BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

Principal Bench, New Delhi

O.A. No. 569 of 2023

In the matter of

Alok Kumar — Applicant

Vs

Union of India & Ors. — Respondent(s)

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1.	**Response on** "behalf of Central Pollution Control Board i.e, Respondent No. 2 in compliance to Hon'ble NGT order dated 25.09.2023 in O.A. No. 569 of 2023.	
2.	**Annexure- 1:** A copy of CPCB letter dated 11.08.2023 to Department of Environment & Forests, UP Government.	
3.	**Annexure- 2:** A copy of report titled "Pollution Source Mapping of River Hindon & its Tributaries and Restoration Plan for Polluted Stretches"	
4.	**Annexure- 3:** A copy of Hon'ble NGT order dated 25.09.2023	

Ajit Kumar Vidyarthi

(A.K. Vidyarthi)

Scientist-F,

Central Pollution Control Board,

Delhi-110032

Place: Delhi

Date: 08.11.2023.

IN THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 569 OF 2023

IN THE MATTER OF:

Alok Kumar ...Applicant

Vs

Union of India & Ors.

... Respondent(s)

RESPONSE ON BEHALF OF CENTRAL POLLUTION CONTROL BOARD i.e., RESPONDENT NO. 2

I, A. K. Vidyarthi s/o Late Shri Vikrama Singh, aged about 53 years, working as Scientist-'F' in Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi-110032, I am fully conversant with the facts of the present matter and competent to affirm this Response on behalf of Respondent No. 2, i.e. Central Pollution Control Board (hereinafter referred to as "CPCB") do hereby declare on oath as under: -

1. That this Original Application is regarding alleged issue of illegal encroachment and pollution caused by unauthorized residential colonies and constructions on river Hindon floodplain, basin and embankment in violation of the environmental norms. Hon'ble NGT considered the matter in OA 569/2023 titled Alok Kumar Vs Union of India & Ors on 25.09.2023. Verbatim of the relevant paras of the order dated 25.09.2023 is reproduced below:

"2. The emphasis is in respect of the floodplains of river Hindon in Ghaziabad and Gautam Budh Nagar and the stand is that in the master plan 2021 of both the districts, the floodplains and

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embankments have been shown as River Protected Areas and Green Area respectively but inaction on the part of the concerned authorities has amplified the rate of encroachment which is against the principle of sustainable development.

5. The Respondent are directed to file their response before the next date of hearing."

In reply to the issues raised in the application, this respondent submits the following:

2. That, it is humbly submitted that a team of officials from CPCB, Uttar Pradesh Pollution Control Board (UPPCB) and Uttarakhand Pollution Control Board (UKPCB) carried out monitoring of River Hindon, its tributaries & drains during November-December, 2022 & January-March, 2023 and also prepared an inventory of polluting sources. Discussions were also held with officials from UPPCB, Central Ground Water Board (CGWB), Central Public Works Department (CPWD), Central Water Commission, Uttar Pradesh Ground Water Department (UPGWD) and National Mission for Clean Ganga (NMCG) on 18.11.2022 and 20.01.2023 to identify the remedial measures for rejuvenation of River Hindon.
3. That, it is humbly submitted that CPCB, based on the data collected during monitoring & inventory of polluting sources, prepared a report titled "Pollution Source Mapping of River Hindon & its Tributaries and Restoration Plan for Polluted Stretches" which incorporates water quality of river, list of hotspots, inventory of polluting sources, performance of STPs, groundwater quality & suggestive action plan incorporating measures for the industrial pollution control, sewage management as well as river rejuvenation.
4. That, it is further humbly submitted that about 17 hotspots on river Hindon, its tributaries & drains were identified for priority action. Consequently, CPCB forwarded the report vide letter dated 11.08.2023 to Department of Environment & Forests, UP Government with recommendation that District-wise task force/executive committee may be constituted to carry out ground verification, inventory of polluting sources and to ensure pollution control measures being taken to restore the quality at these locations/stretches in a time bound manner. Copy of letter dated 11.08.2023 annexed as **Annexure-1.**

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5. That, it is humbly submitted that copy of the above mentioned report titled "Pollution Source Mapping of River Hindon & its Tributaries and Restoration Plan for Polluted Stretches" is annexed herewith as **Annexure-2**.
6. That, it is most respectfully prayed that the report titled "Pollution Source Mapping of River Hindon & its Tributaries and Restoration Plan for Polluted Stretches" may be considered in this present matter.
7. That this answering Respondent no. 2, i.e. Central Pollution Control Board shall abide by any order or direction passed by this Hon'ble Tribunal.

NOTARY PUBLIC
R.L. Chaudhary
N.C.T. of Delhi
Regd. No. 1513
GOVT. OF INDIA

Ajit Kumar Vidyarthi

ए. के. विद्यार्थी / A. K. Vidyarthi
वैज्ञानिक 'एफ' / Scientist 'F'
केंद्रीय प्रदूषण नियंत्रण बोर्ड
Central Pollution Control Board
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार
M/o Env. Forest & Climate Change, Govt. of India
परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली–110032
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

DEPONENT

VERIFICATION

It is verified that the content of this Response which is based on official record and information available in the office are true and correct. Nothing has been concealed therein. Verified on this day ….. of November, 2023 at New Delhi.

- 8 NOV 2023

ATTESTED
NOTARY PUBLIC
GOVT. OF INDIA
- 8 NOV 2023

Ajit Kumar Vidyarthi

DEPONENT

ए. के. विद्यार्थी / A. K. Vidyarthi
वैज्ञानिक 'एफ' / Scientist 'F'
केंद्रीय प्रदूषण नियंत्रण बोर्ड
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परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली–110032
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

Annexure-1

DO No. PJ-14099/36/2022-WQM-II-HO-CPCB-HO 3442-3448

August 11 , 2023

Monitoring of River Hindon, its tributaries and drains was carried out during Nov-Dec, 2022 and Jan-Mar, 2023 by teams of officials from Central Pollution Control Board (CPCB), Uttar Pradesh Pollution Control Board (UPPCB) and Uttarakhand Pollution Control Board (UKPCB). Inventory of polluting sources was also prepared. Discussions were also held with officials from UPPCB, Central Ground Water Board, Central Public Works Department, Central Water Commission, Groundwater Department, U.P. and National Mission for Clean Ganga (NMCG) on 18/11/2022 and 20/01/2023 to identify the remedial measures for rejuvenation of River Hindon.

CPCB forwarded an interim report on River Hindon Pollution to NMCG & UPPCB on 09/01/2023 for necessary action. CPCB also communicated list of polluting drains to UPPCB vide letters dated 13/01/2023, 07/02/2023, 13/02/2023 and 20/03/2023 for necessary action.

I would also like to invite your attention to the meetings held under the Chairmanship of Secretary, Ministry of Jal Shakti on 20/10/2022 on River Hindon pollution and between Secretary, DoWR, RD & GR, MoJS and Secretary, Ministry of Environment, Forest & Climate Change (MoEF&CC) on 30/11/2022 as well as Committee constituted under Chairmanship of Chief Secretary, Government of Uttar Pradesh regarding pollution control in river Hindon, vide NGT order dated 17/03/2023 in OA No. 859/2022 in the matter of Abhisht Kusum Gupta vs State of Uttar Pradesh & Ors.

CPCB, based on the data collected during monitoring & inventory of polluting sources, has prepared a report titled "Pollution Source Mapping of River Hindon & its Tributaries and Restoration Plan for Polluted Stretches" (copy enclosed) which incorporates water quality of river, list of hotspots, inventory of polluting sources, performance of STPs, groundwater quality & suggestive action plan incorporating measures for the industrial pollution control, sewage management as well as river rejuvenation. About 17 hotspots on river Hindon, its tributaries & drains have been identified for priority action. District-wise task force/executive committee may be constituted to carry out ground verification, inventory of polluting sources and to ensure pollution control measures being taken to restore the quality at these locations/stretches in a time bound manner.

Considering the importance of the matter, I solicit your kind attention and intervention in the matter. CPCB would be willing to provide any technical assistance as may be required.

Yours sincerely,

11/8/23

(Tanmay Kumar)

Shri Manoj Singh,
Additional Chief Secretary,
Environment, Forest & Climate Change Department, Govt. of Uttar Pradesh,
17, Rana Pratap Marg, Lucknow – 226001

Encl.: As above

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
निर्गत...
दिनांक... 11/8/2023

Copy to,

1. **Mrs. Leena Nandan,**
   Secretary,
   Ministry of Environment, Forest & Climate Change,
   Indira Paryavaran Bhawan,
   Jorbagh Road, New Delhi – 110003

2. **Shri Pankaj Kumar,**
   Secretary,
   Ministry of Jal Shakti,
   Shram Shakti Bhawan, Rafi Marg,
   New Delhi-110001

3. **Shri Durga Shanker Mishra,**
   Chief Secretary,
   Government of Uttar Pradesh,
   101, 'B' Block, Lok Bhawan, U.P. Secretariat,
   Lucknow - 226001

4. **Shri Manoj Kumar Singh,**
   Additional Chief Secretary,
   IIDC, Infrastructure & Industrial Development Department,
   Block C, Lok Bhawan, Sarojini Naidu Marg,
   Lucknow - 226 001. (U.P.)

