 2012 recommends to all States that State Water Policies may need to be drafted/revised in accordance with this policy, keeping in mind the basic concerns and principles, as well as a unified national perspective.

Audit noticed that the Delhi Jal Board initiated the task of formulating a Water Policy for Delhi in 2011 with the objective of ensuring water security for Delhi in the face of an uncertain resource scenario. The draft document was deliberated in four workshops in which non-governmental experts, NGOs, and RWAs participated. However, the policy has not been formally notified, and no efforts

have been made by DJB to formulate the Water Policy as recommended in the National Water Policy.

DJB in its reply (11 July 2022) stated that it has prepared a long-term Perspective Plan MPD 2041, keeping in view the spirit of the policy document 2016.

Audit is of the view that the Perspective Plan cannot be a substitute for Water Policy. A policy is a long-term broad-based document setting out priorities and a strategic vision, whereas a Perspective Plan details the actions and processes to achieve the long-term vision of the organization.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 1: Government should prepare a Water Policy for Delhi for effective planning and management of the water needs of Delhi, including emergencies by DJB.

2.2.2 Absence of a Water Consultative Council

As per Section 8 of DJB Act, 1998, the Government may constitute a Water Consultative Council to advise the Board on policy matters and for formulation of annual and five years plans; to give expert advice on administrative, financial and technical matters; to advise the Board on matter pertaining to the interest of consumers and issues affecting the environment; and to advise the Board on any matter on which the Board seeks its advice. Audit, however, noted that no such Water Consultative Council was constituted by the Government.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

2.2.3 Water Audit

As per Para 2.6.5 of CPHEEO, Water Audit is required to be conducted to measure gaps in water produced and distributed. Water audit thus provides a fairly accurate picture of water production, water assessed and losses, both physical and revenue.

Audit noticed that DJB had not framed any guidelines or prescribed any procedure for periodically conducting Water Audit. It had conducted a Water Audit of the WTPs only once during the period under review in 2020-21 and it had indicated an overall water loss at WTPs at around 5.87 *per cent*. The maximum water loss was found at WTP Chandrawal (10.50 *per cent*) and minimum at WTP Dwarka (0.27 *per cent*). Five WTPs had water loss above five *per cent*.

However, DJB had not issued any directives or action plan for WTPs to minimize water loss during treatment to enhance water conservation, improve financial performance etc., thereby defeating the purpose of the Water Audit.

Thus, at the policy level the DJB had been found wanting in formulation a Water

Policy, setting up a Consultative Council and conducting of regular Water Audits to help enhance its efficiency.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

2.3 Water requirement, raw water availability and its augmentation

Delhi Jal Board receives raw/surface water from Himachal Pradesh, Haryana, Uttar Pradesh and Uttarakhand. Raw water for Delhi is drawn from River Ganga Upper Ganga Canal (UGC), River Yamuna, and Delhi Sub Branch (DSB)/Carrier Line Channel (CLC) of the Bhakhra Beas Management Board. (i) The overall receipt of raw water from different sources during 2021-22 is given in **Table 2.1**.

Table 2.1: Average raw water receipt per day during 2021-22

(In MGD)

State of origin	Source	Originated from	Release water quantity from origin	Mode	Water received at WTP after transmission loss
Haryana	Yamuna Water	Tajewala/ Hathni kund	484	Through Yamuna river	242
		Tajewala/ Hathni kund Munak regulator)	178	DSB	148
Punjab	Ravi-Beas Water	Nangal Dam (Munak regulator)	267	CLC	220
Uttar Pradesh	Ganga Water	Murad Nagar regulator	253	UGC	253
Total			**1182**		**863**

Source: Information provided by DJB

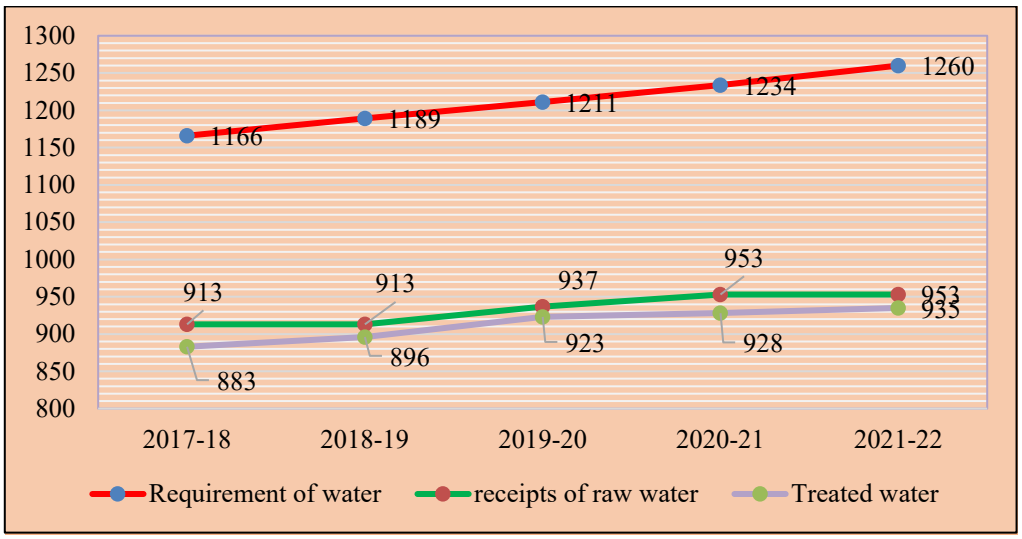
As can be seen from the table above, the water being received from Haryana suffers a 50 *per cent* transmission loss whilst flowing through the Yamuna River.

DJB had also extracted 90 MGD raw water from 11 Ranney wells and 4,919 tube wells during 2021-22. The trends in the projected requirement, actual production and shortfall in supply of water during 2017-18 to 2021-22 are shown in **Chart 2.1**.

2.3.1 Inadequacy of raw water supply

As is clear from the preceding paras, the raw water supply to Delhi id below par. Details are in Chart below.

Chart 2.1: Water Requirement, Receipts and Supply



Source: Information provided by DJB and Economic Survey 2017-18 to 2021-22

It can be seen from **Chart 2.1** that due to increasing urbanization and population growth in Delhi, the requirement for potable water increased[1] significantly from 1166 MGD in 2017-18 to 1260 MGD in 2021-22, registering a growth of eight *per cent,* whereas the production capacity of potable water in Delhi had increased less than six *per cent* from 883 MGD (2017-18) to only 935 MGD (2021-22). This increased the demand-treatment gap from 283 MGD (2017-18) to 325 MGD (2021-22).

DJB has not been able to keep pace with the rapid urbanization of the city and has failed to match the supply with the demand, as assessed. The shortage in availability of raw water against the assessed requirement increased from 22 *per cent* (2017-18) to 24 *per cent* (2021-22) whereas the shortage in potable water against the assessed requirement increased from 24.2 *per cent* (2017-18) to 25.79 *per cent* (2021-22).

Persistent shortfalls in the availability of potable water led to a significantly reduced supply of water to the residents of the National Capital at an average rate of 45 GPCD against the norm of 60 GPCD.

(i) The main reason for the gap between demand and supply of water was the inadequacy of water sources and the failure to augment/develop available water sources. Allotment of water to Delhi as per the Yamuna Water Sharing Agreement signed in May, 1994[2] every year is as detailed in **Table 2.2**.

[1] As per population projection for states during 2011 to 2036 published by National Commission on population, M/o Health and Family Welfare (July 2020).

[2] MoU between Northern Region States of Himachal Pradesh, Haryana, Uttar Pradesh, Punjab, Rajasthan and Delhi.

Table 2.2: Allocation of Yamuna water to Delhi

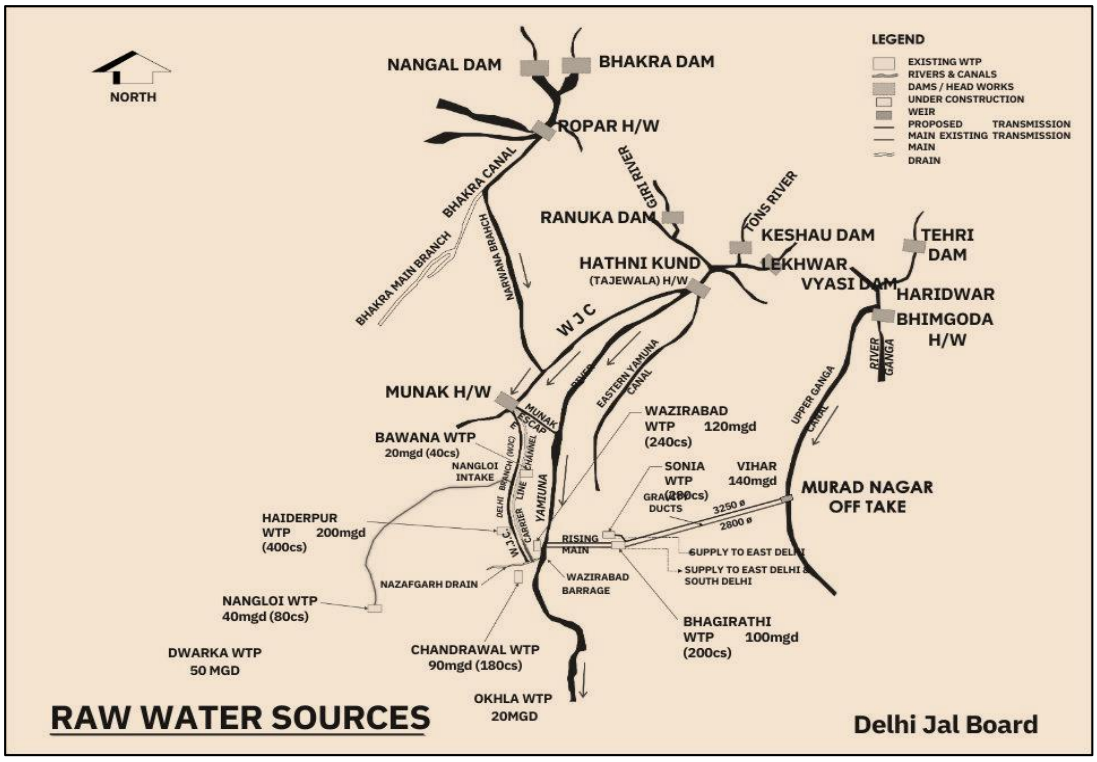
Sl. No.	Period	Allocation (in MGD)
1	July to October (monsoon season)	1544
2	November to February	150
3	March to June	167
	Total	**1861**

Source: Yamuna water sharing agreement

As can be seen from **Table 2.2**, 80 *per cent* of the allocation is during monsoon season, when most of the water flows through Delhi untapped. The allocation during the remaining two seasons works out to approximately 20 *per cent*.

(ii) In order to utilize the flow of the river during monsoon, an MoU was signed (November 1994) by the basin States[3] to build two dams on Yamuna River, one at Renukaji (275 MGD) in Himachal Pradesh and another at Kishau (372 MGD) in Uttarakhand as shown in **Chart 2.2**. DJB made payment of ₹ 230.73 crore for construction of Renukaji dam (₹ 214.84 crore), Kishau dam (₹ 8.10 crore) and another dam at Lakhwar (₹ 7.79 crore) to HP and Uttarakhand (UK) Governments (March 2022). These projects were declared as projects of national importance. However, work on Renuka dam, Lakhwar and Kishau dams was under planning and approval stage with the Upper Yamuna River Commission (UYRC).

Chart 2.2: Raw water sources and under construction Dams



[3] Himachal Pradesh, NCT of Delhi, Haryana, Uttar Pradesh and Rajasthan.

Thus, work on these dams has not started even after a lapse of nearly 30 years since signing of the MOU due to pending approval from UYRC and NGT. The possibility of augmentation of raw water availability from Yamuna River in the near future is thus remote.

(iii) Further, an agreement was signed between GNCTD/DJB and Government of Himachal Pradesh (GoHP) in December 2019 for regular supply of 368 cusecs[4] (237 MGD) from November to February and 268 cusec (173 MGD) from March to June every year. For this, GNCTD/DJB is required to pay to GoHP an advance amount of ₹ 4 crore every year. Audit however observed that the agreement has not been implemented (June 2023) despite repeated request by Delhi Jal Board to GoHP for implementation of MoU. Engineer-in-Chief, Jal Shakti Vibhag Shimla, Himachal Pradesh vide letters dated December 2020 (UYRC) and August 2021 (Member (WS), DJB) conveyed that there is no surplus water available with Himachal Pradesh during the period November to June.

(iv) Additionally, based on available data, the Delhi Jal Board presently utilizes the entire quantity of raw water received daily and does not have a water reserve for even a single day's consumption. This is not an ideal situation as any disruption of daily supply has the potential to throw the water supply to Delhi out of gear.

During the Exit Conference (December 2023), DJB stated that the demand of 60 GPCD of water, based on CPHEEO norms, is considered on the higher side and needs to be rationalized. It was further added that the quantity of groundwater is more than what is reflected in the data, as most of the water extraction from borewells has not been accounted for yet. It further stated that once the assessment is complete and the per capita availability is rationalized, the demand-supply gap of water availability will reduce significantly. On the issue of untapped water, it was stated that DJB was getting more share of water than agreed upon during the lean (other than monsoon) period, and efforts were being made for the utilization of untapped water during monsoon.

While the inaccurate accounting of water extracted from borewells is evidenced in the audit finding (para 2.4.1.3), the other responses of DJB during the Exit Conference were contradictory to the data given by DJB, its Perspective Plan, and the norms on record. Further, as no documentation was provided in support of the assertions, they are unacceptable in audit.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

[4] Cubic feet per second.

Recommendation 2: Government should put in place a system to obtain accurate data by DJB on the water extracted through borewells.

2.3.2 Earmarked water level not maintained

For the smooth functioning of the WTPs at Wazirabad and Chandrawal, the water level at Wazirabad pond is required to be maintained at 674.5 feet by the Haryana Government by releasing extra water from Tajewala/ Hathini Kund. During 2017-22, Audit noted that the earmarked water level was not maintained on 494 days (27 *per cent* days) at Wazirabad pond, as a result, Chandrawal and Wazirabad WTPs did not operate to their full capacity. Necessary steps need to be taken by the DJB/GNCTD with the Haryana government to maintain the water level at Wazirabad.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Photo 2.1: Picture of water level at Wazirabad Pond

Photo 2.2: Wazirabad pond during summer 2022

Recommendation 3: Government need to explore ways for augmenting raw water sources to cater to the needs of a growing population.

2.4 Unreliable water data

Water data is collected through either flow meters (instruments that measure the quantity of water that flows through pipelines) or based on the rate of pumping. If calibrated properly, the Flow meter data is considered more accurate as pumps generally do not function technically at 100 *per cent* efficiency.

2.4.1 Absence of flow meters to measure quantity of water supplied

Flow meters are required to be installed at Under Ground Reservoirs (UGRs), Booster Pumping Stations (BPSs) etc. for quantification of water inflow or outflow, losses or leakages. Deficiencies observed regarding the installation and functioning of the flow meters are discussed in the succeeding paragraphs.

2.4.1.1 Flow meters at Primary and Secondary UGRs/BPS

Potable water treated at WTP is supplied to the UGRs, which are generally

referred as 'Primary UGRs' (Pr. UGRs). The status of installation and functioning of flow meters at primary UGRs is given in **Table**[5] **2.3.**

Table 2.3: Status of installation, functioning of flow meters in Primary and Secondary UGRs

UGRs	Total No. of flow meters to be installed in Pr. UGRs (inlets + outlets)	Flow meters installed in Pr. UGRs		Flow meters functional in Pr. UGRs	
		Number	Percentage (out of required)	Number	Percentage (out of installed)
Primary UGRs	295	194	65.8	142	73.2
Secondary UGRs	850	528	62.1	282	53.4

Table 2.3 shows that only 66 *per cent* and 62 *per cent* of the required number of flow meters were present/available at primary and secondary UGRs/BPS, out of which only 73 *per cent* and 53 *per cent* respectively, were functional. Thus, data on water inflow and outflow were incomplete to the extent of the shortfall.

Photo 2.3: Outlet flow meter not working Jal Vihar (Old) BPS (Dated: 01-06-2022)

Photo 2.4: Outlet flow meter not working Janakpuri A2 BPS (Dated: 16-11-2022)

Further, flowmeters found installed but dysfunctional during the joint field visit of Jal Vihar (old) BPS on 1 June 2022 and Janakpuri A2 BPS and Janakpuri B2 BPS on 16 November 2022, are as shown in **Photos 2.3** and **2.4**.

2.4.1.2 Flow Meters at Water Emergencies [6]

The status of installation and functioning of flow meters at water emergency points as on 31 March 2022 is given in **Table 2.4**.

[5] ACE(M)-1, ACE(M)-3, ACE(M)-4, ACE(M)-5, ACE(M)-6, ACE(M)-7, ACE(M)-8, ACE(M)-9, ACE(M)-10 have provided a common reply for the entire duration 2017-18 to 2021-22 or have provided single data for the latest year 2021-22. Hence data analysis has been done for that data; ACE(M)-2, ACE(M)-11 have provided year-wise data and for them, the latest data pertaining to 2021-22 have been taken for data analysis

[6] Water emergencies are the designated locations from which DJB supply water through tankers.

Table 2.4: Status of flow meters at Water emergencies (as on 31 March 2022)

No. of Water Emergencies (W.E.)	Total filling/hydrants points at W.E.s	No. of Flow meters present / installed at filling-hydrant points	No. of Flow meters functional
30	161	47	14

Source: Data provided by DJB

As is evident from **Table 2.4**, only 29 *per cent* of the 161 filling points had water meters installed as of 31 March 2022, of which only 30 *per cent* were functional.

Thus, DJB was not in a position to accurately measure the water supplied through different water emergencies, despite the probability of wastage and pilferage of water from them being high.

2.4.1.3 Deficiency of Flow Meters at Borewells

As per the Economic Survey report of Delhi for the year 2022-23, DJB had 4,919 tube wells in various parts of Delhi and there are 11 Ranney wells along river Yamuna from which water is extracted and supplied to the residents of Delhi.

The status of year-wise flow meters installed and functioning at borewells as per *limited data*[7] provided by DJB is given in **Table 2.5**.

Table 2.5: Status of flow meters installed and functioning at borewells

As on 31st March of the year	No. of borewells which are used for drinking purpose	Flow meters installed/functional at borewells	
		Number	Percentage
2017	840	130/128	15.5/98.5
2018	869	126/124	14.5/98.4
2019	906	124/93	13.7/75.0
2020	937	128/88	13.7/68.8
2021	1019	130/90	12.8/69.2
2022	1038	117/113	11.3/96.6

Source: Information provided by DJB

As is evident from **Table 2.5,** the percentage of the installed flow meters with respect to total borewells in any given year decreased from 15 *per cent* (2017-18) to 11 *per cent* (2021-22). There was a decrease in the absolute number of flow meters installed by 10 *per cent* during the period under review, while the number of borewells increased by 23.5 *per cent* during the same period.

In the absence of the flow meters at each borewell, the exact quantity of water extracted for supply could not be ascertained and the quantity of water supplied from the borewells could not be verified in audit.

During the Exit Conference, DJB accepted the audit finding and intimated that the required flowmeters have been installed and defective flowmeters repaired/replaced.

[7] Of around 1000 borewells.

2.4.2 Faulty flow meters

As per Section 12.2.5 of Manual of O&M of Water Supply Systems issued by CPHEEO, M/o Urban Development, GoI, periodic calibration and maintenance of the flow meter is necessary to ensure accuracy in recordings.

Test check of log sheets (March 2022) maintained at WTP Haiderpur (HP-I & II) revealed that both calculation methods viz. (i) flow-meter and (ii) rated capacity of the pumps, were being used for measurement of potable water produced at HP-I and HP-II. However, the flow meters were not calibrated even once during the years 2017-18 to 2021-22 rendering the data provided by them unreliable as can be seen from the log sheet data for flow-meters detailed in **Table 2.6**.

Table 2.6: Details of pumping and production of water in March 2022

(Quantity in MGD as per flowmeters)

Plant	Total raw water intake	Total clear water	Water Loss
HP-I	3700.55	3465.60	234.95 (6%)
HP-II	3696.77	3786.90	(+) 90.13 (2% excess)
Total	**7397.00**	**7252.50**	

Source: Information provided by DJB

It can be seen from **Table 2.6** that the HP-II water treatment plant treated two *per cent* in excess of the water intake which makes the data suspect. To ensure accuracy of data, flow meters require to be calibrated regularly. Since flow meters were not calibrated even once during 2017-22, DJB was not in a position to accurately assess the quantity of water treated and supplied by these WTPs.

In the absence of accurate information regarding raw water intake and potable water produced through the flow meters, Audit could not derive assurance that the WTPs at Haiderpur were working efficiently and the wastage of water during purification process was within the permissible limits of eight to ten *per cent*.

In the reply given by the Executive Engineer, water loss was 1.95 *per cent* in the month of March 2022. However, the data is not reliable as calibration of flow meter was not done by DJB.

During Exit Conference, DJB stated that all the flow meters had been calibrated, however, no supporting documents were provided to substantiate their statement. The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 4: Government should install flow meters at inlet/outlet points of all WTPs, UGRs and Tubewells and ensure their regular calibration for accurate measurement of water flows.

2.5 Operation and Maintenance issues at WTPs

2.5.1 Absence of O& M Plan at WTPS

According to para 2.4.2 of the O&M Manual of CPHEEO, a comprehensive Operation and Maintenance Plan is to be prepared to cover all the facilities and clear responsibilities were required to be fixed for the deployed officials.

Test check of records of WTPs HP-I and HP-II revealed that O&M Plan was not prepared at all. It was also seen that supervisory staff was neither assigned duties regarding operation and maintenance nor were checklists prepared for this purpose. In WTP Sonia Vihar, the O&M work was assigned to a private operator since its commissioning. There were no records pertaining to O & M activities at the test-checked WTPs.

In the absence of inspection and maintenance registers, regular and timely maintenance of the machines and inspections conducted by the supervisory officers could not be ascertained.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

2.5.2 Water quality testing

Water Treatment Plant operations require laboratories at these Plants to perform round-the-clock basic process control testing at multiple sites within their facilities to examine and evaluate the suitability of water to be supplied to the public. National Environmental Engineering Research Institute (NEERI) had been contracted for technical guidance and support by DJB and it had made certain recommendations (December 2018) regarding the strengthening of water testing labs. Observations relating to water testing and related issues are as below:

2.5.2.1 Manpower and equipment shortages at Labs

For smooth functioning, the plant laboratory should have sufficient personnel to maintain round-the-clock monitoring of the treatment process. NEERI pointed out shortage of water testing personnel in the plant labs. NEERI had also mentioned 24 major equipment as required in a water treatment plant laboratory.