5. **Chairman,**
   Uttar Pradesh Pollution Control Board,
   Building. No. TC-12V, Vibhuti Khand, Gomti Nagar,
   Lucknow-226 010

6. **Shri G Asok Kumar,**
   Director General,
   National Mission for Clean Ganga,
   1st Floor, Major Dhyan Chand National Stadium,
   India Gate, New Delhi - 110002

(Tanmay Kumar)

Annexure-2

Pollution Source Mapping of River Hindon & its Tributaries

and

Restoration Plan for Polluted Stretches

CENTRAL POLLUTION CONTROL BOARD

Ministry of Environment Forest & Climate Change

Parivesh Bhawan, East Arjun Nagar, Delhi- 110032

(August, 2023)

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PREFACE

Various waterbodies in India, such as rivers, their tributaries, prominent streams as well as the adjoining wetlands, have been converted into either sewage artery for the increasing urban demographics, or tamed for infrastructural developments, thus continuing the legacy of ecological abstraction of the same. The impact of these practices, increases by manifold, when ideas such as river rejuvenation or restoration are disengaged from the tailor-made approaches that bifurcates the river into various segments and talks about segment-specific interventions.

River rejuvenation is an effort aimed at restoring overexploited and polluted rivers. It requires an understanding of requirements towards the restoration efforts from source to sink. Depending on the level of deterioration, river rejuvenation aims at a new sustainable healthy river ecosystem. River ecosystem serves a lot to ecological functioning, so it is essential to restore the damaged as well as polluted rivers back to their normal status. The continuing practice has been to restore the river health back to an accepted pristine state. To achieve this, the underlying premise is to prevent any direct entry of domestic sewage, industrial effluents and solid waste into the river to improve the river health. However, replacing such current practices with state-of-art scientific cum technical knowledge, and integration of the cross-sectoral understanding of the river's management can provide a glimpse of the pluriversal possibilities in rejuvenating the rivers.

Recent times calls for ensuring flow of a river as which is its identity and the most significant variable of a river system. Besides performing various functions, it gives self-cleaning and self-rejuvenation powers to a river. Thus, the river rejuvenation broadly includes ensuring environmental flow in the river during different seasons. However, despite the dynamicity of a river's physical form and its ecosystem, this is applicable only for perennial rivers that are fed by melting of the accumulated ice-cap/glaciers of the mountains along with rainfall. The other set of rivers are entirely rain-fed, land-locked receiving water from the annual rainfall alone. In non-rainy seasons, their flow is limited to the extent of inflow of water from seepage through the soil mass of its catchment. These rivers have an entirely different ecosystem such as river channel, riparian zone, flood plains and embankments. They receive water during monsoon that is stored for a longer duration and helps in recharging of nearby ground water aquifers, connected channels and wetlands, which in-turn helps in maintaining water availability in river during non-monsoon period. Therefore, for such rivers, the concept

of maintenance of different component of their eco-system is more important than the concept for ecological flows.

Further, the lucid understanding of aspects of sewage and industrial pollution control, is yet another challenge, since it is believed that controlling pollution discharge into the river is same as restoring the river water quality. In view of sewage management, the aspect of sewage generation is equated with the sewage treatment capacity to control pollution. But the challenge lies in not just bridging the widening gap between sewage generation and treatment capacity but to go beyond. Combating the challenge of outdated drainage and increasing pollution on the river, it is imperative to restrict the untreated sewage falling into the river not only by Interception, Diversion and Treatment (IDT) but also by using in-situ low-cost decentralized treatment systems. Effectively, it also means developing facilities to divert treated sewage for different purposes such as in irrigation to utilize nutrient value of sewage as well as industrial production thereby reducing burden on fresh water use.

Another facet of river pollution mentioned previously is the industrial pollution control that aim to stop discharge of wastewater generated from industrial processes into the river system. Indian industries characterize themselves with low-scale of operation and production, archaic technology, lack of cleaner technology, high freshwater consumption, high effluent generation and inadequate effluent treatment systems, in addition to unskilled personals that lack technical knowhow. Despite of existing regulatory measures, these outmoded systems have resulted in high effluent generation along-with discharge of partially treated or untreated effluent into the river system.

Therefore, the main focus in river restoration is the maintenance of ecological integrity and improving the river ecosystem by improving flow regime, water quality & sediment chemistry, increasing aquatic and riparian biodiversity, protecting river structure and floodplains. Thus, it can be considered as a way of enhancing the sustainability of river. Keeping in view the above aspects, the present concept of river restoration encompasses 2 prolonged approaches. First priority in water-quality assessment and management is to maintain and restore “the desirable level of river water wholesomeness” and thereafter, comes the fulfilment of “requirement for the best designated use” that has to be taken up at the second stage. It is to be realized that merely meeting bathing water quality, doesn’t equate with rejuvenation of polluted river or any of its stretch. The rejuvenated river should have functional as well as self-purification systems *i.e.* biological communities that have trophic cascades. Further, restoration of river ecosystem considers channel water ecosystem, the riparian

ecosystem, floodplain wetlands, floodplain forests and grasslands as well as development of vegetation on embankment. Such ecosystem restoration methods include planting appropriate plants on top of the riverbanks and bank slopes. Thus, riparian zones can be protected by the roots, stems and leaves of such plants. Further, Biodiversity Parks, restoration of wetlands and converting existing ponds to Constructed Wetlands for water quality improvement are yet another facets of the same.

Treatment of wastewater and bringing the polluted water to the level of bathing quality is just one among many remediation and/or restoration required for rejuvenation of river systems. Therefore, it is being believed that rejuvenation of polluted rivers cannot be achieved by treating wastewater using STP alone. Anthropogenic-mediated activities on the riverscape have been increasingly disrupting the ecological processes leading to further degradation of riverscapes resulting in loss/degradation in terms of function of river health and deterioration of water quality despite of treating waste water through STPs by spending millions of rupees annually. A reliable water quality monitoring system in combination with pollution load assessment of all drains discharging into the river forms the basis for planning targeted interventions to improve water quality, along with judicious water use and water conservation, paves the way for river.

To conclude, there is a need to bridge the gap between science and application to effectively implement an integrated approach for the rejuvenation of polluted rivers involving Nature Based Solution. Further, the long-accepted rejuvenation approach, considering returning rivers to a pre-development condition, is now physically or economically impractical and would require unacceptable limitations on current and future human activities. Also, in areas where rivers have been altered by human development for centuries, such as in India, the concept of a river's 'pre-development' condition is almost meaningless given the extent and duration of human induced alterations. Therefore, rejuvenation of polluted rivers requires bringing back the self-purification system of rivers so that the rivers can sustain the quality of water and start providing ecosystem services, they are destined to provide.

CHAPTER – 1: BACKGROUND

A meeting was taken by Secretary, Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD & GR), Ministry of Jal Shakti (MoJS) on October 20th, 2022 concerning rejuvenation and pollution abatement plan of River Hindon. It was decided in the meeting that CPCB and NMCG may carry out the pollution source mapping of River Hindon and its tributaries from origin to its confluence with River Yamuna to identify the major issues for water quality deterioration and gap areas in sewage management. Further, a meeting was held on November 30th, 2022 between Secretary, DoWR, RD & GR, MoJS and Secretary, Ministry of Environment, Forest & Climate Change (MoEF&CC) and CPCB was directed to focus on industries located in non-conforming areas and other than GPIs responsible for pollution in water bodies. Also, a committee has been constituted under the Chairmanship of Chief Secretary, Government of Uttar Pradesh, vide NGT order dated 17/03/2023 in OA No. 859/2022 in the matter of Abhisht Kusum Gupta vs State of Uttar Pradesh & Ors. regarding the action for pollution control and remediation of river Hindon having CPCB as member.

Further, to come out with measures for rejuvenation of the river Hindon and its tributaries, a committee has been constituted as per the minutes of the meeting comprising Divisional Head-WQM-II, CPCB as the Chairperson and representatives from Uttar Pradesh Irrigation and Water Department, Uttar Pradesh Pollution Control Board, National Institute of Hydrology, Roorkee, Central Ground Water Board, Central Public Works Department, Central Water Commission as well as Uttar Pradesh Jal Nigam (Rural), Ground Water Department, Uttar Pradesh and NMCG as members of the committee.

Meetings with the members of the Committee were conducted on November 18th, 2022 & January 20th, 2023 and members were requested to forward their actions points including activities that shall be undertaken towards rejuvenation of River Hindon. Summary of action points received from Committee members are as follows:

National Institute of Hydrology

National Institute of Hydrology, Roorkee has carried few studies on the aspects of water quality of River Hindon and its tributaries. The following has been suggested by the institute:

- Municipal wastewater and industrial effluents discharging into River Kali and Krishni should also be treated before these rivers confluences River Hindon. Adequate width and

depth of flow should be maintained via structural interventions (like weirs and bunds), if needed.

- Also, ensuring the hydraulic and hydrological connectivity of the river with other water bodies (including groundwater) is important. Since, in the upper stretch of River Hindon, there may be contribution of groundwater to the river while in mid and downstream section, the groundwater table has been so much depleted due to excess exploitation of groundwater for agriculture and other activities that there may be little contribution of river water to groundwater. Therefore, influent and effluent sections in the river should be identified for implementation of reach-wise recharge augmentation plan for continuous flow in the river.
- Further, structural interventions are necessary to ensure the functioning of the river as a secure perennial river without obstructing terrestrial activities. In the Hindon basin, there are several stretches where the flow is stagnant. Some. Thus, for instance, weirs may be needed in river stretches with steep gradients to provide the necessary flow depths or flow velocities needed for river biota; or, embankments may be needed in regions that are susceptible to flooding during heavy storms; or bridges may be needed to secure river crossings for human and terrestrial animals.