- At the four WTPs selected for detailed audit viz Haiderpur (HP) I & II, Sonia Vihar and Dwarka, operation and maintenance work of HP-I and HP-II plants was being done by DJB. Availability of operational staff at privately managed WTPs was adequate. The status of water testing personnel in the plant labs of HP-1 and HP-II (April 2023) is detailed in **Table 2.7.**

Table 2.7: Status of water testing personnel in the Plant Labs HP-1 and HP-II

Name of Post	HP-I			HP-II		
	SS	PiP	Shortage	SS	PiP	Shortage
ACWA	01	01	-	01	01	-
Chemist	01	01	-	01	01	-
Asst. Chemist	07	03	04	08	04	04
Lab Technicians	01	01	-	02	-	02
Lab attendant	08	06	02	08	05	03
Total	**18**	**12**	**06**	**20**	**11**	**09**

Source: Information provided by DJB

It can be seen from **Table 2.7** that despite the issues raised by NEERI, there was a 33 *per cent* to 45 *per cent* shortage of technical staff at WTPs laboratories.

- Audit further observed (March 2023) that, both Plant Labs HP-I and II were short of 16 and 18 pieces of equipment, respectively, against the required 24 equipment. Details are in **Annexure 2.1**.

2.5.2.2 Non adherence to BIS Norms

As per information on Delhi Jal Board website related to quality control, drinking water supplied from all available sources is tested regularly for ensuring potability as per BIS drinking water specifications 10500:2012 which provides that drinking water specification shall comply with norms for 43 test parameters. Against this, DJB was testing only 12 parameters[8] during water treatment process. Thus, DJB was not ensuring that the quality of water supplied was as per BIS norms.

2.5.2.3 Lapses at private testing labs

There was no DJB water testing lab at WTP Sonia Vihar and WTP Dwarka. Tests were being done by outsourced private agencies responsible for the treatment of raw water at WTP Sonia Vihar and WTP Dwarka.

Details of tests to be carried out as prescribed by DJB and tests being carried out by private agencies at WTP Sonia Vihar and WTP Dwarka are given in **Annexure 2.2**. Audit noted that most of the prescribed tests were not being carried out, resulting in shortfall up to 69 *per cent* in Dwarka WTP and 62 *per cent* in Sonia Vihar WTP in testing of required parameters at all stages of the water treatment process.

2.5.2.4 Mixing of treated and untreated water

During test check of records and information furnished by the DJB projects division and laboratories, it was found that 80 MGD to 90 MGD raw water from

[8] i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Turbidity, NTU, v) Ammonia vi) Chloride vii) Iron vii) Nitrate ix) Total alkalinity x) Total hardness xi) residual chlorine xii) chlorine.

borewells/ranney wells was supplied to UGRs/consumers directly without treatment by DJB during 2017-18 to 2021-22, thus compromising water quality which could be hazardous to the health of the people.

2.5.2.5 Use of polyelectrolytes in recycling plant

DJB issued a memorandum in May 2016, banning the use of polyelectrolytes in water treatment processes in all WTPs and recycling plants[9] due to their carcinogenic properties.

Audit observed that the private operator of recycling plant at Haiderpur WTPs was using polyelectrolytes in the treatment process since 2017-18 despite it being prohibited by the Testing and Quality Control Department of DJB.

Director (T&QC), DJB accepted the fact that the use of polyelectrolytes was occurring only in private-run WTPs rather than DJB-run WTPs.

Audit is of the view that it is the responsibility of DJB to ensure that rules and regulations relating to water treatment are adhered by all WTPs, whether run by DJB or private operator.

During the Exit Conference, DJB admitted shortage of permanent staff and assured to provide sufficient equipment in the laboratories. While admitting the fact of mixing borewell/tubewell water directly in the primary UGRs without treatment, it was stated that the quantity was nominal and did not affect the quality of the treated water.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

2.5.3 Regular cleaning of reservoirs/UGRs not done

As per O&M Manual of CPHEEO (January 2005), Overhead Tanks (OHTs)/Reservoirs are to be cleaned at regular intervals (at least once in a year) and samples of water and silt/mud accumulated in the tank are to be collected for biological analysis. During audit of the selected WTPs HP I & II at Haiderpur, Sonia Vihar and Dwarka, it was noticed that only one out of 10 UGRs was cleaned at Haiderpur WTP between April 2017 and March 2022. Further, DJB performs flushing/cleaning of Pr. UGRs and Secondary UGRs on a yearly basis. Testing of water is done to ensure that, after flushing, the water supplied is of the desired quality. Analysis of limited test reports[10] provided to Audit revealed that out of 46 parameters as prescribed by IS 10500:2012 standards, only 16 parameters were checked by DJB **(Annexure 2.3)**.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

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[9] To process wastewater from existing WTPs to extract treatable water which is further treated and supplied to consumer.

[10] Of 15 cases in respect of 13 UGRs.

Recommendation 5: Government should ensure that water quality testing is performed for all the prescribed parameters.

2.6 Augmentation of water resources

Keeping in view the water scarcity in Delhi, DJB took initiatives to raise groundwater aquifers by adopting alternate means of surface water consumption like rainwater harvesting and issued various guidelines and regulations from time to time. Deficiencies noted in the implementation of these measures are as below:

2.6.1 Groundwater Management and Regulation

For monitoring of district wise ground water level and assessment of quantity of extraction and recharge of groundwater in Delhi, the DJB is dependent on the Central Ground Water Board (CGWB).

DJB had extracted 90 MGD of raw water from 11 Ranney wells and 4919 tube wells during 2022-23. Additionally, permission for new tubewell/borewells is being obtained from Advisory Committee constituted in this regard by the GNCTD for augmenting the water supply.

2.6.1.1 Non Enactment of Delhi Water Board (Amendment) Bill, 2011

Delhi Water Board (Amendment) Bill, 2011 was prepared (January 2011) by DJB for enactment by the Legislative Assembly of the NCT of Delhi. The proposed amendment was meant to provide *'Planning for regulation, control and development'* of groundwater as one of the functions of the Board, instead of only '*extraction and management'* as under the Delhi Water Board Act, 1998. Audit observed that the amendment bill was yet to be enacted despite a lapse of more than fourteen years since the amendment bill was prepared by the DJB. Hence, there was no authority under the Delhi Government or DJB which has powers to effectively plan to regulate, control and develop groundwater resources.

2.6.1.2 Quality of Ground water in Delhi

Quality control cell of the DJB regularly monitors the groundwater quality to ensure that it is fit for drinking. Quality testing of groundwater was carried out on 16,234 samples by the eight zonal laboratories of the Delhi Jal Board during the period 2017-18 to 2021-22. Out of the total samples tested, 8,933 samples (55 *per cent*) were found unfit for potable purposes. Audit noticed that the percentage of failed water samples ranged from 49 *per cent* to 63 *per cent* during the audit period. Supplying groundwater from areas where samples were found unfit poses serious health risks to the public consuming this sub-standard drinking water.

2.6.2 Rain Water Harvesting System

Keeping in view the water scarcity in Delhi and the depleting groundwater levels, Delhi Jal Board (DJB) promoted rainwater harvesting. DJB issued various guidelines and regulations from time to time to support these measures.

Audit noticed the following shortcomings in implementation of Rain Water Harvesting System (RWHS) in Delhi.

2.6.2.1 Installation of RWHS

As per provision of Delhi Water & Sewer (Tariff and Metering) Regulations, 2012 (consumers having a plot/property of size 500 sq. metre or more are required to make provisions for rainwater harvesting within one year in case of commercial property and within three years in case of residential property. Failure to do so within this period entails enhancement of water bill by 50 *per cent*. While granting water supply connections, consumers are required to pay Infrastructure Development Charges to DJB based on the area of the property and thus, DJB should be having the details of consumers having properties with area in excess of 500 square metres.

As per information provided by RWH division of DJB, total 2909 RWHS were installed during 2017-18 to 2021-22 in plots of more than 500 square meter and 7590 RWHS were installed in various government departments till date. DJB divisions had conducted inspection of RWHS during the period from September 2021 to February 2022 and found 44 private properties in which RWHS was installed but not functional.

However, the details of properties with an area of 500 sq mtrs or the penalty imposed by way of enhanced water bills in cases of non-installation of RWHS were not provided to Audit. Thus, Audit could not ascertain whether DJB is levying water charges at enhanced rates in case of defaulters.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

2.6.3 Rejuvenation of water bodies/water sources

The Majority of existing water bodies/water sources in Delhi - underground water, lakes, rivers and reservoirs etc have to rely on monsoon rain to replenish naturally. Water bodies in NCT of Delhi are under ownership of various agencies such as DDA, ASI, MCD etc. NGT had directed the Government of NCT of Delhi (June 2016), Central Ground Water Authority and Delhi Jal Board to clean, maintain and restore all water bodies, natural wells etc. which are in existence in the NCT of Delhi. Subsequently, Delhi Jal Board had identified 240 water bodies for restoration and proposals to revive 155 water bodies at a cost of ₹ 376.79 crore were approved by DJB in December 2018. The consultancy work for preparation of DPRs was awarded to NEERI. However, DJB had awarded the work of rejuvenation of only 56 water bodies in nine phases from

October 2019 to March 2022. The following are the observations related to these works of rejuvenation:

i. There were excessive delays in the rejuvenation work as 24 out of 56 water bodies (43 *per cent*) were rejuvenated with delay of 14 months to 27 months against given time of three to six months. Further, no study on impact of rejuvenation works on the groundwater levels was carried out by DJB.

ii. DJB did not make any agreement with the land owning agencies where the water bodies were located, for taking over and carrying out maintenance work after the completion of the rejuvenation of water bodies. Thus, continued maintenance of these bodies remains doubtful.

iii. 776 water samples were collected from 38 water bodies by the DJB's laboratories from March 2022 to November 2022. Out of these, only 172 samples (21 *per cent*) of 13 water bodies were found fit for recharging of ground water. Thus, DJB is recharging groundwater using contaminated water, thereby compromising groundwater quality and undermining the objective of rejuvenating water bodies.

iv. Joint physical verification (November/December 2022) of three water-bodies where Phytorid technology[11] was being used (at Hastsal, Siraspur and Toda Pur) and three water-bodies (at Sanjay Van, Burari and Rani Khera) where Floating Rafter technology[12] was being used, revealed the following:

- The Phytorid technology was dysfunctional at Toda Pur site as as the water body was completely dry. At Rani Khera, floating rafters did not have plants and other equipment (like air blowers and pipes) at the site.
- At Hastsal and Siraspur (Photo 2.5), no boundary wall was constructed, hence locals were dumping garbage in the water body. Both water bodies were found with lot of floating garbage. The water looked dirty. Thus, treatment done and expenditure incurred would become wasteful unless such dumping of garbage is prevented.

[11] Phytorid Technology uses specially selected plants in a constructed wetland system to filter and purify wastewater.

[12] Artificial floating platforms where plants are grown allowing them to filter pollutants from water through their roots.

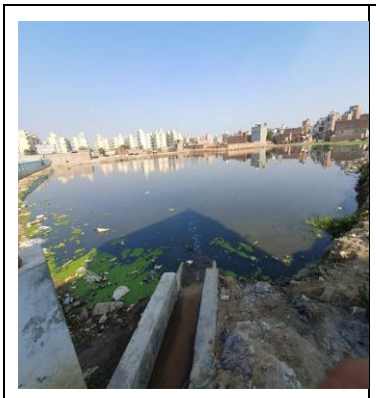
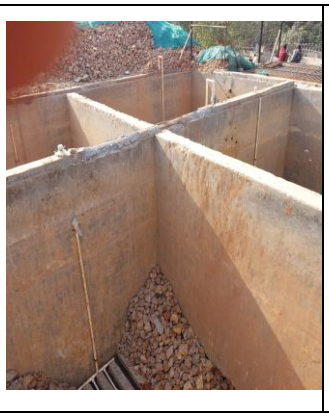


Photo 2.5: Siraspur: Water body without boundary wall (09.12.2022)



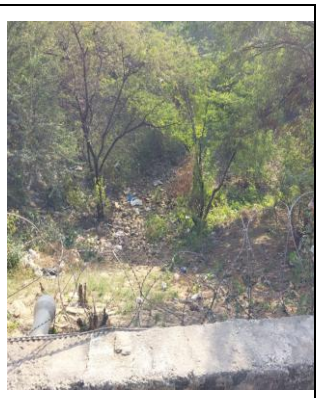


Photo 2.6 & 2.7: Dry water body and empty Phytorid tank at Todapur (08.12.2022)

Water Testing Reports of these water bodies were not made available to audit.

The Division in its reply (December 2022) stated that the work of water body rejuvenation was carried out on the basis of DPR. DJB further stated that since it is not the land-owning agency, the point of lack of boundary walls around water bodies pertains to land-owning agencies.

The reply is dilatory. Since the onus of rejuvenating the water bodies had been taken up by DJB, they should have ensured the continued viability of the rejuvenated body and made comprehensive DPRs to ensure the sustainability of the rejuvenated water body.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB had assured to comply with the shortcomings pointed out by Audit.

Chapter - 3
Water Supply and Distribution System

Chapter 3

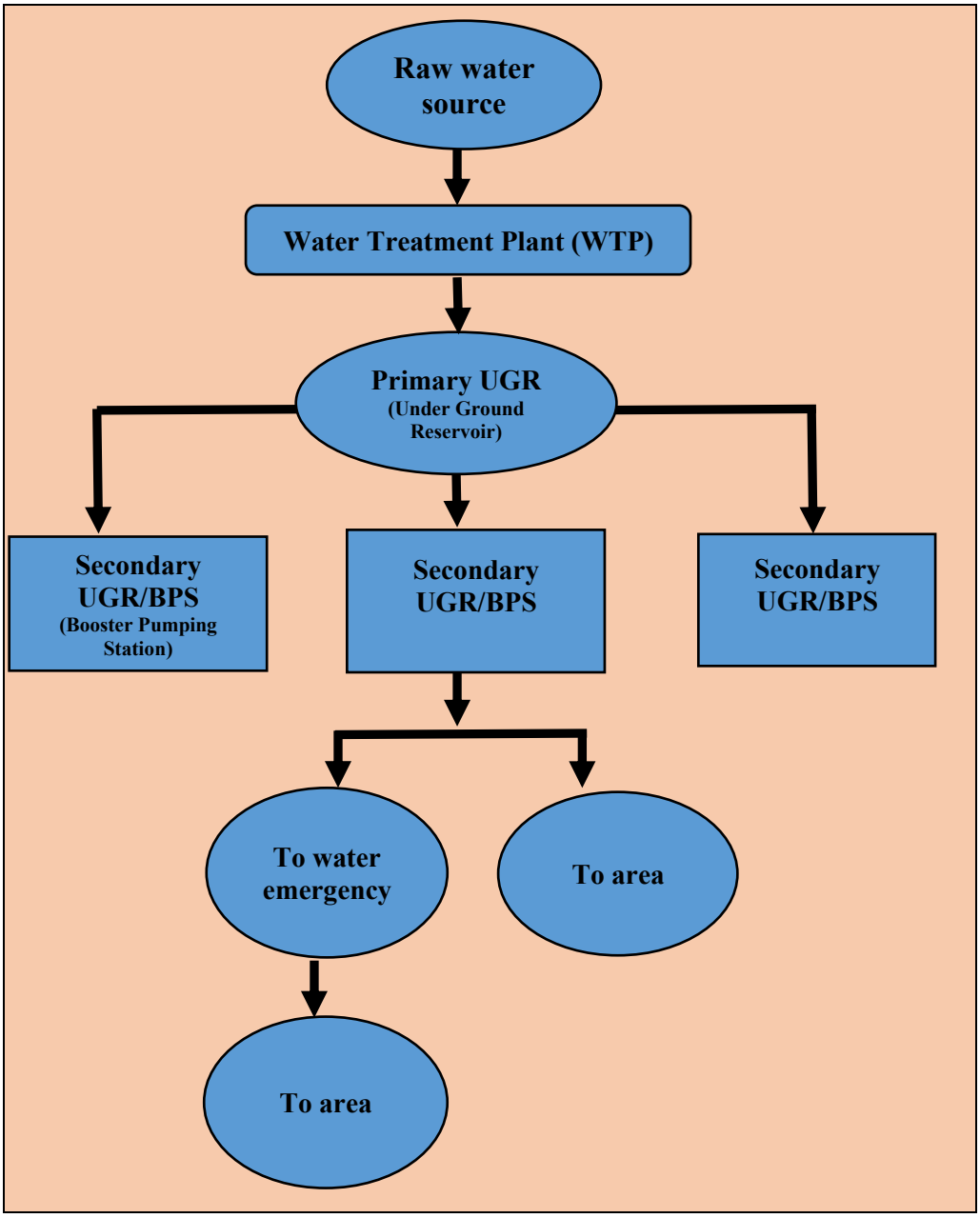
Water Supply and Distribution System

DJB has increased production of potable water from 883 MGD (2017-18) to 935 MGD (2021-22) i.e. 52 MGD; however, total water available for distribution could be increased by only 3.81 MGD. The gap of total water produced and total water distributed increased from 16 *per cent* (2017-18) to 21 *per cent* (2021-22). There was continuous water wastage due to leakages at various UGRs (Underground Reservoirs)/BPSs (Booster Pumping Stations). DJB could not achieve planned aim of replacement of old water distribution lines to ward off losses due to leakages. There was absence of an effective monitoring mechanism in DJB so as to ensure that testing of water samples was done as per fixed parameters/standards. The risk of theft, pilferage and diversion was also high due to the absence of GPS-based monitoring system in the majority of the tankers.

The primary objective of DJB is to provide potable water that has passed through all water quality testing at a reasonable economic price to the residents of Delhi. DJB is also required to take suitable steps to ensure proper supply of water by regularly upgrading and augmenting its supply pipeline network by replacing old pipelines, laying new pipelines, and having a robust leakage management system.

The distribution system of water is depicted in **Diagram 3.1**.

Diagram 3.1: Water distribution system



DJB has 15,383 KM of piped water supply network for the distribution of treated drinking water to the residents of Delhi. The entire area of Delhi is divided into 11 Zones for all maintenance works etc. Each zone is headed by an Additional Chief Engineer (Civil/ E&M).

Audit observed shortcomings in the supply and distribution of available potable water as discussed in the succeeding paragraphs.

3.1 Transmission loss/leakages of water and inequitable supply of potable water

During 2017-22, the details of total potable water produced and distributed from the UGRs is given in **Table 3.1**.

Table 3.1: Transmission loss of water

Year	Production of water (in MGD)	Water distributed from UGRs (in MGD)	Transmission loss of water / Water unaccounted for *(per cent)*
2017-18	883	739	16.31
2018-19	896	740	17.41
2019-20	923	741	19.72
2020-21	928	742	20.04
2021-22	935	742.81	20.56

Source: Information provided by DJB

It can be seen from **Table 3.1** that during 2017-22, the gap of total water produced, and total water distributed from OHTs/SRs[1]/UGRs increased from 16 *per cent* (2017-18) to about 21 *per cent* (2021-22). This indicates that DJB has not taken effective steps in reducing the transmission loss of water from WTPs to SRs/OHTs/UGRs.

It can also be seen that though the production of potable water increased by 52 MGD (5.89 *per cent*) from 883 MGD (2017-18) to 935 MGD (2021-22), the total water available for distribution increased by only 4 MGD (0.52 *per cent*) during the said period. This loss of water/water unaccounted for may be due to transmission loss, leakages, theft, unauthorized diversion, etc. Thus, the overall increase in the distribution of potable water was not commensurate with the increase in the supply of potable water.

Audit could not ascertain the quantity of loss during the supply of water from the UGRs to the consumers, as information/records in this regard were not provided. However, after considering the distribution loss, the water finally reaching the consumers would invariably show more shortfall.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 6: Government should ensure that DJB frames specific guidelines for Water audit and regularly conduct the same to evaluate the existing water supply system to minimise the transmission loss of water from the WTPs to SRs/OHTs/UGRs.

3.1.1 Shortage and inequitable supply of potable water at zonal level

(a) The year-wise details of the distribution of water supply from UGRs to various zones are given in **Annexure 3.1**. The summarised position of per capita water supply to different zones under respective Additional Chief Engineers (ACEs)/ Chief Engineers (CE) is given in **Table 3.2**.

[1] OHT = Over-head Tanks, SR = Service Reservoirs (same as Under Ground Reservoirs (UGRs)).

Table 3.2: Per capita water supply in 11 ACE(M)s and CE(W)Pr.-I

Per capita water supply range in 2021-22 (GPCD)	No. of ACEs/CEs providing water in the range	List of ACE(M)s/CEs
<20	4	ACE(M)-2, ACE(M)-4, ACE(M)-7, ACE(M)-11
>=20 and <30	2	ACE(M)-1, ACE(M)-5
>=30 and <38	6	ACE(M)-3, ACE(M)-6, ACE(M)-8, ACE(M)-9, ACE(M)-10, CE (W) Pr.-I

Source: Data provided by DJB

As is evident from **Table 3.2**, the average water supplied in the year 2021-22, besides being inequitable amongst the various localities of Delhi, was also way lower than the requirement of 60 (GPCD). Further, the shortfall was more severe in the localities like Seemapuri, Burari, Mehrauli when compared to localities like Rajouri Garden, Greater Kailash, Malviya Nagar, indicating a skewed distribution of water supply.

The above status indicates the failure of DJB in supplying water equitably to the residents of Delhi during the period 2017-18 to 2021-22. Such high shortfall indicates that DJB has not been able to deliver evenly the water treated by WTPs to the population of Delhi.

(b) During 2017-22, test checks of records of six Divisions revealed that in all the Divisions, average percentage shortfall in supply of water ranged from 26.91 *per cent* (West-I division) to 38.05 *per cent* (South West-II division) except South-II division. In South-II division, the average percentage shortfall was around 12 *per cent* from being surplus in 2017-18.

During the Exit Conference, DJB assured that necessary steps would be taken to reduce the quantity of transmission loss of water.

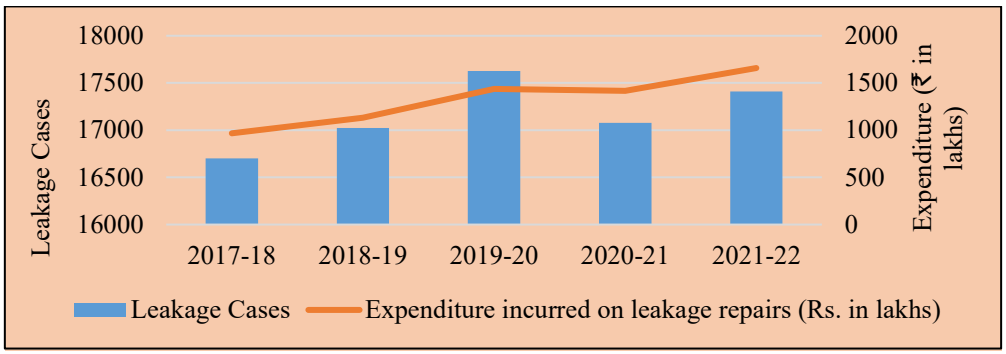
3.1.2 Water leakage management

As per Economic Survey of Delhi of 2021-22, DJB estimated that the total distribution losses, which includes leakage in pipes and theft of water through unauthorized connections, are of the order of 45 *per cent* of the total water supply. Leakages are detected through inspection/survey by the Leak Detection and Investigation Cell (LDI Cell) and also from complaints from public. The leakages are to be attended to by the Maintenance Division concerned as soon as they are detected and Action Taken Reports (ATRs) sent by divisions are to be compiled by the LDI cell. The LDI survey teams also check whether the leakages reported earlier are attended by the divisions or not.

Analysis of the data related to 'Leakage cases' provided by DJB relating to the 11 ACE(M)s[2] has revealed that the number of cases of leakage has shown a generally increasing trend (**Chart 3.1**).

[2] Nil data provided for ACE(M)-6; CE(W)Pr-1 has not provided complete data (expenditure not provided), hence data for CE(W)Pr-1 has not been included in total.

Chart 3.1: Increase in Leakage Cases



DJB did not furnish to Audit any work plan for conducting leak detection surveys/inspections based on the age of pipelines, susceptibility to leakages, topography, etc. Other shortcomings are as under:

i. Audit noted that no new equipment was procured by LDI Cell during the years 2017-18 to 2021-22. LDI Cell had only four functional equipment (as on 31st March 2018), which were reduced to two during the year 2021-22. Resultantly, the number of inspections/surveys for leakage detection by the LDI Cell had decreased by 85 *per cent* during 2017-22, as shown in **Table 3.3.**

Table 3.3: Leakage detections by LDI Cell and ATRs submitted

Year	Number of inspections/ surveys done by Leak Detection Cell	Number of Leakages detected by leak Detection Cell	No. of detection cases in which Action Taken Reports (ATRs) were submitted by concerned division	Percentage of detection cases in which ATRs submitted
2017	1387	1387	5	0.36
2018	1033	1033	85	8.23
2019	1192	1192	68	5.70
2020	803	803	3	0.37
2021	478	478	1	0.21
2022*	204	204	0	0.00

* Data till 31st March 2022 only

Source: Data provided by DJB

ii. The number of inspections conducted tallied with the leak cases detected. This indicates that inspections were restricted to only confirm cases of leaks and there was no preventive leak detection work being carried out.

iii. Further, there was no monitoring of action taken by the divisions in resolving leakages pointed out by the LDI Cell as ATRs were seldom submitted by the divisions concerned.

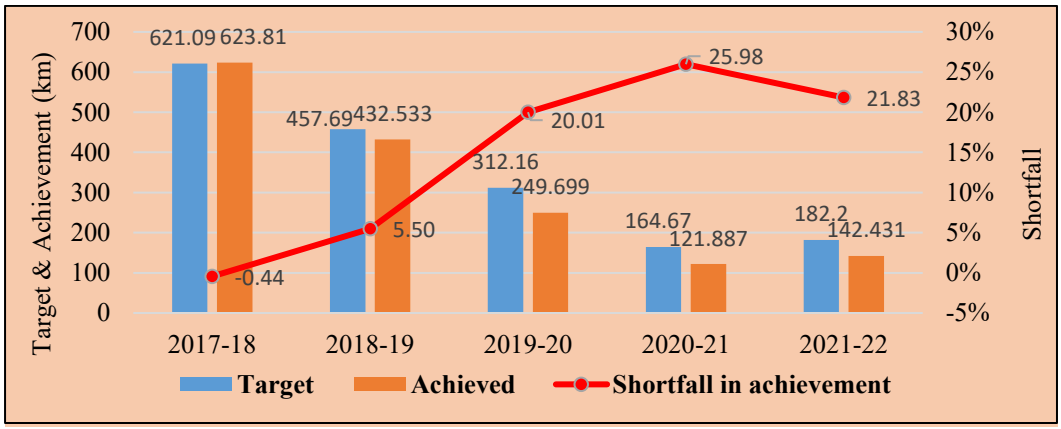
iv. The format of the ATR was deficient as it did not contain crucial monitoring parameters viz the date of leak detection by LDI, date of leak resolution by the division etc. In the absence of such details, Audit could not ascertain whether prompt action was taken by the concerned divisions.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB accepted the shortage of equipment in LDI Cell and assured that additional equipment and manpower would be provided to LDI Cell, and proper planning would be done to substantially increase the number of inspections/surveys.

3.2 Laying of new water pipelines and replacement of old pipelines

(i) While DJB has been fixing targets for laying new water lines, it did not provide records about the process/criteria adopted by it for fixing these targets. In the absence of relevant records, it could not be ascertained whether the targets fixed were part of any planned activity or ad hoc. The target vis-à-vis the achievement of laying of new water distribution lines during 2017-18 to 2021-22 is shown in **Chart 3.2**.

Chart 3.2: Targets and achievement for laying of new distribution lines



Source: Data provided by DJB

As can be seen from **Chart 3.2**, the percentage shortfall against the laid down targets for new pipelines during the review period continuously increased, except in 2021-22, wherein the shortfall was marginally lower. What is also significant is that the overall target for new lines had also drastically reduced by 71 *per cent* during the period under report.

Analysis of overall zone-wise data of new water distribution lines laid during 2017-18 to 2021-22 revealed that in three[3] out of 12 ACEs/CE (W Pr.-I) Zones, the shortfall against the target of laying new lines was more than 25 *per cent*.

(ii) As per the Economic Survey of Delhi 2020-21, a significant portion of water pipelines in Delhi are as old as 40 to 50 years and thus prone to higher leakage losses. Details are given in **Table 3.4**.

Table 3.4: Age analysis of water supply pipelines

Age of water pipeline	0-20 Years	20-40 Years	>40 Years
Length of water pipeline (in km)	6181.34 (50%)	4718.82 (39%)	1308.53 (11%)

Source: Data provided by DJB

[3] ACE(M)-3, ACE(M)-5, ACE(M)-10

It can be observed that around 11 *per cent* of the pipelines are more than 40 years old. It is pertinent to mention here that since data relating to only 12,000 out of 15,000 km of pipelines was provided to Audit, the length of pipelines older than 40 years might be higher than the figures mentioned above.

However, DJB's approach towards the replacement of old pipelines lacked impetus. Analysis of ACE (M)-wise data provided by DJB in respect of "Replacement of old water distribution lines" revealed that there was an overall shortfall in achievement of targeted replacements of around 8.38 *per cent*. Here too, there was nothing on record to show the rationale behind fixing of yearly targets, nor was there any SOP/Plan regarding phased replacement of water pipelines after defined time periods.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

3.3 Revenue Losses due to Non-Revenue Water

Non-Revenue Water (NRW) is defined as the extent of water produced which does not earn any revenue to the organisation. This is computed as the difference between the total water treated and supplied by WTPs and the total quantity of water billed, expressed as a percentage of the total water treated and supplied. As per the Ministry of Urban Development, Government of India's 'Handbook of Service Level Benchmarking', NRW comprises: (a) consumption which is authorised but not billed; (b) apparent losses such as illegal water connections, water theft and metering inaccuracies; and (c) real losses like leakages in the transmission and distribution networks. As per the Handbook, the benchmark value for NRW may be considered at 20 *per cent*.

During the period 2017-18 to 2021-22, the average quantity of total treated water supplied was 883 MGD during the year 2017-18, which increased to 935 MGD during the year 2021-22. The details of treated water supplied, billed quantity of water and NRW for the period 2017-18 to 2021-22 is given in **Table 3.5**.

Table 3.5: Treated water, billed water, NRW and loss of revenue on account of NRW beyond benchmark value

Year	Average quantity of treated water supplied per day (in MGD)	Billed quantity of water supplied per day (in MGD)	Non-Revenue Water (NRW) per day (in MGD)	Percentage of NRW w.r.t. supplied treated water (*per cent*)	Revenue earned by DJB by billed quantity of water (₹ in crore)	Estimated amount of revenue loss due to NRW beyond benchmark value[4] (₹ in crore)
(i)	(ii)	(iii)	(iv) = (ii) – (iii)	(v) = (iv)/(ii)*100	(vi)	(vii) = {(vi)*0.8*(ii)/(iii)} - (vi)
2017-18	883	421	462	52.32	1662.35	1126.92
2018-19	896	419.92	476.08	53.13	1824.35	1289.80
2019-20	923	524.91	398.09	43.13	1705.41	693.62
2020-21	928	457.07	470.93	50.75	1682.23	1050.15
2021-22	935	450.39	484.61	51.83	1252.85	827.86
Total						**4,988.35**

Source: Information provided by DJB

As it is evident from **Table 3.5**, the percentage of NRW was in the range of 51 *per cent* to 53 *per cent* during the period 2017-18 to 2021-22 (except for the year 2019-20) as against the acceptable level of upto 20 *per cent*. However, there was nothing on record to show that DJB made any efforts to reduce the NRW. Reduction in NRW to an acceptable level is also vital for the financial sustainability of DJB. Even after considering an allowance of 20 *per cent* as NRW, DJB should have collected Revenue corresponding to 80 *per cent* of the water produced. The potential revenue loss on account of NRW beyond the benchmark for the review period was to the tune of ₹ 4,988 crore.

During the Exit Conference, DJB, while accepting the audit finding, intimated that necessary efforts were being made to reduce the Non-Revenue Water.

3.4 Inadequate monitoring of water quality

DJB has set up eight water testing laboratories in Delhi, which function under the Director (Testing and Quality Control). These laboratories check the quality of drinking water being supplied. In case the water samples are found unfit for drinking, the reasons for contamination are required to be investigated, and the zonal maintenance staff is required to attend to it immediately.

In this regard, the audit observed the following shortcomings:

(i) Year-wise details of the samples tested and found adverse or below the required standards during the period 2018-19 to 2021-22 are given in **Table 3.6**.

[4] Of 20 *per cent*.

Table 3.6: Increasing rate of failure of water samples in quality testing

Year	No. of samples collected	Samples were found adverse or below BIS 10500 standard			
		Physical		Chemical	
		No. of Samples failed	per cent of samples failed	No. of Samples failed	per cent of samples failed
2018-19	187982	1517	0.81	1559	0.83
2019-20	200680	2911	1.45	2935	1.46
2020-21	210546	3144	1.49	3189	1.51
2021-22	179946	3138	1.74	3166	1.76

Source: Data provided by DJB

As per 'Handbook of Service Level Benchmarking' by Ministry of Urban Development, GoI, benchmark for 'Quality of water supplied' is 100 *per cent*. During the period 2018-19 to 2021-22, cases of samples failed in 'physical quality tests' out of the total sample collected more than doubled and increased from 0.81 *per cent* to 1.74 *per cent* of the total samples collected. Similarly, samples that failed 'chemical quality tests' also doubled from 0.83 *per cent* to 1.76 *per cent*. This shows a deteriorating trend in the quality of water being supplied to residents of Delhi by DJB.

(ii) Out of 12 ACE (M), data of only two were provided. Thus Audit was unable to make a disaggregated analysis of water quality across localities in Delhi.

(iii) Test check of 27 water quality reports at the end point of water supply i.e., at the consumer level, revealed that in 26 cases, only three parameters[5] out of a total of 46 prescribed by IS 10500:2012 were tested by DJB, whereas in one case, 15 parameters were tested **(Annexure 3.2)**.

(iv) DJB also draws raw water from borewells, which, after treatment, is supplied to the consumers. It was observed from the replies provided by DJB to audit that only four out of 46 parameters as prescribed by IS 10500:2012 were tested by the laboratories **(Annexure 3.2)** for borewell water.

As seen from the above, tests related to critical parameters viz "toxic substances[6]" "radioactive substances", "biological tests", and "virological tests" were not conducted by DJB. Tests for the presence of heavy metals like arsenic, copper, lead, etc. in the water were also not conducted by DJB. It is pertinent to mention here that the presence of radioactive substances and heavy metals in drinking water can be fatal as these substances may cause damage to the liver, kidney, and intestine, and also cause anemia and cancer in humans. Thus, not conducting the above mentioned tests and monitoring water quality for health-critical parameters exposes the residents of Delhi to serious illnesses and health problems.

[5] Residual Chlorine, Total Coliform, E. Coli.
[6] Including pesticides.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB intimated that the Wazirabad lab has been upgraded and that instructions would be issued to all labs to test all the required parameters.

3.5 Undue delay in executing works relating to complaints of water contamination

The Executive Engineer of the division concerned has to take corrective measures on the complaints regarding contaminated water received from residents to prevent supply of contaminated water. Test check of files/records at selected divisions revealed that there were significant delays between the date of receipt of the complaint and to the replacement of the damaged water line (causing supply of contaminated water). The delays in attending to the complaints ranged from 154 days (5 months) to 2,152 days (6 years). Supply of contaminated water to the residents in this interregnum could not be ruled out. Further, delays in attending the complaints indicates that DJB has not put in place a proper responsive grievance redressal mechanism for the complaints related to contaminated water.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB assured that necessary steps will be taken to avoid such delay and instructions will be issued.

3.6 Absence of GPS trackers in departmental and hired tankers

During emergency/short supply of water/repair and maintenance work, water is supplied by DJB through tankers (departmental or hired) to the residents. To ensure accurate and timely delivery at consumer's end, DJB had initiated (June 2015) a system of installing Global Positioning System (GPS) trackers in such water tankers.

The analysis of around 143 departmental tankers and around 335 hired tankers of seven ACE(M)s[7] and CE(W) Pr-I revealed the following:

(i) No GPS tracker was installed in the departmental tankers during the period 2017-18 to 2021-22.

(ii) The percentage of hired tankers in which GPS was installed during the review period ranged between 21 *per cent* to 38 *per cent* only.

(iii) Analysis of ACE-wise data revealed that in four ACEs(M) viz. (ACE(M)-2, ACE(M)-3, ACE(M)-7 and ACE(M)-10), no GPS was installed in the hired tankers either.

Thus, the very purpose of fitting GPS trackers in both categories of tankers was defeated. In the absence of GPS monitoring in the majority of tankers, the risk of theft, pilferage, and illegal diversion of water is high.

[7] ACE(M)-4, ACE(M)-5, ACE(M)-9 and ACE (11)- provided two different sets of data which varied from each other, these were excluded from analysis.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB stated that GPS trackers have been installed in all the water tankers. However, no document in support of the assertion was provided to Audit.

3.7 Shortcomings in the management of Water ATMs

To improve potable water availability in JJ clusters and areas not connected with a piped network, DJB in the year 2012-13 introduced RO-based decentralized water dispensing machines (Water ATM). Such ATMs were to be entirely managed by private operators who were authorized to extract groundwater for this purpose. The operators recovered their cost by collecting a user fee (as of December 2022, ₹ 2 to ₹ 6 per 20 litres). During the year 2021-22, it was noted that 71 water ATMs were functioning in Delhi.

(i) Details of the quantity of water supplied through these ATMs were not furnished to Audit. In the absence of the details, Audit could not ascertain whether DJB had regulated or monitored the extraction of groundwater for supply through these ATMs, which could have helped DJB in assessing the requirement of water in those areas.

(ii) Data on water quality of only six out of seventy-one Water ATMs was provided by DJB (though complete test reports were not provided), due to which compliance to IS 10500:2012 standards for water quality could not be ascertained.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 7: Government should ensure installation, proper functioning, and daily monitoring of GPS trackers in all categories of water tankers and monitor and supervise the quantity and quality of water supplied through Water ATMs.

Chapter - 4
Sewerage Management

Chapter 4

Sewerage Management

All sewage generated in the NCT of Delhi ultimately finds its way into the river (whether treated or untreated). However, the Board did not have reliable figures of water usage and sewage generation in Delhi to address the problem of pollution in River Yamuna effectively. Treated effluent from 25 out of 35 STPs did not meet the norms prescribed by DPCC. The Biological Treatment Process at the STP continued to deteriorate, despite intimations from the quality control wing resulting in poor quality of treated effluent and bad odour in and around the plants of DJB. 74 *per cent* of the treated effluent was not fit for reuse.

DJB is responsible for sewage disposal and drainage within NCT of Delhi and for matters connected therewith. All sewage generated in the NCT of Delhi ultimately finds its way into river Yamuna (whether treated or untreated). As per Delhi Pollution Control Committee (DPCC) report (March 2022), the BOD[1] levels in river Yamuna were up to 70 mg/l i.e. 23 times, and FC[2] levels as high as 6300000 MPN i.e. 12,600 times higher than the recommended criteria of Central Pollution Control Board (CPCB). These data clearly shows the high levels of pollution in the Yamuna.

This chapter reports on the sewerage system of Delhi including sewer generation, collection, conveyance, treatment and disposal during the period 2017-18 to 2021-22.

4.1 Anomalies in the estimation of sewage generated in Delhi

As per DPCC report, the total water flow (both treated water and untreated sewage) to Yamuna (March 2022) from Delhi through the untapped drains, STPs and CETPs is given in **Table 4.1**.

Table 4.1: Total water-flow to Yamuna River from Delhi

Drains →	Qudsia Bagh+ Morigate Drain	Barapulah Drain	Maharani Bagh Drain	Najafgarh Drain	Shahdara Drain	STP outfall	CETP outfall	Total
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Flow (MGD)	9.51	14.5	4.43	201	105	545	12.78	**892.22**

Source: DPCC Report (March 2022)

It can be seen from **Table 4.1** that STPs in Delhi treated 545 MGD (Col. g) of sewage and Common Effulent Treatment Plants (CETP) in Delhi treated 12.78 MGD (Col. h) of industrial effluent. As per the report, discharge from Najafgarh drain and Shahdara drain of 306 MGD includes 155 MGD raw sewage received from Haryana and U.P. Besides, several other smaller drains deposit sewage generated within the city into the River Yamuna.

[1] BOD-Biochemical Oxygen Demand.

[2] FC- Faecal coliform.

However, as per DJB, 742.81 MGD (2021-22) of potable water reaches the residents. Sewage water is estimated at 80 *per cent* of the supplied water and thus the estimate of waste water generated by this method gives 594.25 MGD of sewage generated in Delhi. Thus, there is a clear gap of 142.97 MGD[3] in the sewage/waste-water generation estimates of DJB and that of DPCC.

Given the multiplicity of data, Audit is of the opinion that unless DJB works to arrive at realistic figures of sewage generated in Delhi, a concrete and effective plan for its treatment would elude any remediation.

During the Exit Conference, DJB submitted that the flow measurements of various drains by DPCC were not accurate and all the flow was being captured before falling into River Yamuna.

However, in case DJB differs from the DPCC estimates, they need to take up the issue of reconciliation of data by the involved agencies' so as to have a coherent data set, a sine qua non for effective planning.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 8: Government should ensure the availability of realistic data on sewage generation based on scientific methods to enable effective management of sewerage and reduce dependency on other agencies.

4.2 Collection and conveyance of sewage generated in Delhi

Delhi Jal Board has a network of branching peripheral sewers (Main and Sub-Main sewers) of about 9000 km. Also, there is a 200 km network of trunk sewers.

DJB had finalized the Sewage Master Plan- 2031 (SMP) in June 2014. As per the SMP, the sewerage infrastructure in Delhi was to be improved in four phases according to the estimated sewage generation. For providing sewerage facilities in unsewered areas, DJB had formulated 93 schemes under SMP in four phases. The Phase-1 cover the period up to 2016, Phase-2 covers the period 2016-21, Phase-3 covers 2022-27 and Phase-4, 2027-31. The unsewered areas identified in SMP-2031 mainly consisted of unauthorized colonies (UACs) in Delhi. The estimated volume of the sewage generated from the unsewered areas in Delhi was about 212.59 MGD. Irregularities noticed in the implementation of SMP-2031 are discussed in the Chapter 5 of the report.

4.2.1 Untreated sewage (212.59 MGD) from 1080 colonies flowing into the stormwater drains in Delhi

Section 24 of The Water (Prevention and Control of Pollution) Act, 1974 prohibits the disposal of untreated sewage into stormwater drains/ water bodies. The unsewered areas identified in SMP-2031 mainly consisted of unauthorized colonies (UACs) in Delhi. As per the Economic Survey of Delhi 2021-22, of the

[3] Gap= Total flow of water as per DPCC report – (sewage generation from Delhi + sewage from other states) i.e. 892.22-(594.25 + 155) = 142.97 MGD.

estimated volume of the sewage generated from the unsewered areas in Delhi, 28 *per cent* (212.59 MGD) originated from the 1080 UACs which did not have sewer connection and was flowing through storm water drains **(Annexure 4.1)**.

In its reply, DJB admitted (February 2023) that the quantum of untreated sewage in Delhi is 238 MGD and also outlined various efforts being made to trap the untreated sewage by construction of new STPs/DSTPs and trapping of sewage from drains. It also intimated that as on February 2023 sewer lines are functional in 747 UACs. However, no documents were provided in support of the assertions.

4.3 Treatment and disposal of sewage

The sewerage treatment infrastructure of DJB as on 31 March 2022 is given in the **Table 4.2**.

Table 4.2: Sewerage Infrastructure in Delhi

No. of STPs	No. of functional STPs	Installed treatment capacity (MGD)	Available capacity[4] (MGD)	Utilised capacity[5] (MGD)	Length of Sewer Lines (Km)
38	35	697	622	545	9200

Source: Data furnished by DJB

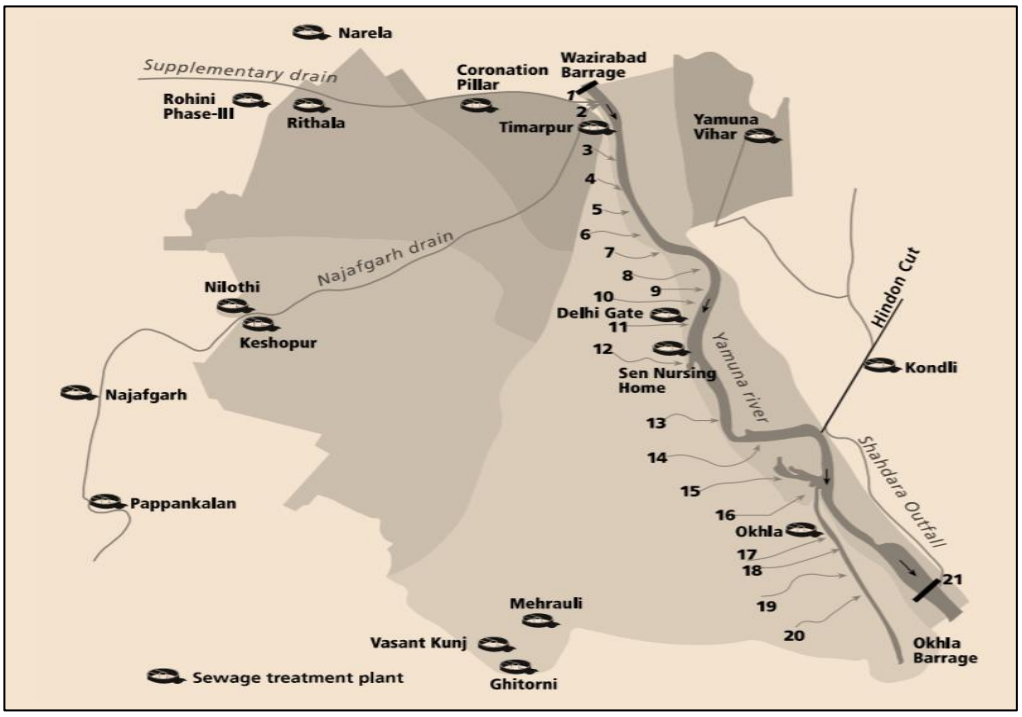
Capacity utilisation of all the 38 STPs as of March, 2022 has been outlined in **Annexure 4.2**

STPs in Delhi mainly use Biological processes for the treatment of sewage, where in Biological organisms are cultured and allowed to consume the organic matter and multiply their population through metabolism. The multiplied organisms are settled out and the clear treated sewage is free from the organic matter. The metabolism can be (a) by aerobic organisms needing oxygen like human beings or (b) by anaerobic organisms that do not need oxygen. The anaerobic digestion is preferred as it yields valuable methane gas, a source of thermal energy used to generate electricity. The digested remains are referred to as digested sludge and can be disposed off as soil filler.