Central Groundwater Board

The board provided some strategies for revival of Hindon river and its tributaries:

- Groundwater levels are comparatively deeper owing to permeable nature in upstream area(s)/catchment. Due to its inherent character, it is conducive for groundwater recharge that will in turn contribute to increased base flow in the Hindon river. Suitable structures may include percolation tanks with stone pitching up-stream up to the highest flood level to avoid embankment erosion.
- Basin spreading method can be adopted wherein the natural floodwaters of the river in spate after monsoon are allowed to spread across large areas of land for infiltration into the underlying aquifer. Successful implementation will result in recouping of groundwater level over time and will contribute to river flow.
- Construction and maintenance of recharge trenches with recharge shafts in downstream areas. Feasible structures for areas where groundwater levels are deeper than 20 mbgl (meters below ground level) or more. Successful implementation will result in recouping of groundwater level over time and will contribute to river flow.

- Enhancing water use efficiency measures in sugarcane cultivated area(s) by successful adoption of drip irrigation will lead to saving in groundwater use from 45 – 60% and this will help in recouping of groundwater levels over time. Once the groundwater levels have reached above the bed of the river, groundwater will contribute to base flow and help in dilution of that stretch of river.
- Sewage and domestic wastes from towns and villages can be diverted to Sewage Treatment Plants. Diversion channels must be lined so as not to pollute groundwater. Once water has been treated and found to pass the quality checks, it can be utilized for recharging aquifer(s) or can be pumped into the river for increasing the flow.

Central Water Commission

- The commission suggested for restoration and development of forests such as riparian buffers along the watershed lines wherein their vegetative zone may serve as a buffer to pollutants entering a stream from runoff, controls erosion, and provides habitat and nutrient input into the stream. Enhancement of the riparian buffer by re-planting native grasses, forbs, shrubs and trees is the first step in the recovery of the stream back to a more natural condition.
- Raising the water table is key requirement for restoring the perennial virgin flow in the lean season. Better practices such as Systematic Sugarcane Initiative(SSI) can help reduce water use in Sugarcane, the most water guzzling crop in the basin.
- Augmentation of water by storing rainwater and encouraging the recycle and reuse of water. Water augmentation looks to increase availability and supply of water by replacement of the current reduced amount of water. This can be done through active recharge of water and protection of water recharge areas. Harnessing rainwater and recharge of the water table allows for recharge through infiltration into aquifers.
- Better management of practices in line with urban river conservation norms. In the urban landscapes, works related to riverfront development, eco-park development, industrial and educational estate plantations, and avenue plantations etc. could be taken up. In this regard, the “River Centric Urban Planning Guidelines” published by Town and Country Planning Organization, Ministry of Housing and Urban Affairs, Govt. of India may be followed for devising certain strategies such as river ecology development plan by conservation of natural areas etc.

- Any diversion of water from River Hindon needs to be regulated in such a way that a minimum flow in the river can be maintained at various locations on the river. Further, encroachments along the river Hindon must be identified and restoration of its flood plain must be promoted to the extent feasible.

Uttar Pradesh Pollution Control Board

- A Project Proposal for "Water Quality Monitoring of Hindon River Basin" for the year 2022-27 in the State of Uttar Pradesh has been reported by UPPCB to National Mission for Clean Ganga towards monitoring of River Hindon, its tributaries namely Kali (west) & Krishni and their polluting sources to enable round the clock surveillance and timely action against the defaulter units discharging polluted effluent.
- This will include mapping and monitoring of the named rivers, drains, the Sewage Treatment Plants and industrial polluting sources in River Hindon basin. The estimated budget is **Rs. 21.22 Crore.**

CHAPTER – 2: MONITORING PLAN

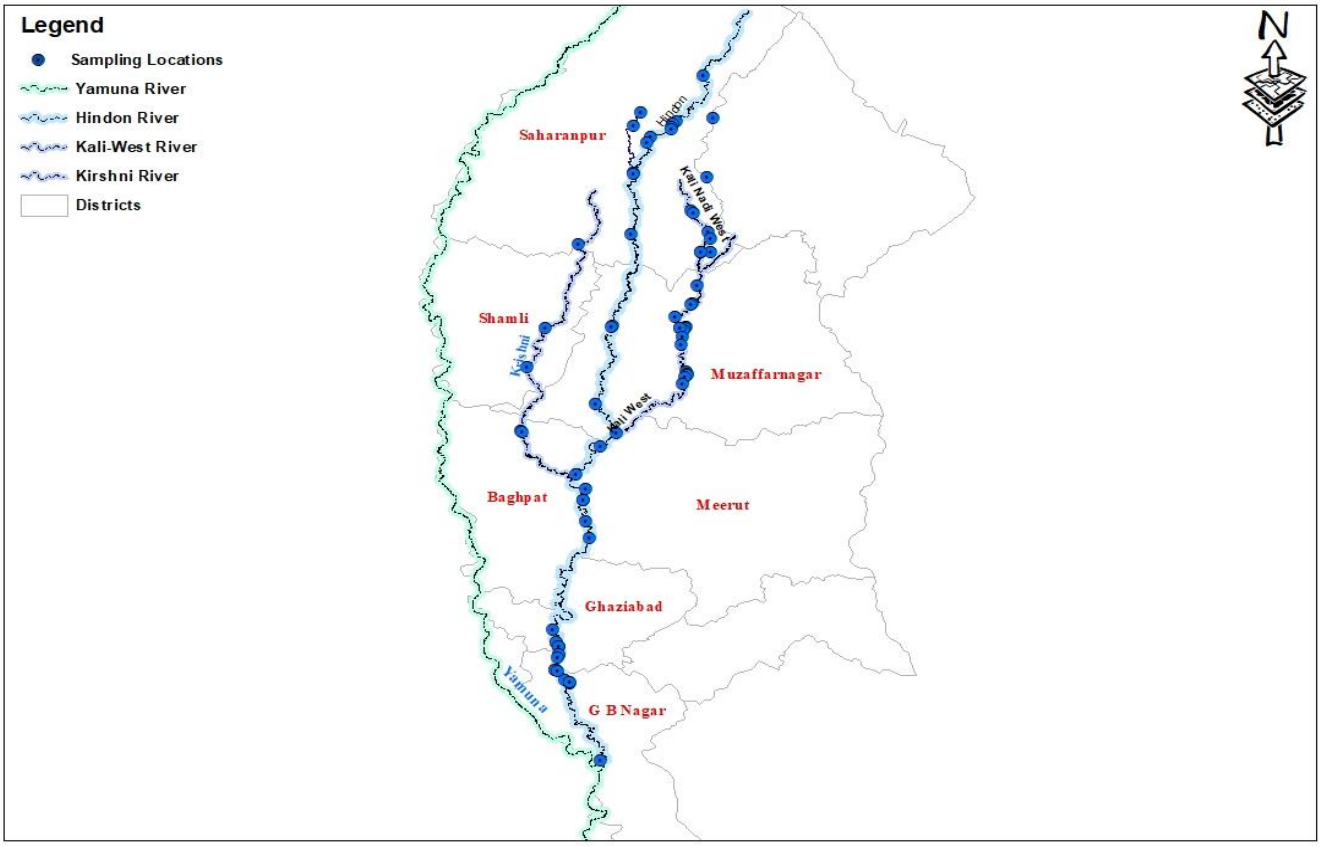
For the purpose of river water quality assessment and pollution mapping, joint monitoring and sampling of River Hindon, its tributaries namely River Kali-West, Dhamola & Krishni and the adjoining drains was carried out by joint teams of CPCB and UPPCB during November 02-16, 2022. The objectives of the pollution mapping were:

a. Tracing and mapping the course of the rivers and identifying major adjoining drains/small streams discharging their content into the mentioned rivers.
b. Characterization of water quality of rivers at various locations (River Hindon and its tributaries namely Rivers Kali-West and Krishni).
c. Identification, quantification and characterization of major drains joining the rivers.
d. Monitoring of STPs in Saharanpur, Muzaffarnagar and Ghaziabad districts for assessment of performance of sewage treatment plants.
e. Groundwater monitoring.
f. Survey of river system for the purpose of identification of possible sites for rejuvenation in River Hindon and its tributaries namely Rivers Krishni and Kali-West.