The position of STPs along with major drains out-falling into river Yamuna is depicted in **Figure 4.1**.

[4] Three STPs of total capacity 75 MGD were under rehabilitation (01/2024).
[5] Based on availability of sewage.

Figure 4.1: Location of STPs and drains



Source: Internet

National Green Tribunal (NGT) vide its order dated 20 September 2018 directed GNCTD to restore Yamuna waters to at least bathing standards. Deficiencies in the treatment and disposal of sewage are discussed in the succeeding paragraphs.

4.3.1 No new STP constructed out of 56 STPs proposed under SMP-2031

As per the SMP 2031, the projected sewage generation of Delhi in 2021 was 863.4 MGD and sewage treatment capacity was to be augmented accordingly. For this purpose, 32 STPs with treatment capacity of 118.9 MGD were planned to be constructed by 2021 which were later revised to 56 STPs.

Audit noted that though the period of Phase- II (2017-21) of SMP has ended in 2021, not a single new STP against the proposed 56 STPs were constructed (June 2023). DJB did not furnish a reply to the audit observation.

During the Exit Conference, DJB stated that lack of progress was mainly because of unavailability of land.

4.3.2 Operation of 25 Sewage Treatment Plants in violation of CPCB/DPCC norms

Delhi Pollution Control Committee (DPCC) using its powers under the Water (Prevention and Control of Pollution) Act, 1974 revised (April 2016) the standards for treated effluent of sewage treatment plants to BOD/TSS[6] to 10/10 mg/l for discharge in water sources as well as for land disposal.

[6] The Biochemical Oxygen Demand (BOD) of 3 mg/l or less of the water ensures reasonable freedom from oxygen demanding pollutants and prevent production of obnoxious gases. TSS stands for Total Suspended Solids in the treated water.

The deadline for the achievement of the standards for existing STPs was within two years i.e. by April 2018.

Audit observed that out of the 35 functional STPs of DJB (as on March 2022), only 10 STPs are designed as per the parameters prescribed by DPCC and the remaining 25 STPs still have design parameters for the BOD/TSS levels in excess of 10/10 mg/l, a violation of the established norms.

Thus, the objective of restoring the Yamuna waters to bathing standards could not be achieved as under-treated effluent was continuing to be discharged into the river.

In its reply, DJB stated (January 2023) that the remaining STPs were in various phases of upgradation.

4.3.3 Absence of mechanism to monitor Faecal Coliform (FC) bacteria levels in the treated effluent

As per the primary water quality criteria for bathing water, FC levels of < 500 MPN/100 ml are required to ensure low sewage contamination.

During joint physical inspections of 22 STPs (April – December 2022), the Audit noticed that DJB was not monitoring the levels of FC in the treated effluent emanating from STPs. DJB's labs were monitoring Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) only.

This is not only in violation of the orders of Hon'ble NGT but also the Yamuna waters cannot be restored to bathing standards without monitoring the FC levels, as the treated effluent ultimately finds its way into the river.

In its reply (December 2023), DJB stated that monitoring of FC level in treated effluent is being done at Okhla, Yamuna Vihar and Keshopur STPs. In the rest of STPs, it is in process. Audit, however, noticed that regular monitoring of FC level in treated effluent emanating from all STPs' were not being done till December 2023.

4.3.4 Major irregularities in O & M of Kondli STP

The work of 45 MGD STP at Kondli, Delhi on DBO[7] basis was awarded (May 2008) and the Operation and Maintenance (O&M) period of the STP started w.e.f. February 2016.

Audit observed the following major irregularities in contract management on the part of DJB as below:

1. No reserve fund was created[8] as per clause 5.3.3 of Contract Agreement to support the cost of major maintenance, repairs and replacements of STP.

[7] Design, Build and Operate.
[8] By setting aside a portion of the periodic fixed payment component.

As a result, the functioning of the plant was badly affected due to lack of regular repair and maintenance by the contractor who cited lack of funds.

2. The plant was allowed to be operated manually in violation of contract provisions which required the O&M of the plant through Programmable Logic Controllers (PLC) based automation system i.e. Supervisory Control and Data Acquisition (SCADA) System (clause.1.2.8 of the CA).

As a result of the above, the Biological Treatment Process at the STP continued to deteriorate, despite intimations from the quality control wing resulting in poor quality of treated effluent and bad odour in and around the plant. The Audit team also observed that diffusers in the aeration tanks were not functioning during Joint Inspection which may lead to anaerobic conditions[9].

Photo 4.1: Malfunctioning of diffusers in Aeration Tank observed at Kondli STP

Despite residents' complaints since 2014, the work order for Retrofitting Odour Control Units at the STP was delayed and issued only in August 2021 in compliance to NGT's orders. DJB paid an amount of ₹ 25 lakh to CPCB on account of penalty imposed by NGT for delay in action. Thus, inactivity on the part of DJB in addressing an issue which was persistent since 2014 resulted in an avoidable payment.

During the Exit Conference, DJB admitted that there were some lapses on the part of DJB and that they were being rectified.

4.4 Irregularities in Septage Management

There are more than 1000 unauthorised colonies in Delhi (February 2023) where sewerage system was not functional, septage is collected in septic tanks. GNCTD notified (12 November 2018) the Delhi Water Board Septage

[9] Lack of oxygen needed for bacterial growth.

Management Regulations 2018, for regulating collection, transportation and disposal of waste of septic tanks (septage) and for matters connected therewith in NCT of Delhi.

Audit, however, observed the following irregularities in the septage management in violation of the said regulations.

4.4.1 Issue of 272 licenses for collection and transportation of septage in violation of the septage managements regulations

DJB issued 284 licenses (till 5 June 2022) for septage collection, out of which only 12 licensees (four *per cent*) were in compliance with the conditions laid down in the regulations. The rest 272 licensees (96 *per cent*) did not fulfil conditions viz. availability of valid transport permit, trained workers, availability of safety gear etc. and insurance cover for the workers.

Despite lack of compliance, these licensees have been functional for more than three years as provisional licenses for six months were issued and renewed by DJB though there is no provision for provisional licences in the Rules.

During the Exit Conference DJB assured to take necessary action.

Photo 4.2: Licensees disposing of septage at DJB installation without safety gear

4.4.2 Negligible collection of septage through tankers

The estimated volume of the sewage generated from the 1080 unauthorised colonies in Delhi is about 212.59 MGD as on March 2022 whereas the rate of septage collection through tankers was 0.27 MGD (March 2022), which is negligible as compared to the volume of untreated sewage in Delhi. This indicates that the scheme had limited effectiveness and DJB needs to take urgent steps to lay sewers in the unsewered areas to mitigate the problem of untreated sewage finding its way into the water bodies.

4.4.3 Absence of monitoring mechanism

Scrutiny of records revealed that there is no monitoring mechanism to check whether the fee charged by the septage collectors from the residents of the UACs was as per approved rates, whether septage only from the Delhi region was being hauled, whether disposal was at designated locations only etc.

In the absence of any checks, proper implementation of septage management regulations cannot be ensured as is evident from the complaints received from general public against the tanker operators and checks by CPCB teams.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

4.5 Reuse of treated wastewater/effluent

Wastewater is a water resource identified under the Delhi Water Policy. The major reuse of treated wastewater is for irrigation, horticulture, construction and industrial use. There is demand for use of treated wastewater for cooling in the power stations. Other options include ground water recharge, return to be raw water source, flushing of toilets, use of non-potable purposes like the washing of Railways and Buses, construction etc. Out of the total estimated wastewater of 594 MGD generated in Delhi, DJB produces 545 MGD of treated wastewater out of which, it is bound to return 250 MGD wastewater to River Yamuna under the Upper Yamuna Water Sharing Agreement. Thus, 295 MGD of treated wastewater is available for re-use and against this, DJB supplied a total of 89 MGD treated wastewater to the irrigation department, power plants and CPWD and DDA for horticulture purposes during 2017-18 to 2021-22.

Deficiencies in utilization of wastewater resource are discussed in the succeeding paragraphs.

4.5.1 Non-availability of wastewater conforming to prescribed parameters for reuse

As pointed out in para 4.3.2, out of the 35 functional STPs (utilized treatment capacity - 545 MGD), effluent of 25 STPs did not conform to the prescribed parameters[10] and combined utilized capacity of these non-conforming STPs was 405 MGD. DJB was also not monitoring the Fecal Coliform (FC) levels in the treated effluent (para 4.3.3) which rendered it unfit even for agricultural reuse as per CPHEEO norms[11]. This meant that 74 *per cent* of the treated wastewater was of inferior quality and not fit for any kind of reuse.

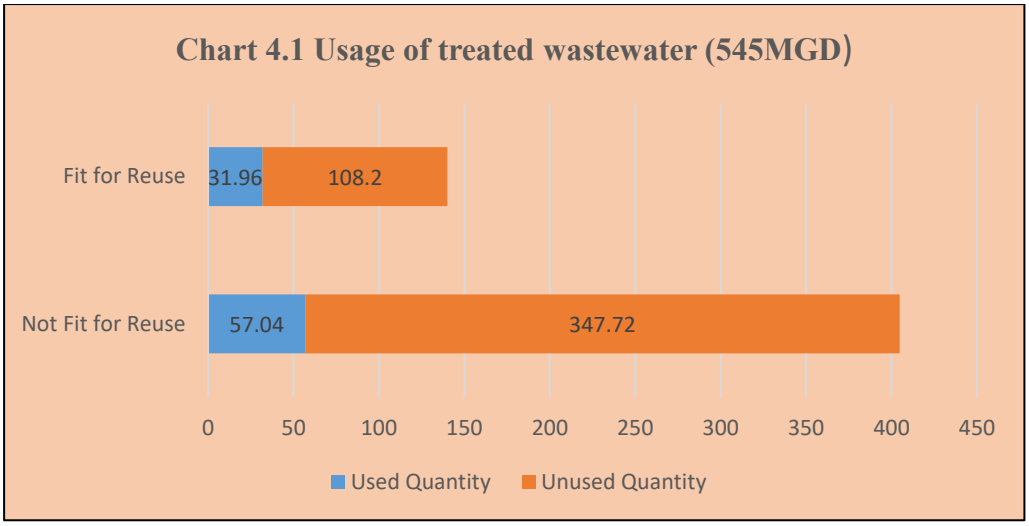
Thus, despite incurring expenditure on treatment of wastewater, 74 *per cent* of the treated effluent was not fit for reuse which not only defeated the purpose of treatment but also led to wasteful expenditure on treatment.

4.5.2 Under-utilization of treated wastewater

The quality parameters of treated effluent produced by 10 STPs were within permissible limit and therefore, could be reused for non-potable usage after chlorination. The quantity of this fit-for-reuse treated effluent was 140 MGD (545-405). Utilisation of effluent, both fit for use and unfit for use, was as shown in **Chart 4.1**.

[10] BOD/TSS values less than or equal to10/10 mg/l.

[11] For agricultural reuse BOD/TSS values upto 20/30 and FC levels upto 230/100 ml were needed.



Source: DJB and Economic Survey

As can be seen from the chart above, even fit-for-reuse treated wastewater supplied by DJB for various purposes was only 32 MGD whereas 108 MGD reusable effluent was returned to Yamuna River through drains.

One of the reasons for inability to re-use / low demand for wastewater could be failure of DJB in making treated wastewater easily available to the intended consumers. Effluent was sold at Seven Rupees *per* Kilo litre from the STPs for non-drinking purposes whereas potable water was supplied by DJB in its own tankers free of cost. Thus, it was easier to get potable water than the treated effluent (which required buying of wastewater from STP and hiring a tanker for its transportation).

4.5.3 Use of treated wastewater in construction activities not mandated

DJB is responsible not only for supply of potable water but also for regulating ground water extraction in NCTD (other than NDMC area). This makes DJB the only agency dealing with the supply of water in Delhi as all the water resources are at its disposal.

As per the National Framework on the Safe Reuse of Treated Water (Ministry of Jal Shakti, Government of India), one of the potential areas of reuse is construction. However, Audit observed that despite having monopoly, DJB has not mandated the use of treated wastewater even for its own construction activities/works, let alone for those of other departments/agencies. It was further observed that despite having sufficient treated wastewater, instead of supplying the same for construction activities, DJB was making reimbursements of water charges to its own contractors (**Para 5.4.5**).

Thus, lack of leadership and direction by DJB on mandatory reuse of wastewater in construction not only resulted in wasting of treated wastewater but also encouraged misuse of potable/ground water.

Best practice- Reuse of Effluent by Pragati Power Corporation Limited (PPCL)

DJB supplied 7.5 MGD treated effluent to PPCL for its power plant at Bawana from Rohini STP. For supplying treated effluent water, DJB constructed effluent pumping station and laid rising main as a deposit work. PPCL also bears the O&M expenses, electricity charges and other recurring expenses of the pumping station. In addition, DJB charges PPCL at the rate of ₹ four per KL for the supplied effluent. This arrangement is an ideal case for DJB, as it generates revenue without incurring any capital expenditure.

DJB may explore such revenue earning avenues from other power companies, MCD, DDA and private companies.

Chapter - 5
Projects/works execution by DJB

Chapter 5

Projects/works execution by DJB

WTP project at Chandrawal was delayed due to non-clearance of site, revisions in DPR, changes in specification of items, non-receipt of approvals from JICA and MoUD. Further in case of Wazirabad WTP, Asian Development Bank had withdrawn the funding due to delay in finalization of tender. Due to not following the NIT/tender conditions the work was awarded to ineligible contractors. In some cases of water/sewerage works, the works were either closed before completion or were not put to use after completion of the project resulting in unfruitful expenditure of ₹ 52.33 crore. Excess payment of ₹ 52.18 crore was made to contractors on account of cost escalation and fixed electricity charges.

Assessment of requirements of water and sewerage projects, timely approval from local bodies and other departments, preparing estimates on a realistic basis, framing NIT conditions and proper tendering process are important parts of planning projects in an essential public service organisation like DJB.

Audit examined selected projects under sewerage and water supply and observed deficiencies in planning and execution stages as discussed in the succeeding paragraphs.

5.1 Construction/rehabilitation of WTPs

5.1.1 Rehabilitation of Chandrawal WTP and its command area

Government of India (GOI)/Delhi Jal Board (DJB) received an ODA (Official Development Assistance) loan from Japan International Cooperation Agency (JICA) amounting to ¥ 28,975 million (₹ 1963 crore) towards Improvement Project (October 2012) in respect of Chandrawal Water Treatment Plant (WTP) and its command area. The project was divided into six packages. Tokyo International Consultancy Services Ltd. (TEC) was appointed (September 2013) as Project Management Consultant (PMC) at the tendered cost of ₹ 70.03 crore with an agreement period of nine years. The construction works/activities of all packages were to be completed by November 2022. Payment of ₹ 57.65 crore was made to the Consultant as of March 2022.

Audit noticed delays at different planning stages as stated below:

Stages	Scheduled time	Delay Months/packages
Preparation of DPR (Stage-I)	Jan 2015 to Aug 2015	9 Months /(Package-II) 17 Months/ (Package-IV) 18 Months/ (Package-V)
Preparation of tender documents (Stage-II)	October 2017 to December 2019	27 Months/ (Package-II) 9 Months/ (Package- III) 19 Months /(Package- IV)

Stages	Scheduled time	Delay Months/packages
		53 Months /(Package- V)
Finalization of tendering process (Stage-III)	Up to November 2016	31 Months /(Package-II) 24 Months/ (Package- III) 31 Months/ (Package- IV)

There were delays at every stage of execution of Packages II to V. Further, DJB decided that NIT for Packages V and VI will be invited after the award of packages II to IV. Work of Package-I had commenced on 2 August 2019 with scheduled completion date as 1 November 2022. The work of package II to IV has not been awarded till 31 March 2022 even after invitation of tender as the tender was either cancelled or re-invited.

Thus, a project conceptualized in 2012 was still in its initial stages of execution even after 13 years raising doubts about the very necessity of the project.

The Division, in its reply (August 2022), accepted the audit observation and stated that the project was delayed owing to revisions in DPRs and implementation of DSR 2014 and 2016, etc. Additionally, there were delays in receiving approvals from JICA and MoUD. Delay in construction under Package-I was due to clearance of site, permission for tree cutting, COVID, etc.

The reply is not acceptable, as all the reasons stated for the delay were administrative in nature. Moreover, the division's reply does not mention the delay in submission of documents by the consultant and non-imposition of penalty on consultant besides granting time extensions beyond the terms of the contract.

5.1.2 Construction of Wazirabad WTP and water supply in command area

Delhi Jal Board approved (March 2014) Delhi Water Supply Improvement Investment Programme in respect of Wazirabad WTP and its command area at a tentative cost of ₹ 2,243 crore. The project was to be funded by the Asian Development Bank (ADB). M/s NJS Consultant Co. Ltd. (Japan) was selected (December 2016) as the project management consultant with a project completion period of 72 months. As per ADB loan requirement, DJB was to achieve project readiness at the time of loan negotiations, requiring contracts worth minimum 30 *per cent* of total project cost to be in award stage. The project was divided into six packages.

Awarding of first package would have met the project readiness requirement for which tenders were issued in August 2017. However, only a single bid was received for Package-I and DJB decided not to evaluate this bid, despite ADB suggesting evaluating the same. Due to non-evaluation of this bid, the project readiness requirement could not be met and loan negotiation could not be done at that time. After much deliberation, ADB agreed to consider rebidding. After re-tendering for Package-1 and tendering for Package-2, Price Bid Evaluation

Report of both projects was sent in November 2019 to ADB and DJB received NOC from ADB for awarding both the works in December 2019.

However, subsequently (June 2020) awarding of both the packages were rejected by the Board. In another flip flop (October 2020), DJB intimated ADB the Board's decision (September 2020) to re-invite tenders to which ADB responded stating that they had withdrawn this project from its pipeline of projects for financing.

Thus, failure of DJB in fulfilling the project readiness requirement, caused by rejection of approved bids and a flip flop by the DJB deprived it of finance for a significant potable water from ADB.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.2 Revision of estimates without justification

Rule 136 (1) of GFR 2017 stipulates that no works shall be commenced until estimates containing the detailed specifications and quantities of various items have been prepared based on the Schedule of Rates maintained by CPWD or other Public Works Organizations and they being sanctioned by the competent authority.

Test check of cases revealed that estimates for works were computed on higher side or without proper technical justification which led to over estimation of project cost as detailed in **Table 5.1**

Table: 5.1: Details of inflated estimates of works

Sl No.	Name of work	Estimates inflated (₹ in crore)	Reasons
1.	O&M of the recycling Plant (Haiderpur-II WTP) For 10 years	3.86	Increase in quantities of PAC and Chlorine without justification.
2.	O&M of raw water pum house (RWPH), Iradat Nagar	1.62	Due to inclusion of desilting work in BOQ against the approval of planning division.
3.	Installation of 200 tube wells	4.98	Increased the size of tube well from 600 mm to 1200 mm without justification.
4.	Installation of 25 tube well	3.80	Due to increasing the size of bore well and casing pipe and including additional items like Collection Chamber etc.
	Total	**14.26**	

Audit noted that the scope of works were changed in a perfunctory and arbitrary manner without any justification and in violation of GFR provisions.

5.3 Irregularities in award of works

Para 5.1.1 of the Manual of Procurement of Works 2019, issued by the Department of Expenditure, M/o of Finance, GoI stipulates that evaluation of bids is one of the most significant areas of purchase management and the bid

evaluation process must be transparent. All tenders are to be evaluated strictly on the basis of terms and conditions incorporated in the tender documents.

Audit observed lack of compliance with the provisions of the Manual by DJB during award of tenders as detailed in **Table 5.2**.

Table 5.2: Details of irregular award of works

Sl No.	Nature of irregularity	Name of work	Cost of work (₹ in crore)	Remarks
1.	Violation of Prior experience and financial criterion	1. O&M[1] of 16 MGD recycling plant and WTP at Haiderpur	39.62	Firm was not having the requisite experience in O&M of a recycling plant.
		2. O&M of 55 MGD Iradat Nagar raw water intake pump house	28.68	Firm was not having experience and did not fulfil the financial criteria as per NIT conditions.
		3. Rejuvenation of water bodies.	39.78	Contractor sub-let the work to ineligible contractors.
		4. Rehabilitation of peripheral sewer in North and North-West Delhi.	57.17	Firm had no experience in the work of CIPP lining method.
2	Preparation of incorrect justification to show compliance of permissible limit[2] of CPWD manual.	Rehabilitation and O&M of Sonia Vihar WTP for 10 years.	147.00[3]	The work was awarded on the basis of justification cost (JC) (₹152.16 crore) inflated by reducing the quantities of cheaper items and increasing those of costlier ones. On the basis of quantities mentioned in the tender, the JC worked out to ₹127.89 crore, which would have rendered the bid unjustified (15 *per cent* above JC).

Thus, works were awarded to contractors who did not fulfil the tender conditions and at unjustified rates impacting the quality of works as well as causing avoidable financial burden on the Board.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.3.1 Splitting of works

Rule 137 of GFR provides that for the purpose of approval and sanctions, a group of works which forms one project, shall be considered as one work.

[1] Operation and Maintenance

[2] Para 20.4.3.2 of CPWD manual 2014 stipulates that variation up to 5 *per cent* over the justified rates may be ignored. Variation up to 10 *per cent* may be allowed for peculiar situations and in special circumstances. Reasons for doing so shall be placed on record. Tenders above this limit should not be accepted.

[3] ₹ 6.60 crore for rehabilitation work and ₹ 140.40 crore for operation and maintenance for 10 years.

The rule basically cautions against splitting of works so as to avoid sanction of the higher authorities.

Audit noticed that in four divisions[4], works of similar nature amounting to ₹ 5.75 crore were not grouped to form one project. The works were thus split to avoid obtaining approval of the next higher authority.

DJB stated (May 2023) that the splitting of works was not done deliberately citing reasons of paucity of budget and preparation of estimates as per the site requirement by the different JE/AEs in-charge of different areas.

DJB's reply is not acceptable as the Executive Engineer is the primary tendering authority of the division and estimates obtained from JE/AEs of different areas should have been clubbed at Executive Engineer level while putting the works to tender.

5.4 Irregularities in execution of works

Irregularities observed in execution of works by DJB are discussed in the succeeding paragraphs.

5.4.1 Undue benefit to contractor

Audit observed that DJB provided undue benefits to contractors in three cases as detailed in **Table 5.3**.

Table 5.3: Undue benefit to contractors

Sl. No.	Details of Work	Amount Involved (₹ in crore)	Reason of anomaly
1.	Rehabilitation and up-gradation of 182 MLD Wastewater Treatment Plant (WWTP), Rithala	0.14	The WWTP never achieved the prescribed standards i.e. BOD ≤ 20 mg/l, TSS ≤ 30 mg/l during February 2020 to March 2021. However, liquidated damages of ₹ 14 Lakh was not recovered as per agreement.
2.	Construction of 16.5 ML capacity UGR/BPS at Karala including O&M	2.15	O&M costing ₹ 2.9 crore was sub-let at just ₹ 75 lakh without prior approval of DJB in violation of contract conditions resulting in undue benefit to contractor of ₹ 2.15 crore.
3.	Construction of UGR/BPS at Mahipalpur	1.04	DJB did not record actual quantity of completed work in measurement book and Payment of ₹1.04 crore was released based on the percentage of work in lump-sum instead of actual quantity.
	Total	**3.33**	

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.4.2 Unfruitful/Wasteful expenditure

Audit observed in the following four cases that foreclosures and additional purchases outside the scope of work caused DJB to incur unfruitful/wasteful expenditure of ₹ 52.33 crore as detailed in **Table 5.4**.

[4] Executive Engineer (E&M)-8, 9, 10 and 11.

Table 5.4: Wasteful and Unfruitful expenditure

Sl. No.	Details of Work	Amount Involved (₹ in crore)	Reason of anomaly
1.	P/L of water main from Ranney well W1 and W2 to Sonia Vihar UGR	1.15	After construction of the water mains, the same was not connected to Ranney well W1 and W2. Further as per water testing report, water of Ranney well W2 was also not fit for drinking rendering the expenditure unfruitful.
2.	Improvement in service level for water supply in Mehrauli and Vasant Vihar Project areas.	25.04	The project was aimed at providing water supply for eight hours a day by improving the existing infrastructure. However, the work was stopped even before the civil work was completed.
3.	laying of MS/DI feeder main and distribution mains for Bijwasan and Rajokari UGR/BPS	23.29	The work of laying the pipeline was stopped after the expiry of the contract period without completing, rendering expenditure of ₹ 23.29 crore wasteful.
4.	Rejuvenation of water bodies using floating rafter (Phase-I)	2.50	As per site conditions, 1839 floating rafters were required in six water bodies which were supplied and installed by DJB. Additional 1,375 floating rafters procured at a cost of ₹ 2.50 crore was lying unused resulting in unfruitful expenditure.
5.	SITC[5] of FRP sealing structure at Kondli STP	0.35	An item in this work namely "covering of odour generating units of the STP with FRP" was already included and executed under other work. This duplication resulted in **overlapping of work** and led to **unfruitful expenditure** to the tune of ₹ 34.63 Lakh.
	Total	**52.33**	

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.4.3 Excess / avoidable expenditure

Audit noticed that in five works, DJB incurred excess / avoidable expenditure worth ₹ 40.88 crore due to improper planning and non-achievement of target within stipulated time. Apart from this, DJB also made an additional payment of ₹ 11.30 crore on account of cost escalation due to delay in completion of project and further due to cost escalation in three cases. Details of these cases are given in the **Table 5.5**.

[5] Supply, installation, testing and commissioning.

Table 5.5: Cases of excess and avoidable payment to contractors

Sl. No.	Nature of anomaly	Details of Work	Amount Involved (₹ in crore)	Reason of anomaly
1	Excess / avoidable expenditure	Improving service level in water supply for command area under Malviya Nagar UGR	1.71	As the target of Coverage of water supply from 84 *per cent* to 100 *per cent* was not achieved within time, So DJB had to supply water through tankers incurring an expenditure of ₹ 1.71 crore from May 2015 to May 2022.
2		Improvement and revamping of existing water supply, transmission and distribution network under Nangloi WTP	39.17	Inordinate delay in execution of project resulted in the extension of time of the project which led to payment on account of cost escalation amounting to ₹ 39.17 crore to the contractor.
3	Excess / Over-payment	DBO of 45 MGD STP at Kondli	0.11	Excess payment of cost-escalation due to application of wrong cost index.
4		Construction of 564 MLD WWTP at Okhla	2.38	As per contract agreement, the price quoted were inclusive of GST. But while calculating 'cost of work done' for cost escalation, GST was not excluded and escalation was paid on the amount inclusive of GST. Due to this an excess payment of ₹ 2.38 crore was made to firm.
5		Rehabilitation and up-gradation of Rithala phase-I WWTP	8.81	Payment of ₹ 8.81 crore on account of cost-escalation was made to contractor though the same was not payable as per Rule 225 (viii) (f)) of General Financial Rules, as the contractor was paid interest-free mobilization advance
Total			**52.18**	

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.4.4 Non-Deduction of Statutory recovery

Audit observed that statutory recoveries of ₹ 1.51 crore were not deducted in five cases as detailed in **Table 5.6**.

Table 5.6: cases of Non-deduction of statutory taxes from contractor's bills

Sl. No.	Details of Work	Amount Involved (₹ in Lakh)	Audit observation
1.	Supply/Installation and operation and maintenance of 39 flow meters	1.84	No tax was deducted from contractor bills under section 194C of Income Tax act.
2.	Departmental fee/ professional fee for higher supervision	45.92	No tax was deducted from contractor bills under section 194J of Income Tax act.
3.	22 works of HP-II and EE (E&M-I) divisions	14.36	Labour cess @ 1 *per cent* was not recovered from contractor bill as per Building and Other Construction Worker's Welfare Cess Act 1996.
4.	Improving service level in water supply for command area under Malviya Nagar UGR	88.94	TDS on GST not deducted under Section 51 of CGST Act 2017
	Total	**151.06**	

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

5.4.5 Other Irregularities

The following anomalies were also observed during the execution of sewer and water works executed by DJB:

- DJB order (August 2011) on reduction of electricity charges stipulated that, as far as possible, the maximum demand[6] should be close to the contract demand[7] (with 10 *per cent* buffer). However, in 11 cases, excess expenditure of ₹ 1.08 crore on account of fixed electricity charges was detected as the sanction load was much more than the maximum demand.
- As per the conditions of contract, wherever employer's water is made available to the contractor for construction and drinking purpose, recovery @ one *per cent* of the gross amount of civil works shall be made. In three test checked cases, water charges amounting to ₹ 1.13 crore were not found recovered from the contractors despite non-availability of water bills on record.
- In two cases, interest free mobilization advances amounting to ₹ 33.27 crore were provided to the contractors in violation of the norms which provide for 10 *per cent* simple interest.

6 Maximum demand means the highest average load measured in kilo volt ampere (KVA) or kilo watt (KW) at the point of supply of a consumer during a consecutive period of thirty minutes.

7 Contract demand means the demand in KW or KVA as provided in the agreement.

- In the work of improvement in service level for water supply in Mehrauli and Vasant Vihar Project areas, secured advance amounting to ₹ 37.44 lakh was found unadjusted. Unapproved deviations in BOQ from original sanctioned work of worth ₹ 1.78 crore was also observed.
- Loss of interest worth ₹ 52.53 lakh due to irregular advance payment was observed in the work of construction of 318 MLD (70 MGD) WWTP Coronation Pillar as DJB released more payment than due as per the payment schedule.
- Delays ranging from 6 to 91 months were observed in the execution of six works of providing & laying internal and peripheral sewer line in various colonies/group of colonies worth ₹ 205.09 crore.
- Interceptor Sewer Projects (ISP) worth ₹ 1395 crore was delayed more than 11 years as only four packages (out of six) were handed over to DJB.
- DJB sanctioned the 2nd Phase of Dwaraka STP (July 2018) with a capacity of 50 MGD with plans to use the effluent water from STPs[8] and diverting some of the raw water presently being supplied to Wazirabad WTP to Dwarka WTP. The work was awarded in August 2021 for ₹ 280.78 crore with completion date of May 2023. However no such arrangement was made by DJB for raw water for WTP till date and construction work was still under progress. Thus even if the project is completed, commissioning of the WTP is doubtful due to unavailability of raw water.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

[8] The water through various STPs was to be discharged into river Yamuna near Palla (entry point in Delhi). Thereafter, it would be allowed to flow in the river course before being lifted from Wazirabad pond for treatment at Wazirabad WTP and Chandrawal WTPs to potable water standards.

Chapter - 6
Financial Management

Chapter 6

Financial Management

Separate Audit Reports prior to 2018-19 have qualified the DJB Accounts as not reflecting a 'true and fair view'. As on 31 March 2022, DJB had outstanding water charges of ₹ 21,696.89 crore including late payment surcharge of ₹ 16,361.43 crore from more than 26 lakh consumers of Delhi.

Outstanding loan of DJB increased to ₹ 34,540 crore as on 31 March 2022 from ₹ 283.49 crore on 1 April 1998. Interest on this accumulated loan was ₹ 32,055 crore as on 31 March 2022. The DJB had not repaid any loan since 2013-14.

During 2021-22, DJB had billed only 371 MGD (40 *per cent*) of potable water produced out of which, only 244 MGD (66 *per cent*) was billed based on meter readings. DJB receives payments at zonal counters through online/offline modes. However, lack of reconciliation process resulted in mismatch between revenue earned figures and the amounts deposited in DJB's account. Revenue Management System (RMS) was not fully implemented and lacked validation checks, reconciliation facility etc.

Less than 30 *per cent* grievances received were addressed by DJB and out of this 20 *per cent* were addressed with delay beyond stipulated period.

Prudent financial management is needed to ensure that financial resources available are allocated and used efficiently in accordance with the objectives of organisation and that it adheres to the extant rules and regulations in this regard. Deficiencies observed in DJBs financial management are discussed in the succeeding paragraphs.

6.1 Preparation and submission of Annual Accounts

DJB has submitted accounts for Statutory audit only up to the year 2021-22 and Separate Audit Reports (SARs) on them have been issued. These SARs have opined that the accounts of DJB do not depict 'a true and fair picture' of the affairs of DJB citing absence of proper maintenance of grant account and fixed assets account; differences in balances depicted in accounts and records; absence of internal audit etc. Thus, the main source of financial data for the Board has been declared as unreliable placing the entire financial management of the Board under a cloud.

Recommendation 9: Government should ensure that the Board sets right its accounts on priority to provide a true and fair picture of its finances to all stakeholders.

6.2 Budget allocation – receipts and expenditure

Under Section 65 of the Delhi Water Board Act, 1998 budget estimates for the

upcoming financial year are framed by DJB based on the requirements received from its divisions against new upcoming/ongoing schemes. The budget is forwarded to the Urban Development Department, GNCTD for approval. After approval of budget, it is allocated to various branches/divisions of DJB.

The sources of funds of DJB for revenue expenditure (expenditure of recurring nature such as salaries, maintenance expenses etc.) are income from supply of water and providing sewerage services, assistance from GNCTD (as ways and means support),cost sharing with New Delhi Municipal Council (NDMC) and Military Engineer Services (MES) for water and sewerage services, infrastructure charges, etc. The main sources of funds for capital expenditure are loan and advances/Grants-in-aid (GIA) from GNCTD, funding from Central Government schemes, AMRUT scheme, Namami Gange, Yamuna Action Plan (YAP), DDA and externally aided projects under Japan International Cooperation Agency (JICA).

6.2.1 Revenue budget

The revenue budget, actual receipts and expenditure of DJB during 2017-18 to 2021-22 is given in **Table 6.1**

Table 6.1: Revenue Budget

(₹ in crore)

Year	Revenue Budget	Revenue receipts	Shortfall/ percentage	Revenue Expenditure	Expenditure in excess of receipts
2017-18	2534.16	2236.19	297.97/11.76	2582.07	345.88
2018-19	2587.24	2212.04	375.20/14.50	2773.19	561.15
2019-20	3417.16	3031.55	385.61/11.28	3375.60	344.05
2020-21	5314.37	3097.93	2216.44/41.71	2968.79	-129.14
2021-22	3549.27	2805.33	743.94/20.96	3101.55	296.22

Source: DJB records

It can be seen from **Table 6.1** that there were continuous shortfalls in revenue receipts against budget ranging between 11.28 *per cent* (2019-20) to 41.71 *per cent* (2020-21). Similarly, DJB was unable to meet its revenue expenditure commitments from its revenue receipts. Infact, the revenue receipts shown above include assistance for ways and means support received from GNCTD (totalling ₹ 2500 crore during 2017-22), thus the actual revenue deficit is much more when just compared to DJB's own income sources.

Audit observed that excess expenditure over income incurred by DJB (except in 2020-21) was met from earnest money, security deposit withheld and unspent balance of capital funds. Thus, DJB was dependent on external sources to meet its expenses on operations & maintenance (O&M) activities, power, salary, pension, cost of raw water, and expenses on water supply and sewerage management. UDD had noted (October 2022) that diversion of funds from capital to revenue is a serious matter and needs to be sorted out urgently.

DJB attributed (April 2023) the shortfall in revenue receipt to outstanding dues

from Government departments (over 50 *per cent)*, lack of payment of water bill by the consumers residing in re-settlement/JJ colonies, etc

The components of revenue expenditure during 2017-18 to 2021-22 is given in **Table 6.2.**

Table 6.2: Components of revenue expenditure

(₹ in crore)

Head of expenditure	2017-18	2018-19	2019-20	2020-21	2021-22
Payment to staff (Percentage of revenue expenditure)	1669.38 (64.65)	1854.35 (66.87)	1852.76 (54.89)	1806.50 (60.85)	1888.41 (60.89)
Power	604.18	558.14	613.12	653.96	694.66
Rebate of late payment surcharge and arrears to consumers	0	0	491.33[1]	27.36	0
Other expenses[2]	308.51	360.70	418.39	472.27	518.48
Total	**2582.07**	**2773.19**	**3375.6**	**2960.79**	**3101.55**

Source: Budget document of DJB

It can be seen from **Table 6.2** that DJB incurred more than 50 *per cent* of its revenue expenditure on payment of salaries to its staff.

6.2.2 Capital budget

Capital budget of DJB during the period 2017-18 to 2021-22 is given in **Table 6.3**.

Table 6.3: Capital Budget

(₹ in crore)

Year	Budget[3]	Capital receipts	Loan[4] received from GNCTD	Total capital receipts	Capital expenditure	Savings (Percentage)
a	b	c	d	e=c+d	f	g= c-d
2017-18	1890.00	1766.37	1129.22	2895.59	1549.22	1346.37 (54)
2018-19	2625.99	2625.98	1391.48	4017.46	1973.56	2043.90 (51)
2019-20	2475.00	2475.00	1812.15	4287.15	2350.78	1936.37 (45)
2020-21	3901.00	3764.00	3139.43	6903.43	2503.8	4399.63 (64)
2021-22	2083.49	1966.77	1927.74	3894.51	2685.01	1209.50 (31)
Total		**12598.12**	**9400.02**	**21998.14**	**11062.37**	

Source: Budget document of DJB. Figures in parenthesis showed percentages

It can be seen from **Table 6.3** that loan from Government constituted more than 40 *per cent* of the total capital receipts of DJB.

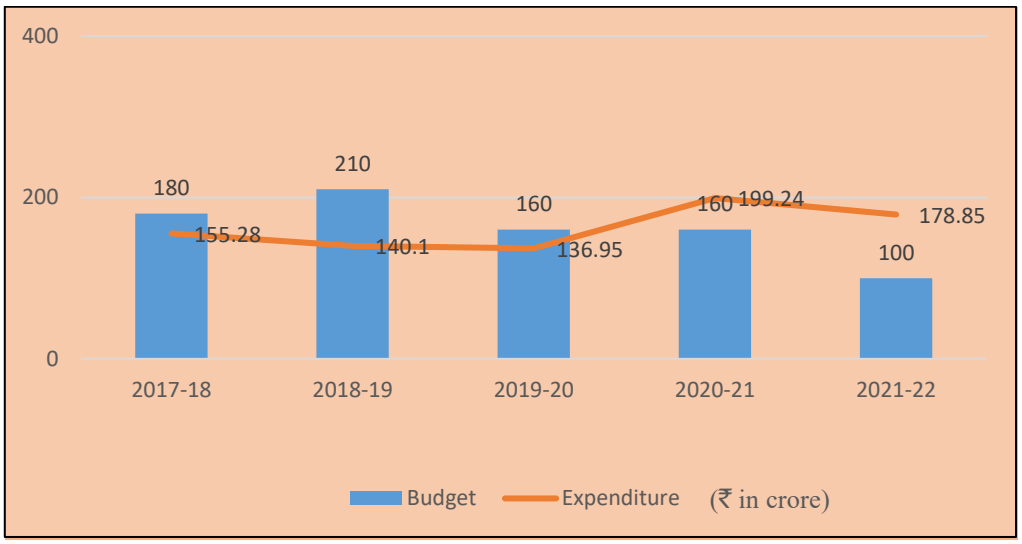
1 It is one time rebate on LPSC.
2 Administrative and finance Cost.
3 Excluding Loans and Advances.
4 Including ways and means advances.

6.2.2.1 Components of capital expenditure

Capital expenditure is incurred by DJB in various water[5]/sewer[6] sector schemes. The budget and expenditure trends under major water sector schemes and sewerage sector schemes are shown in **Charts 6.1 to 6.3** and **Charts 6.4 to 6.6.** respectively**.**

A Water sector:

Chart 6.1: Budget and expenditure under replacement of old distribution and trunk transmission system scheme



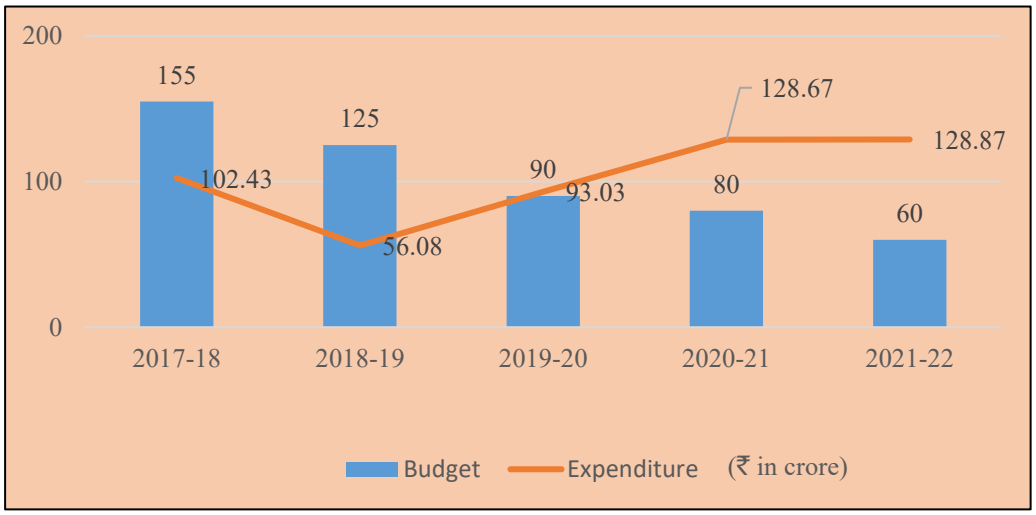
Source: Budget document of DJB

It can be seen from **Chart 6.1** that there was a significant shortfall in budget in last two years. Excess expenditure of 25 *per cent* and 79 *per cent* against the budget in the years 2020-21 and 2021-22 respectively is also seen.

[5] Replacement of old distribution and trunk transmission system, Improvement of existing water works, Ranny wells and tube wells in urban areas, laying of water mains in regularized colonies, raw water arrangements, distribution main and reservoirs, water supply in urban village, water supply in resettlement colonies, rural water supply, Jan Jal Prabandhan yojna, GIA for providing water supply in unauthorized colonies, GIA for augmentation of water supply in JJ Clusters etc.

[6] Trunk peripheral sewer and gravity duct, sewerage treatment plants and pumping stations including R/mains, renovation of existing plants and pumping stations, branch sewer, interceptor sewers, construction of STP/SPS, sewerage and drain scheme in trans Yamuna area, sewerage facilities in urban villages, sewerage facilities in rural villages, sewerage facilities in unauthorized colonies, sewerage facilities in squatter re-settlement colonies, GIA rejuvenation of Yamuna and water bodies etc.

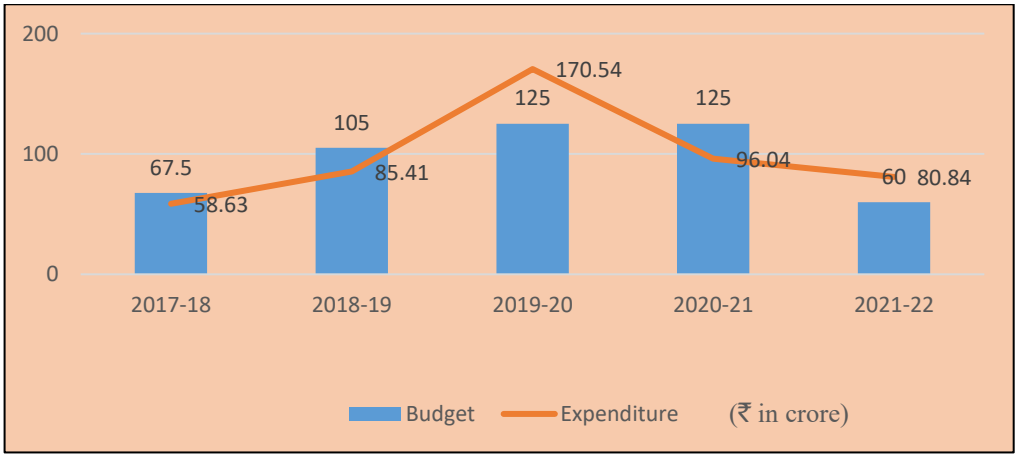
Chart 6.2: Budget and expenditure under improvement of existing water works scheme



Source: Budget document of DJB

It can be seen from **Chart 6.2** that there was a significant shortfall in budget in last two years. Excess expenditure of 61 *per cent* and 115 *per cent* was reported against the budget in the year 2020-21 and 2021-22 respectively.