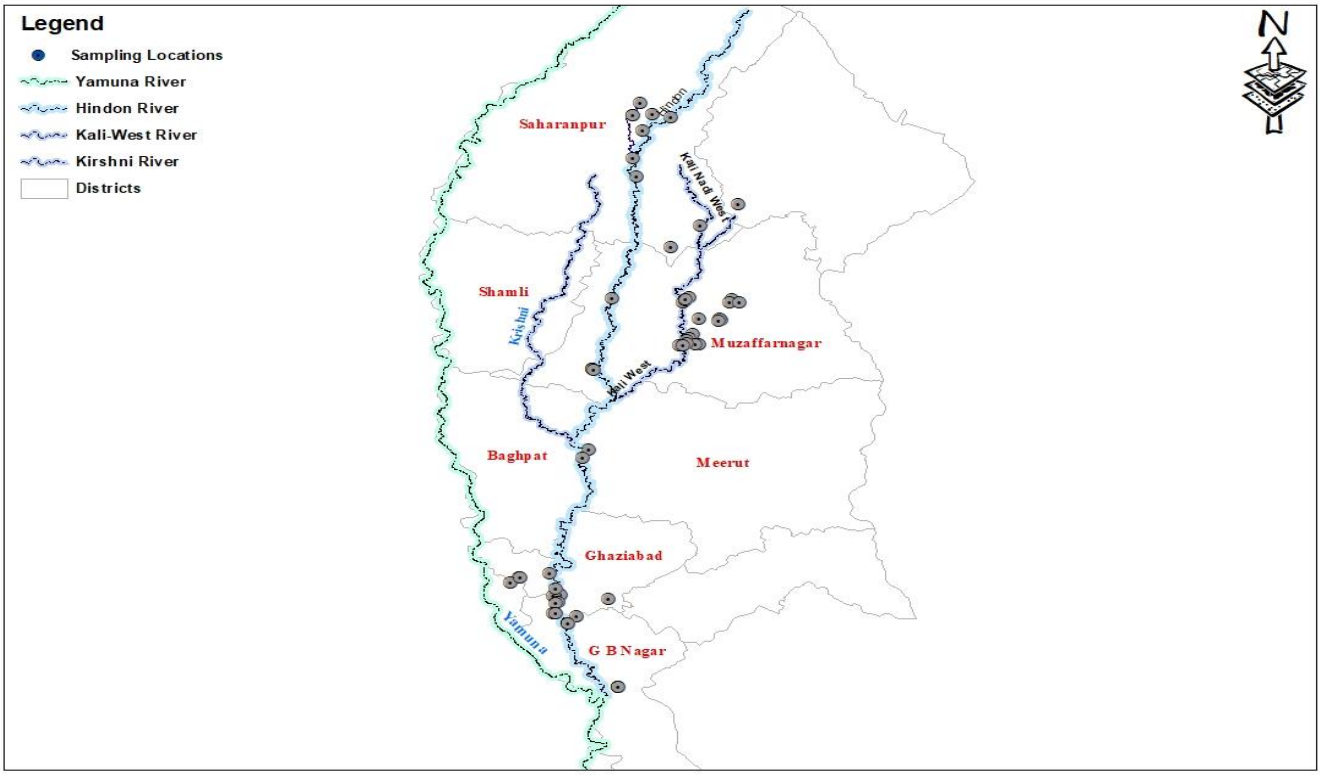
During monitoring, pollution in rivers and adjoining drains has been observed for which pollution source mapping of polluted river stretches/drains has been carried out jointly by teams of CPCB and UPPCB during January-March, 2023 wherein mapping, monitoring and sampling of river water, adjoining drains and groundwater were carried out.

Monitoring of river Hindon was carried out at 34 locations, Kali-West at 21 locations, Dhamola at 4 locations, Krishni at 5 locations and Yamuna at 2 locations. A total of 55 adjoining drains of river Hindon (26), Kali-West (17), Dhamola (5), Krishni (4) and Yamuna (3). Ground water was also monitored at 31 locations.

The sampling locations on rivers and adjoining drains are shown in **Map 1 & 2**, respectively.



Map 1 Monitoring locations on Rivers Yamuna, Hindon, Kali-West and Krishni



Map 2 Drains adjoining Rivers Yamuna, Hindon, Kali-West and Krishni

CHAPTER – 3: RIVER WATER QUALITY ASSESSMENT AND POLLUTION SOURCE MAPPING

3.1 Catchment of river Hindon

River Hindon is an important tributary of Yamuna river, which flows between Ganges (right side) and Yamuna (left side) rivers for approx. 400 kilometres. Hindon originates in the Saharanpur district of Uttar Pradesh at a distance of about 3 to 4 km from the Barsani Falls inside the dense forest area of Upper Siwalik region (lower Himalayas) (**Figures 1-2**) and traverses through Muzaffarnagar, Meerut, Baghpat, Ghaziabad and Gautam Buddh Nagar districts before it joins Yamuna river in Greater Noida. It is purely a rain fed river with a catchment area of about 7,083 Sq. Kms. Dhamola, Kali-West and Krishni are three major tributaries of river Hindon.

Dhamola River originates from a pond in Sansarpur village, Saharanpur and flows for approximately 52 Kilometres before meeting the Hindon River at Village Sharakthal/Sadoli Hariya in Saharanpur district.

River Kali-West originates from a series of wetlands in Gangali and Kalahati villages in Saharanpur district of Uttar Pradesh. From its origin up to the confluence with Hindon river, it travels a distance of about 150 Kms through Saharanpur, Muzaffarnagar and Meerut districts. The significant drainage area of the river is about 750 Sq. Kms which mostly lies in plains.

River Krishni originates from a wetland situated at Savalpur Navada near Krishni village in Saharanpur district. River is dry from its origin to confluence with Thaska drain in Saharanpur district. It traverses approximately 152 Kms through the district of Shamli and confluences with river Hindon near Barnawa village in Baghpat district.

3.2 Criteria for identification of polluted stretches/hotspots

River locations/stretches having BOD>10 mg/l are considered as polluted. The adjoining drains having BOD>150 mg/l, COD>450 mg/l, Color>75 Hazen, Chloride>1000 mg/l, TDS>1000 mg/l, TSS>500 mg/l, NH_3-N>50 mg/l, acidic pH (<5) which are not the typical characteristics of domestic drains and high metal concentrations (exceeding general discharge standards prescribed in Environmental (Protection) Rules, 1986) are considered polluted.

A total of 55 adjoining drains of river Hindon (26), Kali-West (17), Dhamola (5), Krishni (4) and Yamuna (3) and the district-wise status is given below:

District	No. of drains	Domestic	Industrial	Mixed	Tapped/Untapped/Dry/ STP Outlet
Haridwar	1	-	-	1	Untapped-1
Saharanpur	12	5	-	7	Untapped-11, Dry-1
Shamli	2	-	-	2	Untapped-2
Muzaffarnagar	19	12	2	5	Untapped-17, Tapped-2
Meerut	2	-	1	1	Untapped-1, Dry-1
Baghpat	1		-	1	Untapped-1
Ghaziabad	14	5	-	9	Untapped-12, Tapped-1, STP outlet-1
Gautam Buddha Nagar	4	2	-	2	Untapped-4
Total	55	24	3	28	Untapped-49, Tapped-3, Dry-2,STP outlet-1

Based on BOD and COD values, the categorization of drains has been done.

BOD (mg/l)	No. of drains	COD (mg/l)	No. of drains
0-50	11	0-250	16
51-100	15	250-500	18
101-150	4	501-1000	11
151-250	12	>1000	8
> 250	11	Dry/no significant flow	2
Dry/no significant flow	2		

3.3 Saharanpur and Shamli Districts

River Hindon

The water in the river is fed by small fresh water streams from its point of origin to Barsani Fall (**Figures 1-2**). Freshwater was observed at the origin, with meagre flow. The dissolved oxygen (DO) and biological oxygen demand (BOD) in the river at the Barsani waterfall were 10.8 mg/L and NIL, respectively. After travelling 5.5 Kms, there is pond fed by waterfall which has clean water full of fishes at Kaluwala Rao (**Figure 3**). Bunds have been constructed on the River Hindon at Pur ka Tanda, Saharanpur by the Irrigation Department to revive the river

(**Figure 4**). The river stretches up to 45 km before entering the city of Saharanpur. The river is mostly dry during the lean period; however, spring water was observed in some parts of this stretch.

Figure 1 Barsani waterfall

Figure 2 River Hindon near origin

Figure 3 River Hindon at Kaluwala Rao

Figure 4 Bunds at Pur ka Tanda

Stagnant, polluted wastewater (DO: NIL, BOD: 291 & 369 mg/l, & COD: 612 & 763 mg/l) was found in the river at Janta Bridge, Saharanpur-Dehradun road, Saharanpur (**Figure 5**), indicating that nearby industries, including Slaughter house-ALM Industries Ltd. and Pulp & Paper Industries namely Soofi Pulp and Board Mill, Anant Board Mill, Balaji Board Mill, Ekta Board Mill, and Krishna Board Mill, may be the potential source of discharge of untreated effluent into the river. In downstream (before confluence of Daya Sugar Mill drain), flow was observed in the river due to the contribution of sewage discharged from Gagelheri and Dinapur village. In River Hindon b/c of Daya Sugar Mill drain, the DO was NIL, and BOD was 80 mg/L. Daya sugar mill drain (dry) meets river Hindon at approx. 48.5 km downstream from