Chart 6.3: Budget and expenditure under Distribution Main and Reservoirs scheme



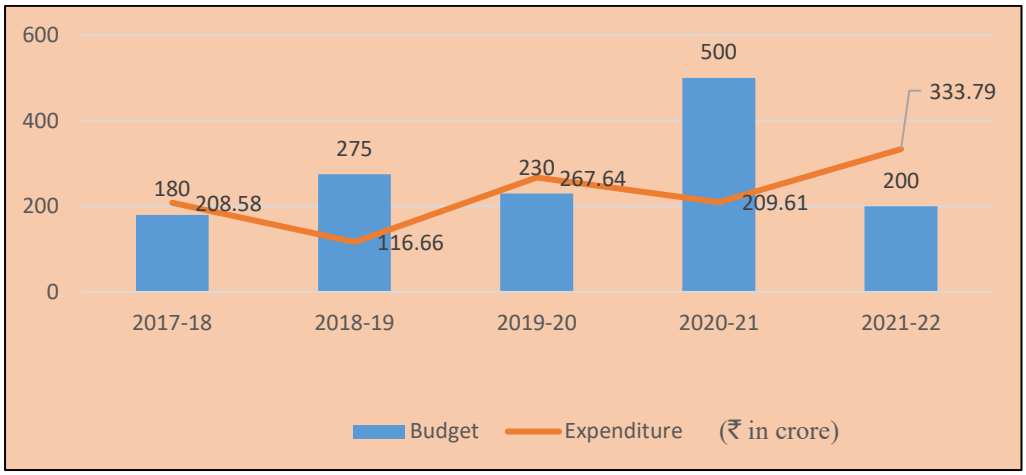
Source: Budget document of DJB

It can be seen from **Chart 6.3** that there was an excess expenditure of 36 *per cent* in the year 2019-20 and 35 *per cent* in the year 2021-22.

B Sewerage sector

Budget and expenditure trends under major sewerage sector schemes are shown in **Chart 6.4 to 6.6.**

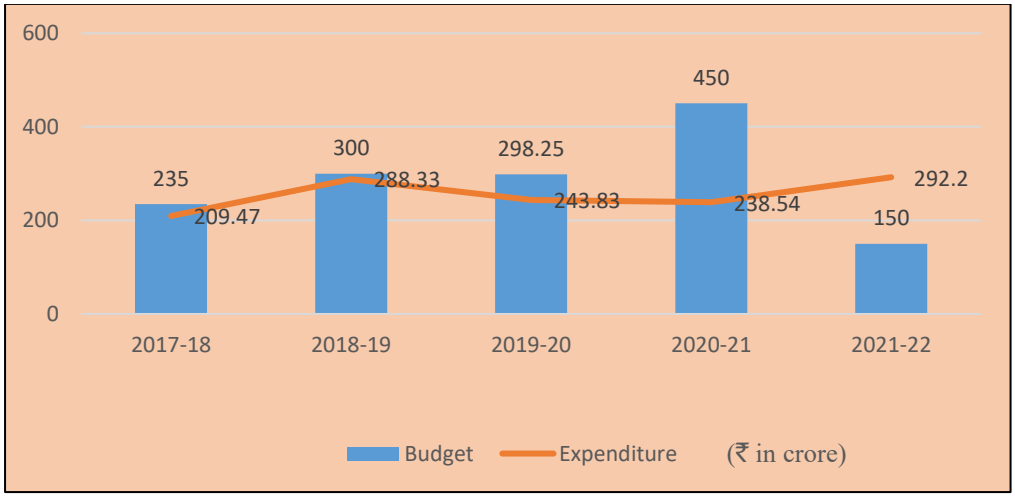
Chart 6.4: Budget and expenditure trend under sewerage treatment plants and pumping station including R/Mains scheme



Source: Budget document of DJB

It can be seen from **Chart 6.4** that there were savings of 58 *per cent* in the years 2018-19 and 2020-21 while there was excess expenditure of 67 *per cent* against the budget in the year 2021-22.

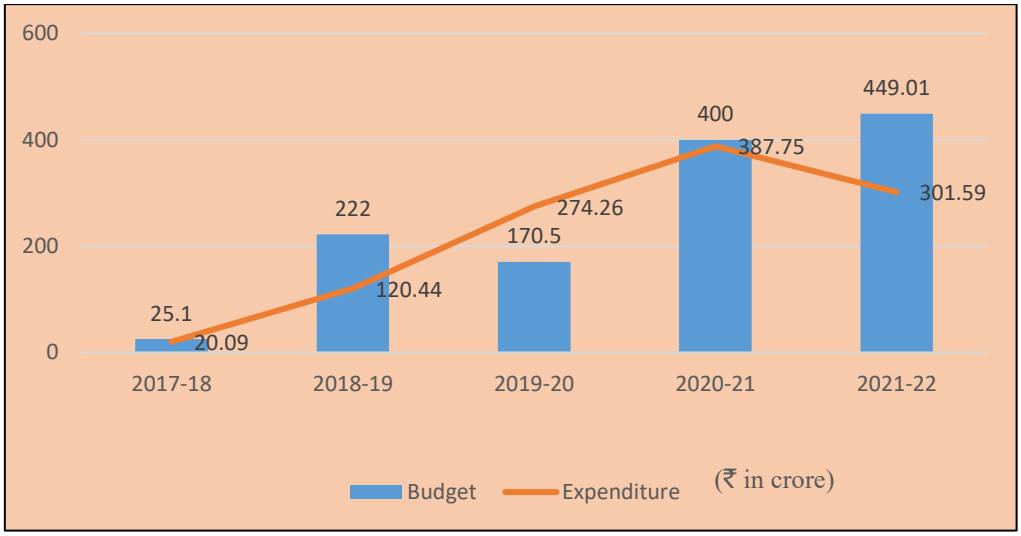
Chart 6.5: Budget and expenditure under sewerage facilities in unauthorized colonies scheme



Source: Budget document of DJB

It can be seen from **Chart 6.5** that there was an unrealistic rise in the budget in the year 2020-21 (50 *per cent*) which came down by 67 *per cent* in the year 2021-22. While the expenditure over the budget shows savings of 47 *per cent* in the years 2020-21 and excess expenditure of 95 *per cent* against the budget in the year 2021-22.

Chart 6.6: Budget and expenditure under Yamuna action plan scheme



Source: Budget document of DJB

It can be seen from **Chart 6.6** that there was excess expenditure of 61 *per cent* in the year 2019-20 while savings of 46 *per cent* and 33 *per cent* against the budget are reported in the years 2018-19 and 2021-22 respectively.

Savings of 3.50 *per cent* to 71.06 *per cent* under GIA and Centrally Sponsored Schemes were noticed under selected heads detailed in **Annexure 6.1**. Such excess expenditure and savings indicate that the budget allocation was not prepared on a realistic basis. The reasons of under-utilization of budget during 2017-18 to 2020-21 were sought for from the DJB (September 2022 and February 2023), however reply was awaited.

6.3 Efficacy of financial management by DJB

6.3.1 Outstanding water charges from consumers

Section 87 of the DJB Act, 1998 pertaining to recovery of dues, provides that if a person failed to pay any dues to the Board, such dues shall be recoverable under a warrant by sale of the movable property or the attachment after following a prescribed procedure.

Audit noted that huge amount of water charges was pending from the consumers at the end of March during the period 2018 to 2022 as given in **Table 6.4**.

Table 6.4: Details of water charges outstanding from the consumers

(₹ in crore)

As on	Principal amount	Late payment surcharge (LPSC)	Total
31.03.2018	3560.10	5746.10	9,306.20
31.03.2019	3974.74	11073.13	15,047.87
31.03.2020	3856.67	10526.29	14,382.96
31.03.2021	4325.66	8798.03	13,123.69
31.03.2022	5335.46	16361.43	21,696.89

Source: Information furnished by revenue wing of DJB

It is clear from **Table 6.4** that in 2021-22, there has been 23 *per cent* increase in principal amount (from ₹ 4,325.66 crore to ₹ 5,335.46 crore) and 65 *per cent* overall increase (from ₹ 13,123.69 crore to ₹ 21,696.89 crore) in outstanding dues from customers, government department etc., including Late Payment Surcharge (LPSC).

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 10: Government should ensure that DJB explores ways and means for collection of the huge amount of dues outstanding from the consumers including various government departments and agencies so as to improve its financial position.

6.3.2 Outstanding loan and interest liability amounting to ₹ 66,595 crore

All loans received from GNCTD under different schemes like water supply, drainage and sanitation have to be repaid by DJB within fifteen years. Interest at the rates prescribed by the Government and penal interest at the rate of 2.75 *per cent* per annum in case of default were to be paid.

Audit noted that outstanding loan of DJB increased from ₹ 25,140 crore (April 2017) to ₹ 34,540 crore (March 2022). Moreover, the interest on accumulated loan was ₹ 32,055 crore (31 March 2022). However, DJB had not repaid any loan to GNCTD since 2013-14 and the total outstanding loan and interest was ₹ 66,595 crore as of March 2022.

DJB stated (November 2022) that it is a non-profit organization with main objective of supplying water to more than 26 lakh consumers of Delhi which comes under essential household service. To provide water supply, GNCTD grants loan to DJB because the income of DJB from supply of water is not enough to repay the loan amount; therefore, it has requested the Government to convert the loans into grants. The decision is still pending with the GNCTD.

The reply of the DJB is not acceptable as it did not make rigorous efforts to either periodically revise the water/sewage charges nor made efforts for recovery of dues pending from the consumers, in order to meet out its expenses.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

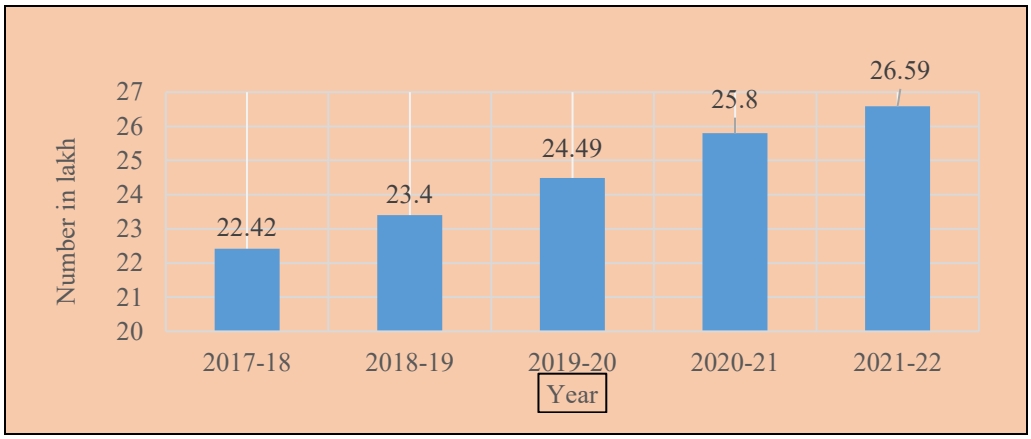
6.3.3 Billing and Collection of Water Charges

The total distribution of potable water was 743 MGD (2021-22) against which DJB had billed only 371 MGD (50 *per cent*). Moreover, only 244 MGD (66 *per cent*) out of this was billed on the basis of actual meter readings. Thus, 33 *per cent* of the potable water supplied was not billed as per actual meter readings.

Year-wise number of water connections given to residents of Delhi by the DJB,

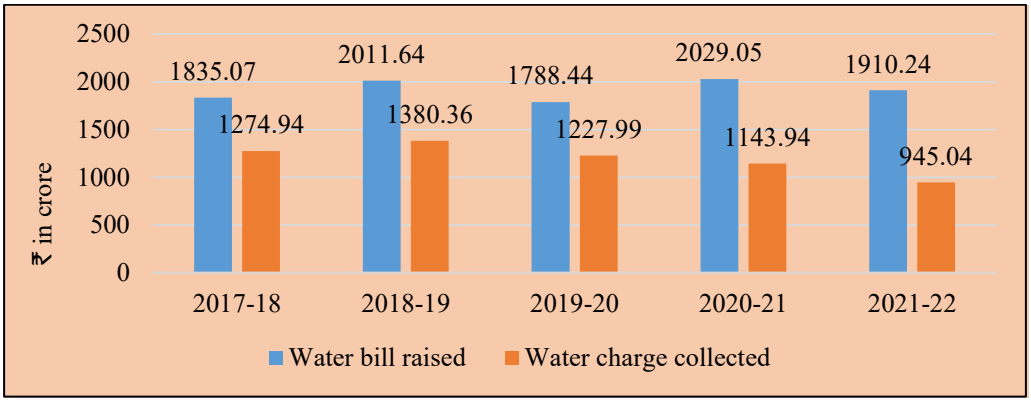
water bill raised in these period and position of actual levy of water charges are shown in **Chart 6.7 and Chart 6.8** below:

Chart 6.7: Trend of active water connections by DJB during 2017-18 to 2021-22



Source: DJB ZRO (Audit)-HQ/LO through M/s Wipro/System Integrator.

Chart 6.8: Trend of water bills raised and water charge collected during 2017-18 to 2021-22



Source: DJB ZRO (Audit)-HQ/LO through M/s Wipro/System Integrator.

In can be seen from **Chart 6.7 and Chart 6.8** that though the number of active water connections increased consistently and there was an overall increase of about 16 *per cent* in the number of water connections during the period under review, the quantum rise in water bills was not commensurate with this. Further, the shortfall in collection of water charges increased from 30.5 *per cent* in 2017-18 to 50.5 *per cent* in 2021-22. This besides being indicative of inadequate effort on the part of DJB to improve revenue collection, also raises questions on the accuracy of the billing process itself.

During the Exit Conference, DJB while accepting the observation assured that the billing process would be improved.

6.3.4 Revenue withheld by Bank - ₹ 15.87 crore

DJB had an agreement with Corporation Bank (2012) to enable the DJB consumers to pay water bills through e-kiosks. The Bank was to credit the amount collected to DJB within 48 hours failing which a penalty of 12 *per cent*

per month (revised to 12 *per cent* per annum in 2015) was to be paid by the Bank.

The Bank had defaulted in crediting the collected amount in time from December 2013 onwards and it had not deposited the collected amount of ₹ 14.21 crore from 23 March 2019 onwards. In a meeting held in October 2021, the dues from the Bank was reconciled and DJB asked the Bank to deposit an amount of ₹ 6.79 crore after adjusting amounts payable as service charges and payments to sub-contractor.

Audit noted that there was nothing in records furnished to Audit to indicate DJB had collected the balance amount or had levied/collected any penalty from the Bank. As per Audit calculations, ₹ 9.08 crore was to be levied as penalty for the period from December 2013 to August 2022. Thus, an amount of ₹ 15.87 crore was recoverable from the Bank.

DJB stated (15 May 2023) that the matter was under investigation with the Vigilance Department of DJB as well as Anti-corruption Branch and that FIR has been lodged. A demand notice has also been issued to the Bank for recovery of the amount. It was further stated that the Vigilance Department has seized all records pertaining to e-kiosk without which no further reply could be provided to audit.

6.3.5 Avoidable expenditure due to absence of MoU

Delhi Jal Board pays for the procurement of raw water from neighbouring states. Audit observed that DJB is making payment for raw water to Uttar Pradesh Irrigation Department (UPID) for the supply of 470 cusecs (253 MGD) raw water from Tehri Dam (Uttarakhand) via Upper Ganga Canal at two differential rates.

Water treatment plant (WTP), Sonia Vihar intakes 140 MGD raw water @ ₹ 31.50/34.00/33.70 per Trillion Cubic Feet (TCF) whereas the WTP, Bhagirathi intakes 71 to 116 MGD raw water @ ₹ 13.00/13.90 per TCF from the same source from UPID. Audit noted that the difference of payment was due to the absence of an MoU with UPID for supply of raw water to WTP, Sonia Vihar.

Thus, procuring raw water without an MoU allowed the UPID to claim water charges against the Sonia Vihar plant at a much higher rate than from the same source to the Bhagirathi water treatment plant. This has led to an avoidable expenditure of ₹ 55.52 crore.

The Department replied (August 2022) that the MoU is yet to be signed. Further, during the Exit Conference, it was informed that the matter has been taken up with UPID.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

6.3.6 Non levy of penalty of ₹ 8 crore

DJB signed a contract (December 2017) with M/s Wipro Pvt. Ltd. For up-gradation, operation and maintenance of RMS at a total cost of ₹ 81.56 crore. As per the contract, payments were to be made according to achievement of milestones and penalty was leviable in case of delay up to a maximum of 10 *per cent* of the contract value.

Audit scrutiny revealed that 1st and 2nd milestones were treated as completed without submission of reports and deliverables and no completion certificate was found available in the records pertaining to the 5th and 6th milestones.

Audit noticed that there were delays on the part of DJB in finalising site for training cell and DC/DR site. The site for training centre was finalised by DJB after a delay of two years. Besides, it could not be ascertained from the records whether upgradation, operation, and maintenance of the RMS was completed and intended outcome could be actually obtained. Thus, making the payment of ₹ 81.16 crore to contractor without imposing penalty of ₹ 8 crore[7] on non-achieving the milestones was in violation of the contract conditions.

During the exit conference, DJB stated that the reply would be given as soon as possible.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

6.4 Revenue Management System (RMS)

DJB is using (from 2011) IT based Revenue Management System (RMS) for providing service such as online application of water connection, mutation, bill generation and payment etc.

RMS was intended to simplify payment and application procedures to enhance billing and collection efficiency, provide real-time cash counter collection data of Zonal Offices and integrate RMS system with Delhi Online Registration Information System (DORIS) software of Revenue Department.

Deficiencies observed in the functioning of RMS and other areas of revenue management are discussed below:

6.4.1 Partial Rollout

Audit noted that the services i.e. providing of real time status of cash counters, tracking of application within the Engineering Division, providing support for Hindi for displaying various menu options in respect of website "djb.gov.in were not implemented. In the absence of these, DJB was not in a position to monitor the cash collected at a particular point of time, track services and grievances in Engineering Divisions, and get stage-wise overview of SLA.

[7] Total penalty ₹ 8 crore = 10 *per cent* of CAPEX value of ₹ 81.56 crore- ₹ 16.57 crore already recovered.

Thus, RMS was not implemented fully as per agreement despite investing an amount of ₹ 112.08 crore.

6.4.2 Poor Validation Controls in RMS

Test check of the RMS database revealed gaps in Tables which indicates lack of effective validation within the system as detailed below:

(i) Consumer grievances stored in 'Case Table' had 14.27 lakh records out of which 9.68 lakh records had 'Nil'/'Blank' entries in the column 'Comment_Long' relating to consumer grievances.

(ii) Meter details stored in the 'MTR Table' had 44.29 lakh records. 16.48 lakh records, had 'Nil'/'Blank' entries in the column 'Meter Serial Number'.

(iii) Bill details stored in the 'BILL Table' had columns 'Start Date' and 'Late Pay Charge Date' with 'NULL' in 11.73 crore and 0.32 crore records respectively.

In the absence of data validation checks, sanctity and reliability of data cannot be ensured.

6.4.3 Reconciliation facility not available in RMS

RMS did not provide reconciliation of mode-wise payment received in the intermediary bank account of DJB and the total amount collected in the Board's main account. This has resulted in mismatch between revenue earned as per RMS and revenue amount actually realized/deposited in the intermediary bank account.

During the exit conference, DJB accepted the observation and stated that the process of reconciliation through RMS would be started soon.

6.4.4 Lack of digitalization of records in RMS

From 14 Zonal Revenue offices of DJB, total 355 records pertaining to application for connections (124 approved cases and 231 cancelled cases) covering the period from 2017 to 2022 were sought for detailed scrutiny. Out of 124 (approved), Information in respect of 100 cases were furnished to Audit, which contained only information relating to date of application and date of approval of water connection. Supporting documents such as field inspection reports and JE Reports were not available in RMS. Similarly, out of 231 (cancelled cases), 173 (75 *per cent*) applications were traced out from RMS. However, these applications were not automatically cancelled after 15 days and time taken to cancel these application ranged from 16 to 1349 days.

Thus, neither digitalization of records in RMS was complete nor complete physical records were available in ZROs.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 11: Government should ensure that DJB fully operationalises RMS by digitalization of all records and providing reconciliation facility and also addresses the issue of poor validation control to enhance its operational effectiveness.

6.5 Miscellaneous Issues

6.5.1 Reasonability of rates prepared after opening of financial bids

As per para 5.1.6 of CPWD manual, justification rate should be prepared before the date of opening of financial bids. In one of the tenders issued by DJB (January 2017) for procurement of 281 tablets at an estimated cost of ₹ 1.06 crore, a single bid of ₹ 1.52 crore was received which was more than 43.09 *per cent* above the estimated cost. Audit noted that DJB prepared reasonability of rates after opening of the financial bids by including items which were not in the scope of the contract. As per justification statement the cost was computed at ₹ 1.57 crore (28 April 2017) which almost matched with the amount quoted by L1.

6.5.2 Fixed assets register not maintained

As per Rule 211 of GFR 2017, separate accounts shall be kept for (a) fixed assets such as plant, machinery, equipment, etc. in Form GFR 22 and (b) consumables such as office stationery, maintenance spare parts, etc. in Form GFR 23.

Audit observed that DJB did not maintain any fixed assets register/inventory register at DJB Headquarters or in any of its divisions. In the absence of registers, Audit could not verify whether all the assets and stores of DJB were accounted for.

In reply (December 2022), DJB accepted the observation and stated that an agency has been appointed (March 2022) for physical assessment of its fixed assets/inventory.

6.5.3 Ineffective internal audit system

Audit observed that DJB did not prepare an annual audit plan for internal audit of its units during 2017-18 to 2021-22. The details of divisions/units audited by the internal audit wing of DJB during 2017-18 to 2021-22 is given in **Table 6.5.**

Table 6.5: Number of units/divisions audited during 2017-18 to 2021-22

Sl. No.	Year	Total No. of divisions/units	No. of divisions/ units audited	No. of divisions/ units not audited (in *per cent*)	Percentage shortfall
1.	2017-18	108	14	94 (87)	87
2.	2018-19	108	8	100 (93)	93
3.	2019-20	108	2	106 (98)	98
4.	2020-21	108	4	104 (96)	96
5.	2021-22	108	Nil	108 (100)	100

It can be seen from **Table 6.5** that out of 108 divisions/ zonal revenue offices

and headquarters only 28 divisions/ offices of DJB were audited during 2017-18 to 2020-21 and no unit was audited during year 2021-22. Internal audit reports were also not placed/ discussed in the Board meetings.