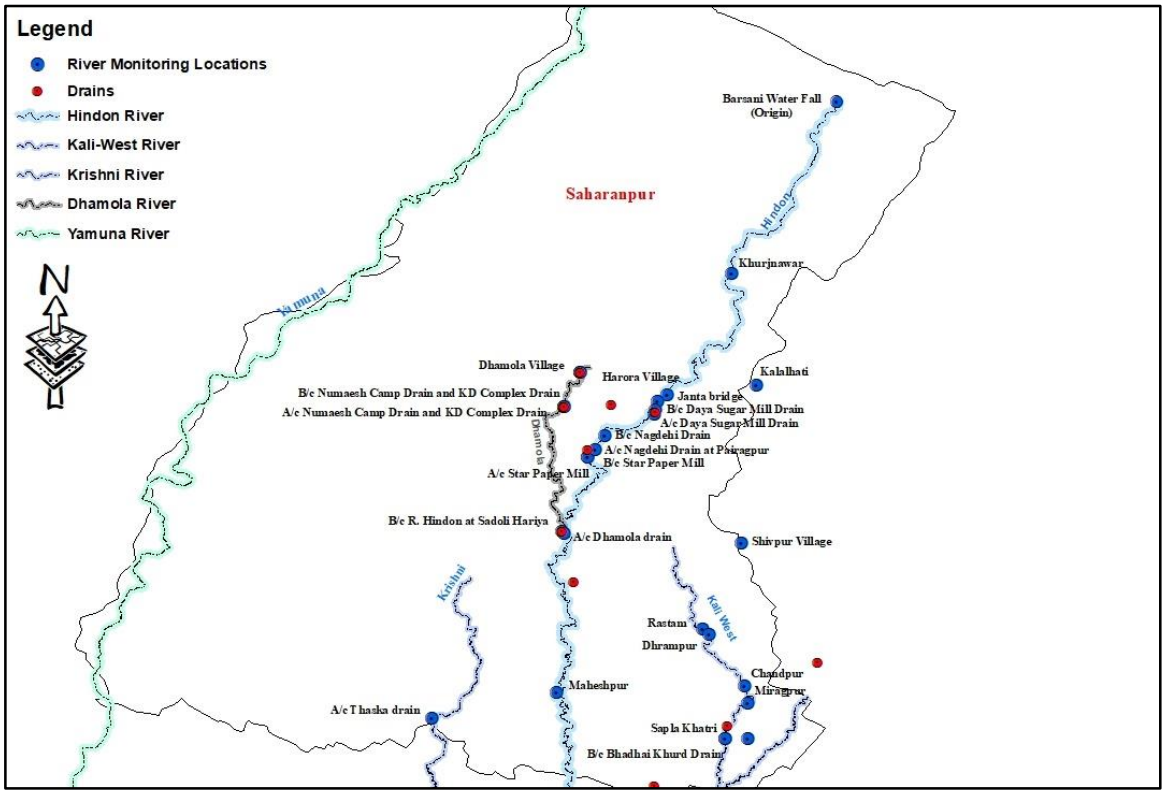
origin. In River Hindon a/c of Daya Sugar Mill drain, DO and BOD were NIL and 73 mg/L, respectively.

Figure 5 River Hindon at Janta Road Bridge, Saharanpur-Dehradun Marg

Further downstream, Nagdehi drain (Flow-0.74 MLD, BOD-34-237 mg/l & COD-103-349 mg/l) meets River Hindon. The river stretch b/c and a/c of Nagdehi drain was found dry. However, the river gained flow only after receiving effluent from the Star Paper Mill drain (Flow: 20.75-23.76 MLD, Color-75-107 Hazen, BOD: 61-198 mg/L, and COD: 181-338 mg/L). DO and BOD in the River Hindon a/c with Star Paper Mill drain were 0.8 mg/L and 61 mg/L, respectively. The monitoring locations on river Hindon and its tributaries Dhamola, Krishni and Kali-West along with adjoining drains in Saharanpur district are shown in **Map-3**:

Further downstream, Dhamola river (Flow-250.56 MLD, BOD-8 mg/l, COD-86 mg/l) meets River Hindon, and DO and BOD in River Hindon a/c with Dhamola river were NIL and 7-24 mg/L, respectively. Dhamola river carries sewage discharged from Madh village, Numaish camp area, Saharanpur city, Ram Nagar market area and treated sewage discharged from 38 MLD STP at Saharanpur near Mahilpur road and wastewater discharged from 21 industrial units.

In downstream, Bajaj Sugar Mill drain (Flow-0.05 KLD, BOD: 20-74 mg/l and COD: 82-211 mg/l) meets river Hindon and DO & BOD in river Hindon a/c Bajaj Sugar Mill drain at Maheshpur village were 0.35-0.9 mg/l and 14-21 mg/l. The flow diagram depicting the Hindon River from its origin to village Maheshpur in district Saharanpur is shown in **Figure 6**.



Map 3 Monitoring locations on river Hindon and its tributaries Rivers Dhamola, Krishni and Kali-West along with adjoining drains in Saharanpur district

Issues:

- Discontinuity of flow, dry stretch of river and encroachment of river bed at many places before confluence of Star paper mill drain.
- Pollution with high BOD level was observed in the Hindon River, specifically in the stretch from Janta Bridge to Maheshpur village (BOD exceeding 10 mg/l). The levels of DO and BOD in this stretch ranged from NIL to 0.9 mg/l and from 14 to 369 mg/l, respectively.
- High pollution level (BOD>150 mg/l and Colour>60 Hazen) in drains draining in to river Hindon:
    - **Nagdehi drain:** Nagdehi drain, also known as Nagdev River, flows for 55 kilometers before it joins Hindon River and carries both sewage and industrial effluent. High level of BOD (237 mg/l) was observed in the drain. UPPCB reported that three industrial units namely Jagdamba Gramodhyog Sansthan (Pulp & Paper) and Pashupati Dairy (P) Ltd. located on Dehradun Road and Bombay Hosiery (Textile) located at village Mohmmadpur, Kailashpur are operating in the catchment of the drain.

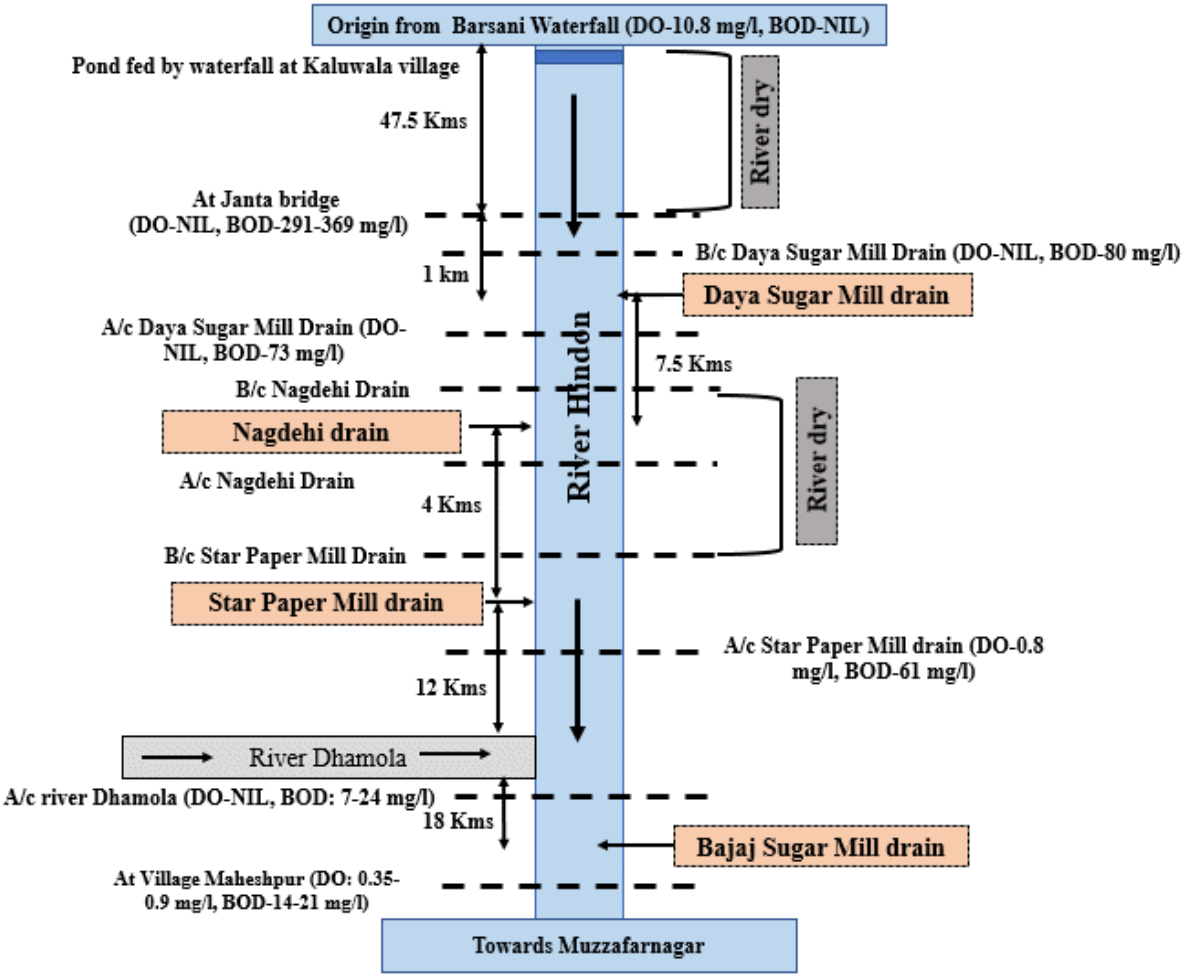


Figure 6 Flow diagram of river Hindon from origin to village Maheshpur in Saharanpur district

- **Star Paper Mill drain:** The Star Paper Mill drain is untapped and mixed drain carries industrial effluent from the Star Paper Mill and sewage from the Shantagarh area. The drain was found to have high levels of color-107 Hazen and BOD-198 mg/l.

River Dhamola

Dhamola River originates from a pond in Sansarpur village, Saharanpur and flows for approximately 52 Kilometres before meeting the Hindon River at Village Sharakthal/Sadoli Hariya in Saharanpur (**Figure 7)**, which was found dry.

The river is recharged by groundwater at Salempur Bhugdi village. Downstream, at a distance of approximately 3 Kms, the Madh village drain (Flow-1.71 MLD, BOD-17 mg/l & COD-100 mg/l), which carries sewage from the Madh village, meets the Dhamola River. After confluence of Madh village drain, the levels of DO and BOD in the river at Dhamola village were 8.04

mg/l & 1.6 mg/l in round I (17/12.2023) and 13.9 mg/l & 3 mg/l in round II (Feb 7-8; 2023) respectively (**Figure 8**).

Figure 7 Origin of River Dhamola - Pond in Sansarpur village

Figure 8 River Dhamola at Dhamola village

After flowing for approximately 27 Kilometres from its origin, two drains, namely the Numaesh Camp drain (domestic) (Flow-10 MLD, BOD-63-76 mg/l & COD-197-258 mg/l) and Kamdhenu Complex (KD Complex) drain (industrial) (BOD-28-204 mg/l, COD-142-545 mg/l, TSS-1066 mg/l, Cd-7.09 mg/l, Cu-15.95 mg/l & Fe-6.49-97.05 mg/l), discharge into the river. The levels of DO and BOD in the river before and after the confluence of these two drains were 0.36 mg/l and 23 mg/l as well as NIL and 42 mg/l, respectively.

Further downstream, two domestic drains, namely Paondhoi drain (domestic) (BOD-64 mg/l & COD-170 mg/l) and Kishanpur drain (domestic) (Flow-95 MLD, BOD-206 mg/l & COD-347 mg/l), meet the river, and the levels of DO and BOD in the river were 0.95 mg/l and 37 mg/l, respectively. The river was also monitored before its confluence with the Hindon River (after discharge of treated sewage from STP), and the levels of DO and BOD in the river were NIL and 8-47 mg/l, respectively. List of units provided by UPPCB in the catchment of river Dhamola is given below:

1. Shankar Board Mill, Saharanpur;
2. Arora Hosiery, Janta Road, Saharanpur;
3. Kamal Enterprises, Village Dhamola, Janta Road, Saharanpur;
4. General Textiles, Janta Road, Saharanpur;
5. Mak Hosiery, Tiparpur, Janta Road, Saharanpur;
6. Super Textile, Village Tiparpur, Janta Road, Saharnapur;

7. Shah Industries, 18 Medanta Complex, Janta Road, Saharnapur;
8. Ganpati Textile, Janta Road, Saharanpur;
9. Ekta Textile, Janta Road, Saharanpur;
10. Anmol Textile, Janta Road, Saharanpur;
11. Shalimar Cotton Dyeing, Saharanpur;
12. Siddharth Textile, Chilkana Road, Saharanpur;
13. Saharanpur Wools Ltd. Dehli Road, Saharanpur;
14. Atul Textile, Behat Road, Saharanpur;
15. Durga Textile, Janta Road, Saharanpur;
16. Garg Dyeing, Janta Road, Saharanpur;
17. J.J. Textile, Janta Road, Saharanpur;
18. Saharanpur Textiles Pvt. Ltd., Janta Road, Saharanpur;
19. Standard Engineering works, Industrial estate, Delhi road, Saharnapur;
20. Nagar Nigam, Pashubadhshala, Saharanpur
21. Deep Industries, I.E. Delhi Road, Saharanpur

The flow diagram depicting the Dhamola River from its origin to its confluence with the Hindon River is shown in **Figure 9**.

Issues:

- Pollution (BOD>10 mg/l) was observed in river Dhamola stretch from before confluence of Numaish Camp drain and KD Complex industrial drain to before confluence with river Hindon. DO and BOD in this stretch ranged as NIL-0.36 mg/l and 22-37 mg/l, respectively. River carries discharge of 21 industrial units (including industrial units discharging via Kamdhenu complex drain).
- Pollution due to drains (BOD>150 mg/l & COD>450 mg/l):
    - **Kishanpur drain:** Kishanpur drain is an untapped drain (domestic drain) which has a flow of around 95 MLD and carries domestic sewage from Saharanpur city and Ram Nagar market area. The drain has been found to have high levels of BOD (206 mg/l) which indicate discharge from industrial/commercial activities like dairy farming in to drain. Inventory of industrial units discharging into this drain is not available.

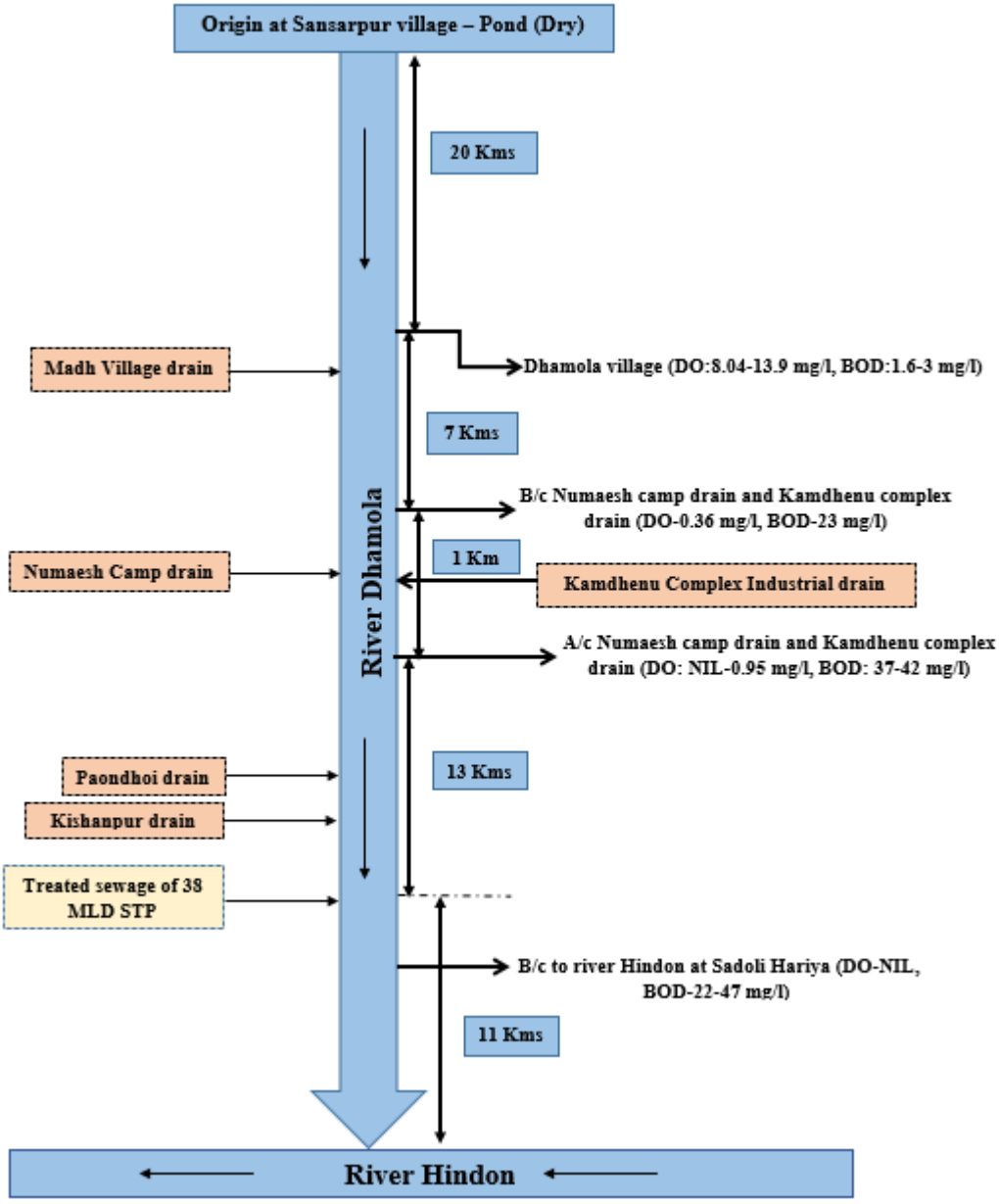


Figure 9 Flow diagram of river Dhamola from origin to confluence of river Hindon

- **Kamdhenu Complex Industrial drain:** Kamdhenu Complex Industrial drain is an untapped mixed drain that originates in Saharanpur city and carries untreated/partially treated industrial effluent from four textile units located on Janta Road in Saharanpur district and grey colored sewage from Balmiki Basti. The drain has been found to have high levels of BOD (204 mg/l) and COD (545 mg/l), as well as high concentrations of heavy metals, including Cd (7.098 mg/l), Cu (15.958 mg/l), and Fe (6.496-97.05 mg/l). The high concentrations of heavy metals such as Cd, Cu and Fe indicates that metal surface finishing industries are operating in the catchment of

Kamdhenu Complex Industrial drain. According to UPPCB, four textile units operate in the catchment area of the drain:

1. Durga Textile, Janta Road, Saharanpur
2. Garg Dyeing, Janta Road, Saharanpur
3. J.J. Textile, Janta Road, Saharanpur
4. Arora Hosiery, located on Janta Road in Saharanpur.