Absence of dedicated internal audit mechanism is detrimental to the proper functioning of DJB as there is no independent oversight mechanism to ensure that various rules and regulations applicable to DJB are followed.

DJB stated (October 2022) that due to a huge shortage of Assistant Accounts Officers (AAO), no AAO was posted in the wing since 2017-18. However, AAO's from other wings were on additional charge of internal audit unit.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

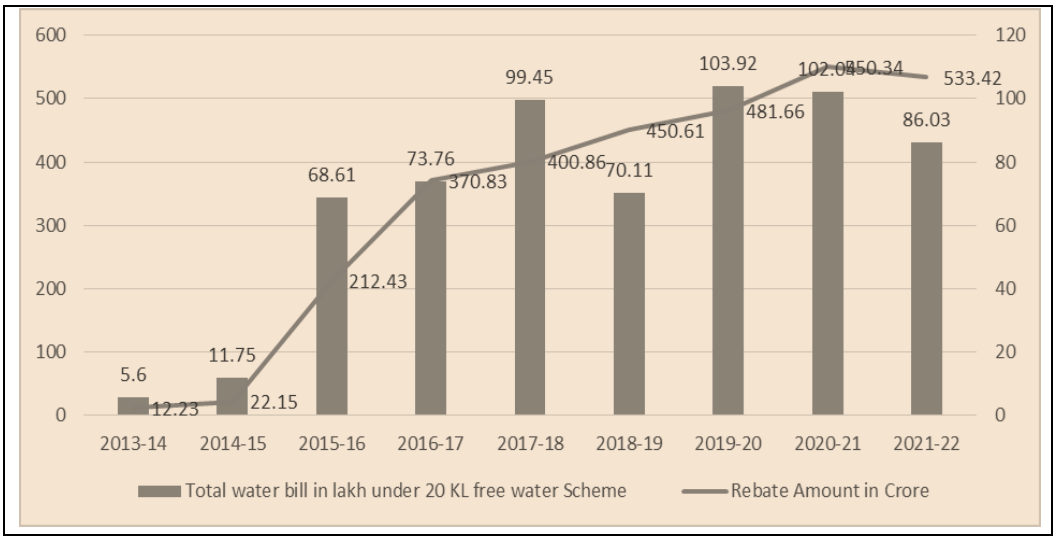
Recommendation 12: Government should ensure that DJB forms a dedicated internal audit wing commensurate to the size of the organization and prepare and implement annual audit plans after identifying key-risk areas.

6.5.4 Implementation of 20KL free water scheme

DJB initially introduced free water supply up to 20 kilo litres (KL) per month per family (December 2013) for the period 1 January till 31 March 2014. Later the scheme was reintroduced from 1 March 2015. The expenditure on implementation of this scheme was to be compensated by the GNCTD as per Section 73 of the Delhi Water Board Act 1998.

The trend of water subsidy under 20 KL free water scheme during the period 2013-14 to 2021-22 as per RMS database furnished by DJB is depicted in **Chart 6.9**.

Chart 6.9: Trend of water subsidy under 20 KL free water scheme during 2013-14 to 2021-22



Source: Figures derived from the RMS database

It can be seen from the above chart that number of water bills generated under

20 KL water scheme increased from 99.45 lakhs (2017-18) to 103.92 lakh in 2019-20 and then reduced to 86.03 lakh (2021-22), the lowest numbers during the review period.

Further, DJB was to develop a mechanism to prevent multiple water connections to a family to ensure that only deserving families got the subsidy. Scrutiny of rebate database revealed that there were 23.65 lakh consumers having total 24.26 lakh connections. Further, 824 consumers were awarded more than four connections each totalling 5,257 connections and they availed rebate of ₹ 5.53 crore up to March 2022. Out of these, 785 consumers had 5 to 10 connections each, 36 consumers had 11 to 20 connections, 2 consumers had 21 to 50 connections each and 1 consumer was having more than 50 connections. DJB did not develop any mechanism to prevent multiple water connections under a single name and to ensure that only deserving families consuming less than 20 KL of water got subsidy.

Absence of social behaviour and impact study: - The monthly slab rates for water consumption in March 2015 was ₹ 2.93 (up to 10 KL), ₹ 4.39 (10 to 20 KL), ₹ 21.97 (20 to 30 KL), and ₹ 36.61 (above 30 KL) which was revised in February 2018 as ₹ 5.27 (up-to 20 KL), ₹ 26.36 (20 to 30 KL), and ₹ 43.93 (above 30 KL). A comparison of slab rate for the water consumption revealed that the rates for first 20KL were far less than the next slab for providing motivation to consumers to save water and thus providing free water without studying the social behaviour and impact was incomprehensible. The families consuming less than 20 KL of water tempted to consume/waste water up-to 20 KL being free. Also consumers temped to apply for multiple connections to use more water while availing free limit of 20 KL per connection.

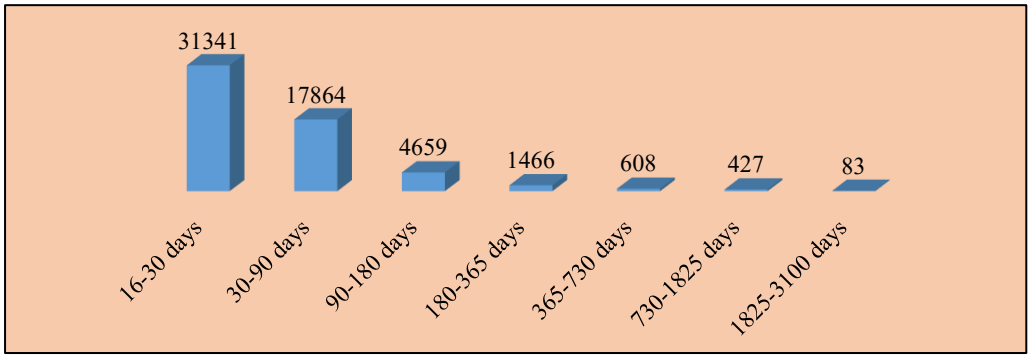
During the exit conference DJB directed his officials to cross verify the data and submit reply to audit at the earliest.

6.5.5 Inefficient grievance redressal system

The citizen charter of DJB states that all types of grievances should be redressed within 15 days. To check the efficiency and promptness of the system, 9.52 lakh grievances from 1 April 2017 to 17 August 2022 were test checked.

It was observed that only 2.77 lakh out of 9.52 lakhs (29.17 *per cent*) grievances received were addressed by DJB as per the database. Of the 2.77 lakh cases redressed; 56,448 cases (20 *per cent*) were addressed beyond the stipulated 15 days as shown in **Chart 6.10** below:

Chart 6.10: Delays in Redressal of Grievances



Source: Figures derived from the RMS database

During the exit conference, DJB while accepting the observation assured that DJB is working on improving the Grievance Redressal System.

Chapter - 7
Human Resource Management

Chapter 7

Human Resource Management

Shortage of staff in various wings of DJB ranged from 16.35 *per cent* to 53.55 *per cent*. Sixty-five posts out of sanctioned 90 posts of Assistant Accounts Officers (AAO) were also lying vacant. DJB irregularly granted re-employment/extension as consultants to its officers after superannuation and in some cases, the engagement was continued beyond the age of 65 years. DJB made many contractual appointments on the ground of functional requirement, but in none of these cases, proposal was sent in advance with full justification to Finance Department as required. Audit further observed that DJB did not have a training policy and Training Needs Analysis (TNA), nor did it make the calendar of training programmes for its officials.

Effective human resource management (HRM) is essential for ensuring efficient functioning of an organisation. In case of DJB, HRM efficiency impinges upon production of potable water, providing reliable water supply and sewerage facility to the residents of Delhi. Regular and timely assessment of staff requirement, recruitment, training and transfer is a mandatory requirement for any healthy organisation including DJB.

7.1 Discrepancies in employee data

DJB started using an Integrated Financial Management Information System (IFMS) in August 2022 for payment of salary to regular employees. The regular staff strength as on 31 December 2022, as per information provided by various wings of DJB was 15,603[1]. However, salary of only 12,546 regular employees was prepared through IFMS (December 2022).

Thus, there was a mismatch of 3,057 staff in IFMS figures and the figures of Persons in position maintained in different wings of DJB - a nearly 20 *per cent* mismatch between the online database and the manual data sets in each vertical of DJB.

As in virtually every area where data is concerned, DJB does not seem to have any coherent idea of the numbers involved nor any efforts at reconciliation are on record.

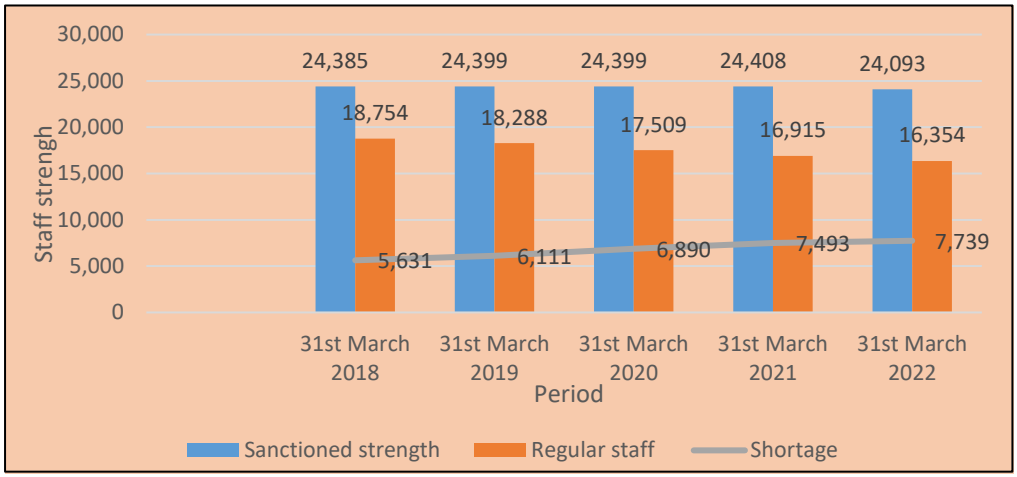
The matter was referred to the Government in July 2023, reply was awaited (April 2025).

7.2 Shortage of staff in DJB

As per information furnished by different wings of DJB, the sanctioned strength and actual strength of regular staff as at the end of March during the period 2018 to 2022 is detailed in **Chart 7.1**.

[1] 16,354 (as on March, 2022) – 753 (staff retired) +2 (fresh appointment during March, 2022 to December, 2022)

Chart 7.1: Staff position at the end of March during the period 2018-22



Source: Information furnished by DJB

It can be seen from **Chart 7.1** that during 2017-22, shortage of regular staff had continuously increased from 23.09 *per cent* (2017-18) to 32.12 (2021-22) *per cent*. To fill the gap in staff strength, DJB had engaged an average of 1,062 contractual staff in each category. Shortages in different cadre in the respective wings are discussed below:

- There were significant shortages of manpower in the cadres of Assistant Accounts Officer (72 *per cent*) and Sr. Assistant/Jr. Assistant (60 *per cent*) in the Distribution wing. To mitigate the shortfall in AAO cadre, eight persons were appointed on officiating arrangement who had, however, not passed the required qualifying examination.

- Similarly, 20 *per cent* shortage in the cadre of Executive Engineer (E&M) and 50 *per cent* shortage in Assistant Engineer (E&M) cadre in the Technical wing of DJB was noted.

- Similar shortage was also noticed in other cadres such as Security Guard (78 *per cent*), Assistant Chemist (72 *per cent*), Field Assistant (59 *per cent*) and Fitter (53 *per cent*) in the Bulk wing of DJB.

Increasing shortages of staff in each cadre indicate that DJB did not adopt any system of regular assessment of its requirement of staff, nor did it make any concrete effort to fill the posts through recruitment/deputation.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). In the Exit Conference, DJB stated that it had asked DSSSB for fresh recruitment and was trying to fill the vacant posts through deputation basis.

Recommendation 13: The Government should take immediate action to address the serious shortage of staff in DJB.

7.3 Irregular re-employment after retirement

The conditions for re-employment of staff laid down by Finance Department (December 2015), GNCTD provide that engagement of a retired government

servant as consultant should be against a vacant sanctioned post and his services can be extended up to a maximum of five years up to the age of 65 years. DJB was required to forward proposals for appointment of consultant/extension to the Finance Department, GNCTD through Urban Development Department.

Audit observed that in five cases of appointment/extension of tenure of consultants, DJB did not obtain approval of the Finance Department. Out of these, one appointment was against a post which was not in the respective category/discipline. Further, in three cases, their tenure was extended beyond the age of 65 years and in two cases, even approval of the Board was taken after their engagement. Details are given in **Annexure 7.1**.

During the Exit Conference, DJB agreed with the audit observation and stated that the practice of engaging consultants beyond the age of 65 years has been discontinued.

7.4 Irregular appointments

Audit test checked records related to contractual appointments and found various irregularities as under:

7.4.1 Violation of the Eligibility criteria

(i) Eligibility for the post of Media Advisor and Chief Media Advisor included five years' /ten years' experience in handling digital media/stake holders. Audit observed that the person appointed as Media Advisor (January 2019) to the post had completed education only in 2014-15 but DJB accepted her claim of having six years' experience without any supporting documents. In the case of appointment of Chief media Advisor in January 2021, there was no certificate regarding the required work experience available on record. DJB stated that the Selection Committee verified the experience. However, no supporting document was provided with the reply.

(ii) A Technical Advisor and an Additional Private Secretary (both to the Chairperson) were appointed in August 2020 and January 2012, for which there were no sanctioned posts in DJB. Further, no selection process had been followed in these appointments. DJB stated that the appointment was made with the approval of Chairman DJB/Minister (Water) and later approval of the Board was also taken. The reply of DJB is not acceptable as no prior approval was obtained from Finance department of GNCTD.

(iii) Records relating to selection process in the appointment (October 2018) of Consultant (Hydraulic and Water Bodies) were not provided to Audit due to which eligibility of the appointee could not be verified. Audit further observed that the consultant was granted extension for three years (from October 2020 to October 2023) in one go and his remuneration was increased in the middle of the contract period against the extant rules/instructions. He was also provided with a government vehicle without entitlement.

DJB replied that the performance report of the consultant was outstanding,

based on which the term was extended for three years in one go. It also stated that the Board is competent as such there is no requirement to send the proposal to Finance Department.

The reply of DJB is not acceptable as the procedure prescribed was applicable to all appointments.

7.4.2 Irregular hiring of security guards, science graduates and data entry operators

As per Rule 49 (a) of Delegation of Financial Power Rules, 2015 (DFPRs), Principal Secretary/Secretary of the Administrative Department has full powers for administrative approval and expenditure sanction for engagement of security services with the approval of Finance Department at the first instance with reference to the number of persons to be engaged. Heads of the autonomous bodies have not been delegated any such powers.

Audit noticed that DJB had engaged security guards, science graduates and data entry operators as detailed in **Table 7.1** without adhering to the above provisions.

Table 7.1: Cases of engagement of staff in violation of extant instructions

Sl. No.	Post	Nos of persons engaged	Period of appointment
1.	Security Guards	503 710	1 July 2017 to 31 January 2020 1 February 2020 to 31 March 2023
2.	Science Graduates	87	June 2017 to 31 December 2021
3.	Data Entry Operators	230	April 2017 to March 2022

DJB had replied (July and September 2022) that these engagements were against functional requirements. The reply of DJB is untenable as DJB did not have any delegated powers to make contractual appointments without the approval of the competent authorities.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

7.5 Training

Training Need Analysis (TNA) is a systematic exercise of identifying the kind of training required and providing the details related to training implementation. Training assumes greater significance in the case of DJB because of frequent technological advancements in the sector.

Audit observed that DJB did not carry out Training Need Analysis (TNA) nor did it make a calendar of training programmes. Training programmes were simply awarded to two agencies on the basis of proposal submitted by them. DJB had incurred a total expenditure of ₹ 3.85 crore on 51 training programmes conducted within India during 2017-18 to 2022-23 (till June 2022). In the absence of TNA, Audit could not assess the utility of the trainings imparted.

In its reply (November 2022), DJB accepted that it has no training policy and

no training calendar is prepared and training programmes were awarded with approval of competent authorities. During Exit Conference, DJB assured to prepare training schedule in future and any future outsourcing of training activities would be done as per the provisions of GFRs.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

Recommendation 14: Government should ensure that DJB, being a service oriented as well as a highly technical organization, frames a training policy with a calendar of training programmes to update knowledge/skills of staff.

7.6 Implementation of transfer policy

DJB had framed transfer policy of officers/officials in August 2016, to avoid development of vested interests and to provide exposure to employees in working in different divisions/units for overall growth/knowledge of an employee. The policy of transfer/posting also provided that it may be dispensed with by CEO, DJB in the interest of efficiency and on other administrative grounds.

Audit observed that 139 officers/officials posted in different units of DJB, including Headquarters were not transferred for periods ranging from six years to 22 years.

DJB stated (September 2022) that the guidelines/procedure in this regard is being followed except in some cases due to administrative constraints, shortage of staff, specialised nature of job, etc. During Exit Conference, DJB further informed that it was working on transfer/posting and shortage of staff.

New Delhi
Dated: 13 November 2025

(ROLI SHUKLA MALGE)
Accountant General (Audit), Delhi

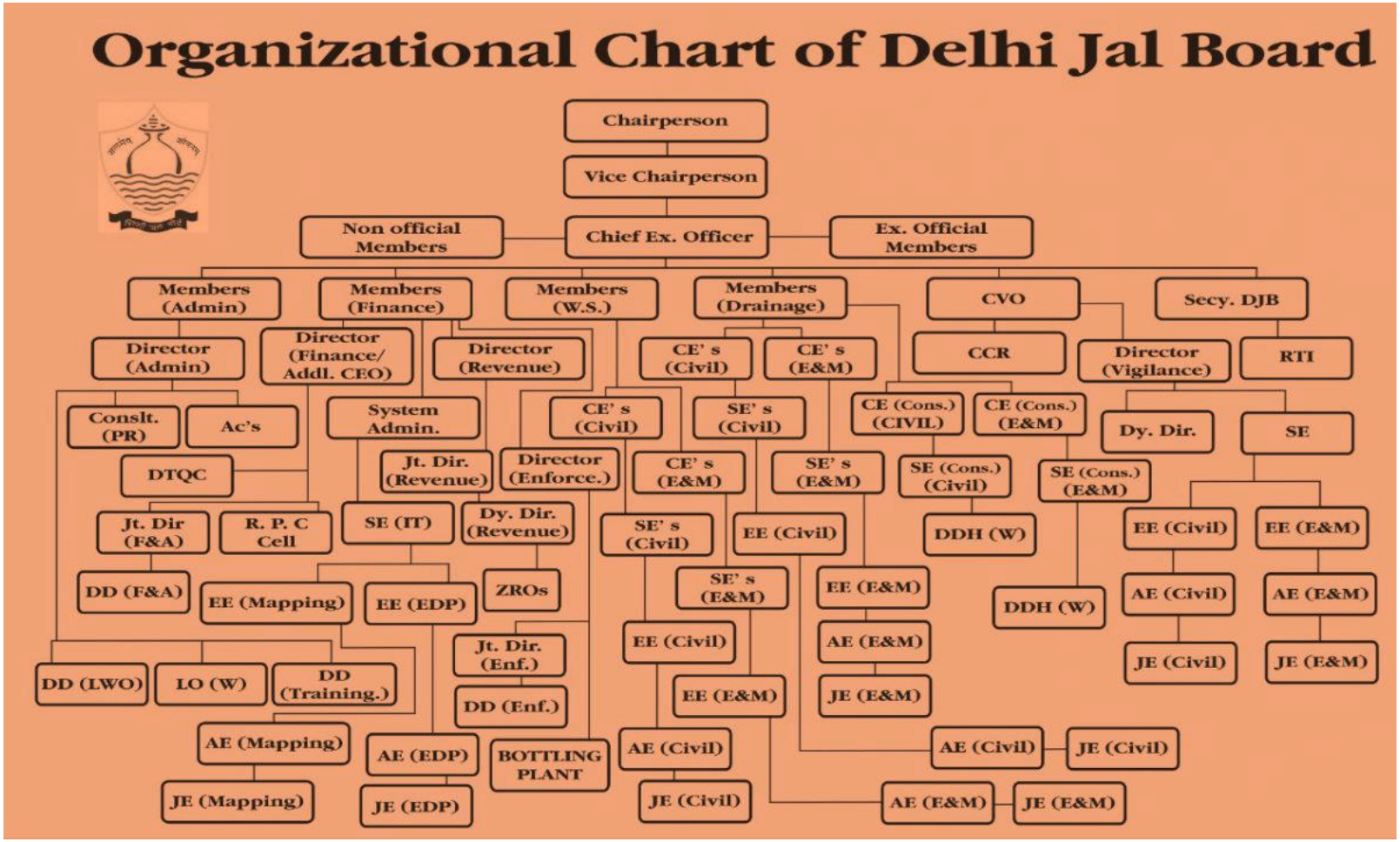
Countersigned

New Delhi
Dated: 19 November 2025

(K. SANJAY MURTHY)
Comptroller and Auditor General of India

Annexures

Annexure 1.1
(Referred to in paragraph 1.2)
Organizational Chart



Annexure 2.1
(Referred to in paragraph 2.5.2.1)
Details of equipment at WTP HP-I and HP-II

Instruments Required for testing	Non-Availability of instrument in HP-I	Availability of instrument in HP-I
1. Ph meter (both lab benchtop and portable digital display, 0-14 range) 2. TDS/Conductivity meter (both benchtop based and portable type) 3. Nephelometer (Turbidity meter) both bench top and portable type. 4. Digital balance single pan capacity 200g. Tarring device accuracy 0.0001g 5. UV-Visible Spectrophotometer (should cover wavelength of important metals/ ions) 6. Hot plate big size/ induction plate. 7. Heating mentie capacity 1 litre. 8. Water bath big size (12 holes) temperature 50 to 100 degrees Celsius. 9. Vacuum pump 1 HP capacity 10. Flame photometer 11. Hot air oven standard make Big Size 12. Dispensets 13. Digital Auto Pipettes 14. Magnetic Stirrer with speed control and Teflon paddle. 15. Jackson turbidity meter 16. Digital thermometers 17. Desiccator 18. Double distillation apparatus 19. Specific ion meter along with electrodes 20. Centrifuge 21. Refrigerator 22. Colorimeter 23. DO meter digital 24. Jar tester	1. UV visible spectrophotometer 2. Hot plate big size/ induction plate 3. Heating mentie capacity 1 litre 4. Water bath big size (12 holes) temperature 50 to 100 degrees Celsius 5. Vacuum pump 1 HP capacity 6. Flame photometer 7. Refrigerator 8. Desiccator 9. Hot air oven standard make Big Size 10. Dispensets 11. Digital Auto Pipettes 12. Magnetic Stirrer with speed control and Teflon paddle 13. Digital thermometers 14. Double distillation apparatus 15. Specific ion meter along with electrodes 16. Centrifuge 17. Colorimeter 18. DO meter digital.	1. UV visible spectrophotometer 2. Hot plate big size/ induction plate 3. Heating mentie capacity 1 litre 4. Water bath big size (12 holes) temperature 50 to 100 degrees Celsius 5. Vacuum pump 1 HP capacity 6. Flame photometer 7. Refrigerator 8. Desiccator 9. Hot air oven standard make Big Size 10. Magnetic Stirrer with speed control and Teflon paddle 11. Digital thermometers 12. Double distillation apparatus 13. Specific ion meter along with electrodes 14. Centrifuge 15. Colorimeter 16. DO meter digital.