River Kali-West

The Kali-West River originates from a series of wetlands in the villages of Gangali and Kalahati in Saharanpur **(Figure 10**). In downstream, at Shivpur village, the river flows into a pond which has become highly silted and polluted due to the discharge of sewage from nearby villages. However, the river channel/bed in the upper reaches, up to Dharmpur village, is not distinct and is being encroached upon by farmers for farming and cultivation purposes.

The river begins to attain a continuous flow from Dharampur village, where DO and BOD in the river were found as 10.2 mg/l and 1.1 mg/l, respectively. Further downstream, freshwater from the Ganga canal is discharged into the river at Rastam village. In downstream, DO and BOD in the Kali-West River at Miragpur village were measured as 9.92 mg/l and 3 mg/l, respectively.

After confluence of Deoband drain (Flow-12.51 MLD, BOD-21 mg/l & COD-77 mg/l) near Fatehpur village, DO and BOD levels in the river at Sapla Khatri village (**Figure 11**) were 2 mg/l and 1.1 mg/l in round I (02/11/2022) and 0.7 mg/l & 6 mg/l respectively in round II (15/12/2023).

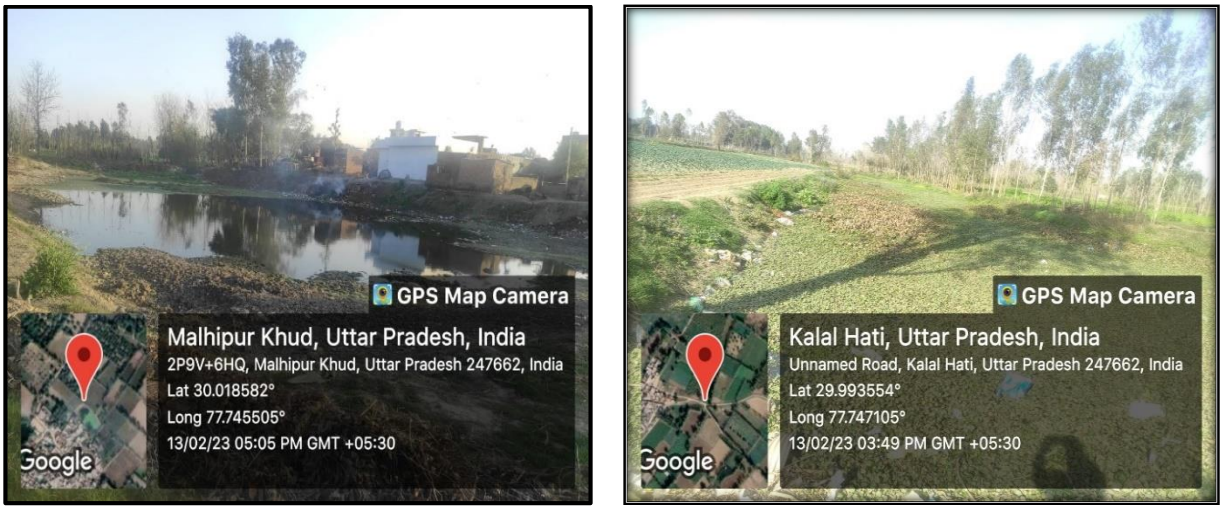


Figure 10 River Kali-West origin from wetland at Gangali and Kalalhati

Figure 11 River Kali-West at Sampla Khatri

Further downstream, Sheela drain (Flow-20.04 MLD, BOD-365 mg/l and COD-702 mg/l) originates from Roorkee, Uttarakhand (Mixed drain) meets the river. Decrease in DO levels from 1.2 to 1 mg/l was observed in the Kali-West River, after confluence with Sheela drain. Flow diagram of river Kali West from origin to after confluence of Sheela drain is shown in **Figure 12**.

Issues:

- Pollution due to drains (BOD>150 mg/l & COD>450 mg/l):
    - **Sheela drain:** Sheela drain is an untapped mixed drain. The drain carries both industrial effluent and untreated sewage from nearby villages and the Roorkee city (Uttarakhand). Sheela drain was monitored at Lakhnauta, Uttarakhand before confluence of channel of Ganga canal with the drain. High BOD (365 mg/l) and COD (702 mg/l) were observed in the drain indicating industrial discharge. Freshwater from Ganga Canal is discharged into Sheela drain near Rasoolpur Fakerhery village near Uttarakhand-Uttar Pradesh border. Catchment of the drain includes Libaheri, Jhabrera, Tikkolakala, Kbalpura village/town of Uttarakhand. Industries located in the catchment area of the drain include:
        1. M/s Uttam Sugar Mills Limited Distillery Division, Libberheri, Dist. Haridwar. (Uttarakhand)
        2. M/s Uttam Sugar Mills Ltd., Khasra No.- 42, 45 etc, Vill. - Libberheri, Roorkee, District Haridwar

3. M/s Aroma Craft & Tissues Pvt. Ltd., Khasra No. 103, 104, Vill- Nurpur, Pargana- Manglore, Tehsil- Roorkee, District Haridwar
4. M/s Sagar Paper Mills Pvt. Ltd., Khasra No. 223, 225, 5th K.m., Manglore-Jhabrera Road, Latherdeva Hoon, Tehsil- Roorkee, Distt. - Haridwar
5. M/s Asahi India Glass Ltd.- AIS Industrial Estate, Jhabera Road, Latherdeva Hoon, Roorkee, District Haridwar
6. M/s Air Liquide North India Pvt. Ltd., Unit -I, AIS Industrial Estate, Jhanreda road Tehsil- Roorkee, District Haridwar
7. M/s Finolex Cable Limited, Plot no.: K1 & 2 AIS Industrial Estate, Latherdeeva Hoon, Manglaur Jhabrera Road, Tehsil- Roorkeee, District Haridwar, Uttarkhand
8. M/s Carborundum Universal Ltd., Plot No. K-3, AIS Industrial Estate, Tehsil-Roorkee, District Haridwar
9. M/s Uttaranchal Pulp & Paper Mill Pvt. Ltd. Khasra No. – 29, 02nd Km stone Mangalore, Vill. – Mundet, Roorkee, District Haridwar, Utttarakhand
10. M/s Aadharshree Paper Mills Pvt. Ltd. Mangalore – Deoband road, Vill. – Mundet, Roorkee, District Haridwar, Utttarakhand
11. M/s Sagar Pulp & Paper Mills Ltd. Khasra No. 14/1, 2.5 Km. Mangalore – Deoband road, Vill. – Mundet, Roorkee, Dist. – Haridwar, Utttarakhand
12. M/s Gold Plus Glass Industry Ltd. Gold Plus Industrial Estate, Vill. – Thithola, P.O. – Landhora, Laksar Road, District Haridwar
13. Inwing Industries
14. UMRB Electronics
15. AIS Outglass
16. Saraswati Paints Pvt. Ltd.