Annexure 2.2
(Referred to in paragraph 2.5.2.3)
Details of tests at WTP Sonia Vihar and WTP Dwarka

Stage	Parameters as per DJB norms	Parameters Actually analysed in Dwarka WTP	Shortfall (*per cent*)	Parameters Actually analysed in Sonia Vihar WTP	Shortfall (*per cent*)
Raw Water	Total – 13 (pH, Turbidity, NH3, Chlorides, Diss. Oxy., T. Hardness, T./ Pth Alk., Nitrite, Nitrate, Cr, CN, Fe, Colour/ Odour)	Total - 3 (pH, Turbidity, T./ Pth Alk.)	69	Total - 4 (pH, Turbidity, NH3, T./ Pth Alk)	62
Clarified Water	Total – 4 (Turbidity, pH, Alkalinity, Residual Chlorine)	Total - 3 (Turbidity, pH, Alkalinity)	25	Total - 2 (Turbidity, pH)	50
Filtered water	Total parameters- 3 (R/ Alumina, Turbidity, Residual Chlorine)	Total-1 (Turbidity)	67	Total- 2 (Turbidity, Residual Chlorine)	33
Treated water	Total -5 (Turbidity, pH, Hardness, Alkalinity Residual Chlorine)	Total- 4 (Turbidity, pH, Alkalinity Residual Chlorine)	20	Total-3 (Turbidity, pH, Alkalinity Residual Chlorine)	40

Annexure 2.3
(Referred to in paragraph 2.5.3)

Testing of Water Quality

Requirement as per BIS 10500: 2012		**Tests conducted by DJB at different levels:**
		After UGR flushing
Organoleptic and Physical Parameters	i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Taste v) Turbidity, NTU, Ma vi) Total dissolved solids, mg/l, max	i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Turbidity, NTU, Max v) Total dissolved solids, mg/l, max
General Parameters Concerning Substances Undesirable in Excessive Amounts	i) Aluminium ii) Ammonia iii) Anionic detergents iv) Barium v) Boron vi) Calcium vii) Chloramines viii) Chloride ix) Copper x) Fluoride xi) Free residual chlorine, xii) Iron xiii) Magnesium xiv) Manganese xv) Mineral oil xvi) Nitrate xvii) Phenolic compounds xviii) Selenium xix) Silver xx) Sulphate xxi) Sulphide xxii) Total alkalinity xxiii) Total hardness xxiv) Zinc	i) Ammonia ii) Calcium iii) Chloride iv) Fluoride v) Free residual chlorine vi) Magnesium vii) Nitrate viii) Sulphate ix) Total alkalinity x) Total hardness
Parameters Concerning Toxic Substances	i) Cadmium ii) Cyanide iii) Lead iv) Mercury v) Molybdenum vi) Nickel vii) Pesticides, µg/l viii) Polychlorinated biphenyls ix) Polynuclear aromatic hydrocarbon x) Total arsenic xi) Total chromium xii) Trihalomethanes	nil
Parameters Concerning Radioactive Substances	i) Alpha emitters Bq/l, ii) Beta emitters Bq/l	nil
Bacteriological Quality of Drinking Water	i) E. coli or thermotolerant coliform bacteria ii) Total coliform bacteria	i) Total Coliform Bacteria
Total parameters	**46**	**16**

Annexure 3.1
(Referred to in paragraph 3.1.1)
Shortage and inequitable supply of potable water

Sl. No.	Year	ACE(M)	Population (In lacs)	Availability of water (In MGD)	Desired water availability based on per capita availability in NCTD for respective year (in MGD)	Shortage (*per cent*)	Per Capita availability of water (in GPCD)	Requirement of water (In MGD) as per DJB	GPCD criteria used by ACE for per capita requirement calculation
1	2017-18	ACE(M)-1	32.18	78.58	146.20	46.25	24.42	99.50	30.92
2	2017-18	ACE(M)-2	29.00	61.31	131.76	53.47	21.14	174.00	60.00
3	2017-18	ACE(M)-3	22.16	65.00	100.68	35.44	29.33	70.00	31.59
4	2017-18	ACE(M)-4	26.50	39.00	120.40	67.61	14.72	78.79	29.73
5	2017-18	ACE(M)-5	23.88	70.92	108.50	34.63	29.70	117.77	49.32
6	2017-18	ACE(M)-6	15.50	55.00	70.42	21.90	35.48	76.11	49.10
7	2017-18	ACE(M)-7	14.10	24.58	64.06	61.63	17.43	70.50	50.00
8	2017-18	ACE(M)-8	13.28	45.57	60.34	24.47	34.31	58.31	43.91
9	2017-18	ACE(M)-9	13.85	47.40	62.93	24.67	34.22	62.33	45.00
10	2017-18	ACE(M)-10	14.39	54.96	65.38	15.94	38.19	58.25	40.48
11	2017-18	ACE(M)-11	30.30	57.72	137.66	58.07	19.05	144.33	47.63
12	2017-18	CE(W)Pr.-I	17.31	62.82	78.65	20.12	36.29	71.50	41.30
13	2018-19	ACE(M)-1	33.36	79.29	150.86	47.44	23.77	103.26	30.95
14	2018-19	ACE(M)-2	29.90	62.21	135.21	53.99	20.81	179.40	60.00
15	2018-19	ACE(M)-3	23.06	70.00	104.28	32.87	30.36	75.00	32.52
16	2018-19	ACE(M)-4	26.90	39.00	121.64	67.94	14.50	78.81	29.30
17	2018-19	ACE(M)-5	24.65	71.20	111.47	36.13	28.88	120.19	48.76
18	2018-19	ACE(M)-6	16.00	55.50	72.35	23.29	34.69	78.56	49.10
19	2018-19	ACE(M)-7	14.70	24.58	66.47	63.02	16.72	73.50	50.00
20	2018-19	ACE(M)-8	13.48	45.62	60.96	25.16	33.84	59.14	43.87
21	2018-19	ACE(M)-9	14.06	47.90	63.58	24.66	34.07	63.23	44.97
22	2018-19	ACE(M)-10	14.59	55.71	65.98	15.56	38.18	59.58	40.84
23	2018-19	ACE(M)-11	31.14	58.33	140.82	58.58	18.73	148.26	47.61
24	2018-19	CE(W)Pr.-I	18.16	63.91	82.11	22.17	35.20	74.22	40.87
25	2019-20	ACE(M)-1	34.26	79.64	156.60	49.14	23.25	106.89	31.20
26	2019-20	ACE(M)-2	30.80	62.16	140.78	55.85	20.18	184.80	60.00
27	2019-20	ACE(M)-3	24.15	77.00	110.39	30.25	31.88	85.00	35.20
28	2019-20	ACE(M)-4	27.02	40.00	123.51	67.61	14.80	78.92	29.21
29	2019-20	ACE(M)-5	25.32	71.43	115.73	38.28	28.21	122.58	48.41
30	2019-20	ACE(M)-6	16.80	56.00	76.79	27.07	33.33	82.49	49.10
31	2019-20	ACE(M)-7	15.05	24.58	68.79	64.27	16.33	75.25	50.00
32	2019-20	ACE(M)-8	13.80	45.67	63.08	27.60	33.09	60.50	43.84
33	2019-20	ACE(M)-9	14.28	48.00	65.27	26.46	33.61	64.26	45.00
34	2019-20	ACE(M)-10	14.89	57.68	68.06	15.25	38.74	62.47	41.95
35	2019-20	ACE(M)-11	31.89	60.89	145.77	58.23	19.09	151.95	47.65
36	2019-20	CE(W)Pr.-I	18.98	64.89	86.77	25.22	34.18	77.24	40.69
37	2020-21	ACE(M)-1	35.34	80.49	159.43	49.51	22.78	110.98	31.40
38	2020-21	ACE(M)-2	31.75	63.36	143.23	55.76	19.96	190.50	60.00
39	2020-21	ACE(M)-3	24.87	78.00	112.19	30.48	31.36	90.00	36.19
40	2020-21	ACE(M)-4	27.05	40.00	122.03	67.22	14.79	78.93	29.18
41	2020-21	ACE(M)-5	26.37	72.10	118.96	39.39	27.34	126.38	47.93
42	2020-21	ACE(M)-6	17.40	56.50	78.49	28.02	32.47	85.43	49.10
43	2020-21	ACE(M)-7	15.25	25.58	68.80	62.82	16.77	76.25	50.00
44	2020-21	ACE(M)-8	14.13	45.72	63.74	28.27	32.36	61.87	43.79

Sl. No.	Year	ACE(M)	Population (In lacs)	Availability of water (In MGD)	Desired water availability based on per capita availability in NCTD for respective year (in MGD)	Shortage (*per cent*)	Per Capita availability of water (in GPCD)	Requirement of water (In MGD) as per DJB	GPCD criteria used by ACE for per capita requirement calculation
45	2020-21	ACE(M)-9	14.50	48.20	65.41	26.31	33.24	65.25	45.00
46	2020-21	ACE(M)-10	15.37	58.37	69.34	15.82	37.98	63.60	41.38
47	2020-21	ACE(M)-11	32.55	61.76	146.84	57.94	18.97	155.04	47.63
48	2020-21	CE(W)Pr.-I	19.86	65.62	89.59	26.76	33.04	80.60	40.58
49	2021-22	ACE(M)-1	36.97	82.04	164.88	50.24	22.19	116.41	31.49
50	2021-22	ACE(M)-2	32.73	63.76	145.97	56.32	19.48	196.38	60.00
51	2021-22	ACE(M)-3	25.67	80.01	114.48	30.11	31.17	115.00	44.80
52	2021-22	ACE(M)-4	21.50	29.00	95.89	69.76	13.49	62.41	29.03
53	2021-22	ACE(M)-5	27.18	72.92	121.22	39.84	26.83	129.64	47.70
54	2021-22	ACE(M)-6	18.30	58.71	81.61	28.06	32.08	89.75	49.04
55	2021-22	ACE(M)-7	15.39	26.58	68.64	61.27	17.27	76.95	50.00
56	2021-22	ACE(M)-8	14.49	45.79	64.62	29.14	31.60	63.45	43.79
57	2021-22	ACE(M)-9	14.75	48.50	65.78	26.27	32.88	66.38	45.00
58	2021-22	ACE(M)-10	15.71	58.78	70.06	16.10	37.42	64.80	41.25
59	2021-22	ACE(M)-11	33.27	62.54	148.38	57.85	18.80	158.29	47.58
60	2021-22	CE(W)Pr.-I	20.78	66.10	92.67	28.67	31.81	84.12	40.48

Annexure 3.2
(Referred to in paragraph 3.4(iii))

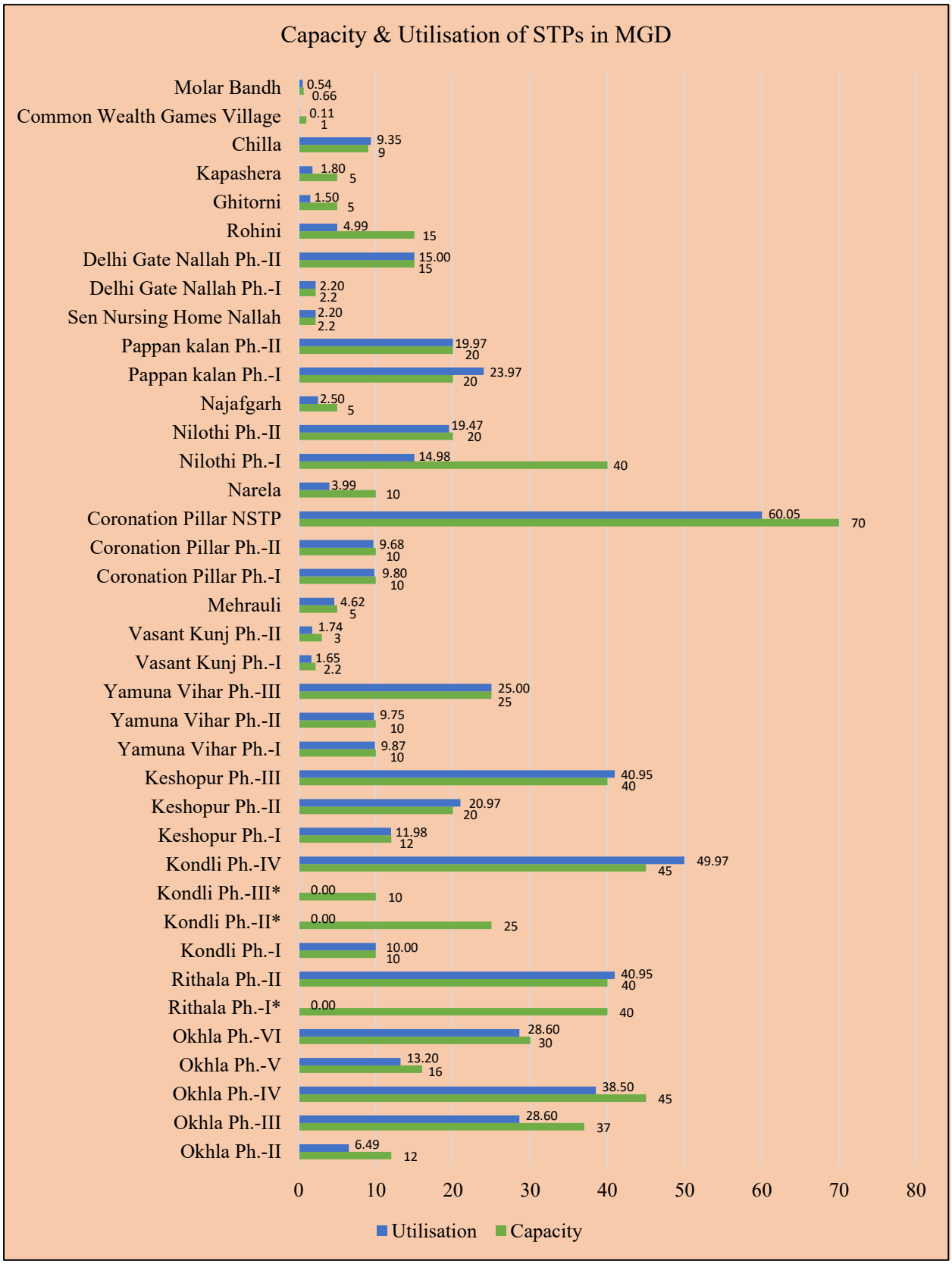
Testing of Water Quality

Requirement as per BIS 10500: 2012		**Tests conducted by DJB at different levels:**	
		At Consumer level	**At Borewells**
Organoleptic and Physical Parameters	i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Taste v) Turbidity, NTU, Ma vi) Total dissolved solids, mg/l, max	i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Turbidity, NTU, Max v) Total dissolved solids, mg/l, max	
General Parameters Concerning Substances Undesirable in Excessive Amounts	i) Aluminium ii) Ammonia iii) Anionic detergents iv) Barium v) Boron vi) Calcium vii) Chloramines viii) Chloride ix) Copper x) Fluoride xi) Free residual chlorine, xii) Iron xiii) Magnesium xiv) Manganese xv) Mineral oil xvi) Nitrate xvii) Phenolic compounds xviii) Selenium xix) Silver xx) Sulphate xxi) Sulphide xxii) Total alkalinity xxiii) Total hardness xxiv) Zinc	i) Ammonia ii) Calcium iii) Chloride iv) Fluoride v) Iron vi) Magnesium vii) Nitrate viii) Sulphate ix) Total alkalinity x) Total hardness	i) Ammonia ii) Fluoride iii) Iron iv) Nitrate
Parameters Concerning Toxic Substances	i) Cadmium ii) Cyanide iii) Lead iv) Mercury v) Molybdenum vi) Nickel vii) Pesticides, µg/l viii) Polychlorinated biphenyls ix) Polynuclear aromatic hydrocarbon x) Total arsenic xi) Total chromium xii) Trihalomethanes	nil	nil
Parameters Concerning Radioactive Substances	i) Alpha emitters Bq/l, ii) Beta emitters Bq/l	nil	nil
Bacteriological Quality of Drinking Water	i) E. coli or thermotolerant coliform bacteria ii) Total coliform bacteria	nil	nil
Total parameters	**46**	**15**	**4**

Annexure 4.1
(Referred to in paragraph 4.2.1)
212.59 MGD of untreated sewage from 1080 colonies

Sl. No.	Drainage Zone	Unsewered Areas/ Group of Colonies	Sewerage Generation (MGD)
1	Rohini- Rithala	Kirari GOC	41.00
		Begumpur GOC	6.55
		Budh Vihar GoC	7.03
2	Kanjhawala Bawana	Kanjhawala GOC	11.00
		Nizampur GOC	3.50
		Ghewra GOC	4.60
		Katewara	4.60
		Daryapur	3.70
		Bawana village	4.80
		Sultanpur Dabas	3.00
		Pooth Khurd	5.80
		Bankner	6.30
		Bawana	11.80
3	Nilothi	Kamruddin Nagar	2.53
		Shiv Enclave	5.17
		Ranhola GoC	7.38
		Vikaspuri GoC	6.59
4	Najafgarh	Galibpur GOC	0.22
		Jafarpur GOC	0.66
		Khera Dabar GOC	0.26
		Shikarpur GOC	0.12
		Hasanpur GOC	0.43
		Tikri Kalan GOC	0.76
		Tajpur Khurd GOC	2.38
		Sarangpur GOC	0.59
		Kazipur GOC	0.24
		Kair GOC	0.66
		Kanganheri GOC	0.44
		Goyla Vihar GOC	1.76
		Mitraon GOC	4.40
		Dichaon GOC	1.54
5	Okhla	Sangam Vihar	3.56
		Sangam Vihar GOC	1.79
		Tajpur Pahari GOC	9.99
6	Shahdara	Sonia Vihar GOC	7.04
		Gokalpur GOC	1.92
7	Narela	Palla GOC	1.54
8	Coronation Pillar	Wazirabad GOC	4.82
		Bhalaswa GOC	2.19
9	South Delhi	Chhattarpur GOC	4.95
		Samalka GOC	0.53
		Bijwasan East GOC	1.50
		Mahipalpur GOC	2.97
10	Outer South Delhi	Fatehpurberi and Chandanhola	10.00
		Rajpurkhurd	10.00
Total			**212.59**

Annexure 4.2
(Referred to in paragraph 4.3)
Capacity & Utilisation of STPs



*Rithala Ph.-I, Kondli Ph.-II and Kondli Ph.-III are under rehabilitation.

Annexure 6.1
(Referred to in paragraph 6.2.2.1 (B))
Savings under GIA and Centrally Sponsored Schemes

(i) Savings in selected heads:

(₹ in crore)

Year	Sl. No.	Head of Account	Actual allocation	Actual expenditure	Funds not utilized	Percentage of un-utilized funds (in *per cent)*
2017-18	1	I.T Infrastructure and Digitized mapping	69.73	24.78	44.95	64.46
	2	Yamuna Rejuvenation	27.50	0.33	27.17	98.80
	3	Urgent and Emergent works in Water supply and sanitation	35.00	-	35.00	100
2018-19	1	Raw Water arrangement	168.75	47.60	121.15	71.79
	2	Water Supply in Resettlement Colonies	10.00	4.33	5.67	56.70
	3	Use of treated effluent	7.50	1.54	5.96	79.47
	4	Urgent and Emergent works in Water supply and sanitations	69.00	20.09	48.91	70.88
2019-20	1	GIA-Construction of Iron removal plant at Palla& Installation of Tube wells	11.25	-	11.25	100
	2	Use of treated effluent	7.50	1.86	5.64	75.20
	3	Water Supply in Resettlement Colonies (new scheme)	20.00	7.25	12.75	63.75
	4	Mukhyamantri Muft Sewer Connection Yojna (GIA-House Service Connections)	50.00	-	50.00	100
2020-21	1	Raw water arrangement	119.97	50.44	69.53	57.96
	2	GIA-Construction of Iron removal plant at Palla& Installation of Tube wells	10.00	-	10.00	100
	3	Use of treated effluent	50.00	1.35	48.65	97.30
	4	Water Supply in Squatter Resettlement Colonies (new scheme)	10.00	2.70	7.30	73.00
	5	GIA for Rain Water Harvesting	50.00	12.35	37.65	75.30
	6	EAP Funding YAP-III (Central)	225.00	58.16	166.84	74.15
	7	GIA for Septage Management (New head)	40.00	0.07	39.93	99.83

(ii) Details of GIA and expenditure of centrally sponsored schemes:

(₹ in crore)

Sl. No.	Year	Name of Scheme	GIA	Actual Expenditure	Savings	Percentage of un-utilized funds (in *per cent)*
1	2017-18 to 2021-22	AMRUT	355.24	342.79	12.45	(3.50)
2	2017-18 to 2021-22	Yamuna Action Plan III	1001.37	938.33	63.04	(34.27)
3	2017-18 to 2021-22	JICA	305.02	88.27	216.75	(71.06)
4	2017-18 to 2021-22	Namami Gange	200.00	180.30	19.70	(9.85)
Total			**1861.64**	**1549.69**	**311.94**	**(16.76)**

Annexure 7.1
(Referred to in paragraph 7.3)
Cases of re-employment in violation of extant instructions

Sl. No.	Post for which Consultant appointed	Vacant post against which appointment made initially	Date of appointment	Audit remarks
1.	Consultant (Finance)	Joint Director (F&A)	June 2016	The engagement was extended till 4 June 2023, up to the age of 67 years. Extension beyond 1 July, 2019 was also against the vacant post of Law Officer which was not in the respective category/discipline.
2.	Consultant (Law)	Chief Law Officer	18 April 2016	The engagement was extended continuously up to the age of 69 years.
3.	Consultant (Finance/ Accounts & Audit)	System Administrator	September 2017	DJB extended his engagement (six months) on the same terms and conditions beyond the age of 65 years.
4.	Consultant (Horticulture)	D.D., Horticulture	1 April 2022	Ex-post-facto approval from the Board was taken after their engagement.
5.	Consultant (T&QC)	Chief Water Analyst	1 April 2022	

https://cag.gov.in/ag/new-delhi/en