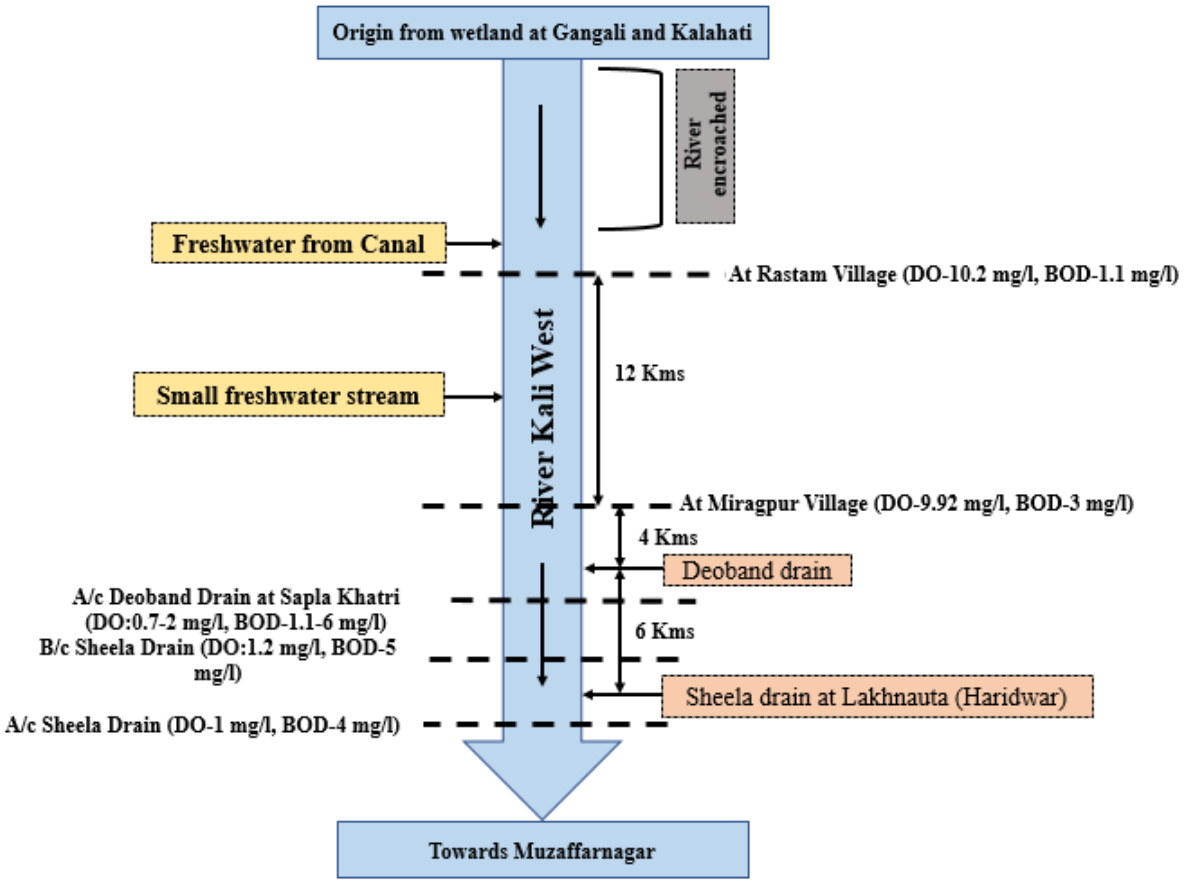
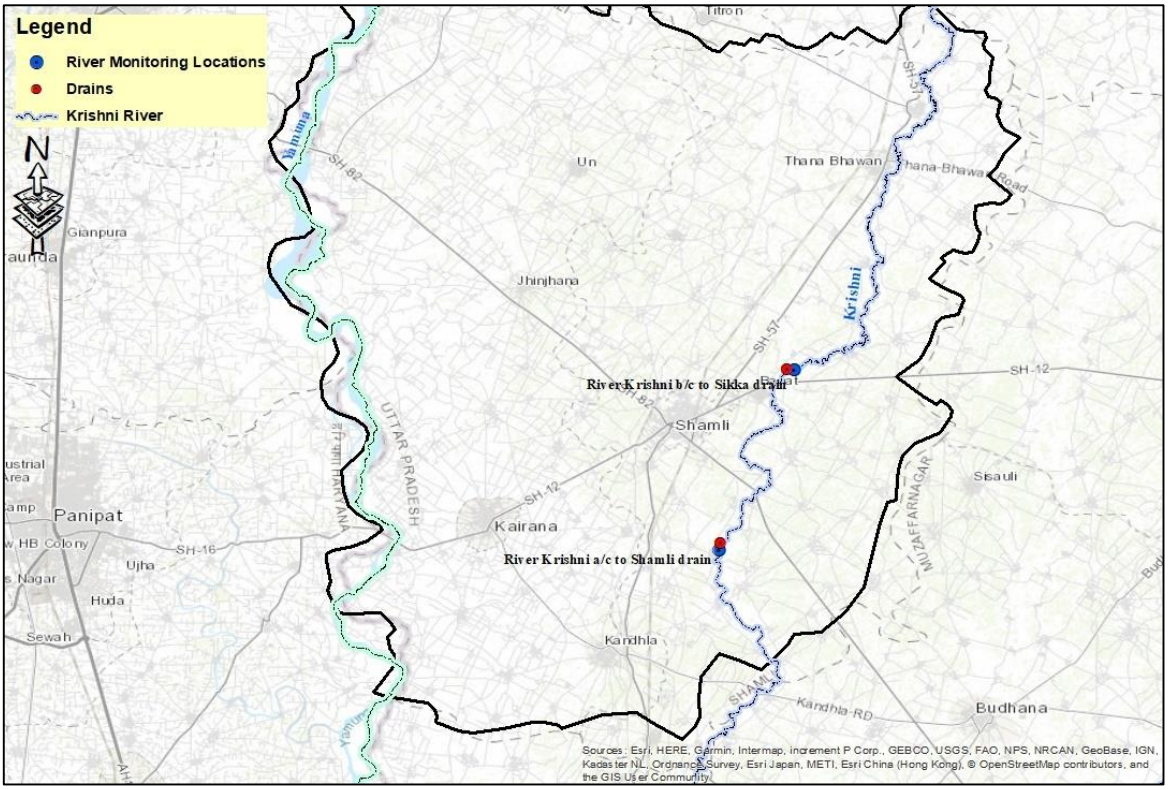


Figure 12 Flow diagram of river Kali-West from origin to after confluence of Sheela drain in Saharanpur

River Krishni

River Krishni originates from a wetland situated at Savalpur Navada near Krishni village in Saharanpur district (**Figure 13**). Before the confluence of Thaska drain at Bhanera Khemchand village near Nanauta town, the river was observed dry.

River gained flow after confluence with Thaska drain (BOD-98 mg/L and COD-354 mg/L). Thaska drain meets river Krishni approx. 36 km downstream from the origin point of river. The DO and BOD levels in the river a/c of Thaska drain were found to be NIL and 98 mg/l, respectively (**Figure 14**). Thaska drain receives industrial effluent along with domestic sewage from nearby areas. In catchment of Thaska drain, there are three industries namely Kisan Sahkari Chini Mill (Sugar); S.M.C. Foods Ltd. (Dairy) & U.P. Co-Operative Sugar Factory (Distillery Unit) located at Nanauta, Saharanpur. Further at downstream, Sikka drain (untapped, mixed drain) (BOD-48 mg/L and COD 256 mg/L) confluence with river Krishni at approx. 75 Kms. DO, BOD and COD levels in river Krishni before confluence to Sikka drain were NIL, 57 mg/l & 228 mg/l respectively (**Map-4**).



Map 4 Monitoring locations on river Krishni along with adjoining drains in Shamli district

Figure 13 River Krishni origin from wetland at Savalpur Navada

Figure 14 River Krishni A/c Thaska drain

Thereafter, stagnant water was observed in river Krishni before confluence of Shamli drain with the river. Shamli drain (Flow-93.41 MLD, BOD- 48 mg/L & COD- 254 mg/L) discharges into river Krishni at approx. 92 Kms from origin. Water quality of river Krishni w.r.t. DO, BOD & COD after confluence to Shamli drain was NIL, 57 mg/l and 297 mg/l, respectively. Flow diagram of river Krishni from Origin to after confluence of Shamli drain is show in **Figure 15**.

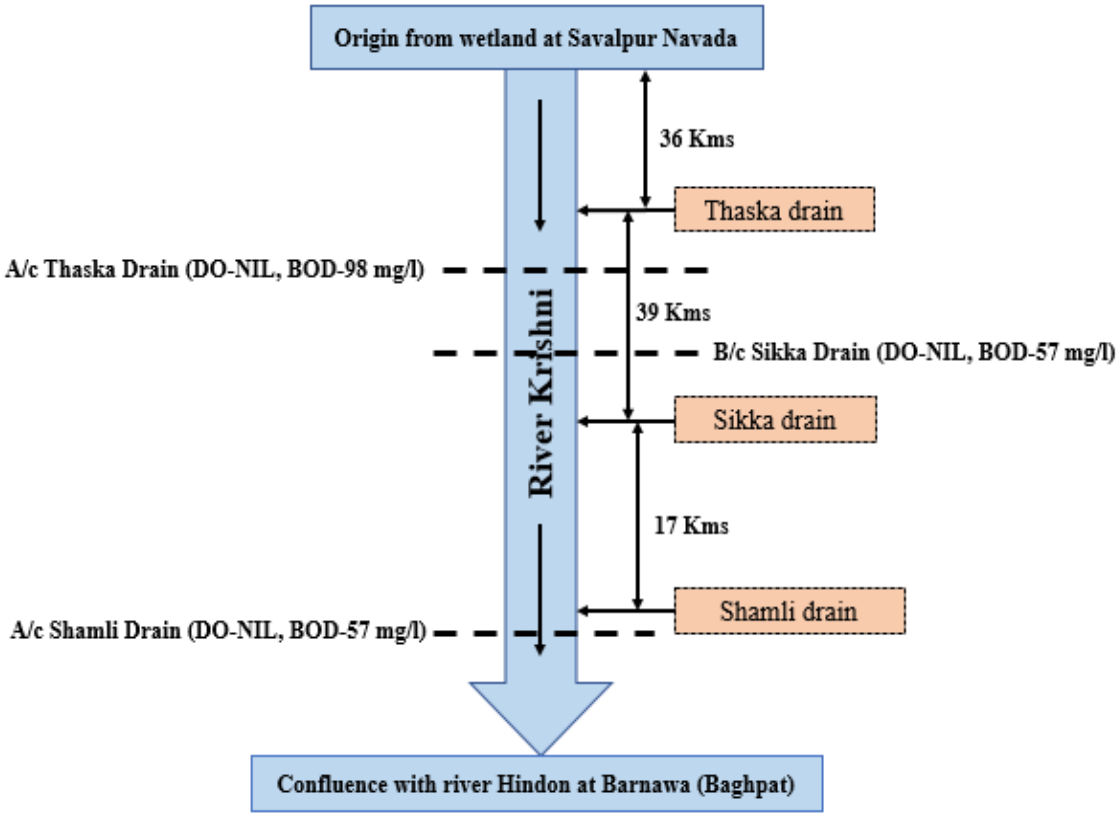


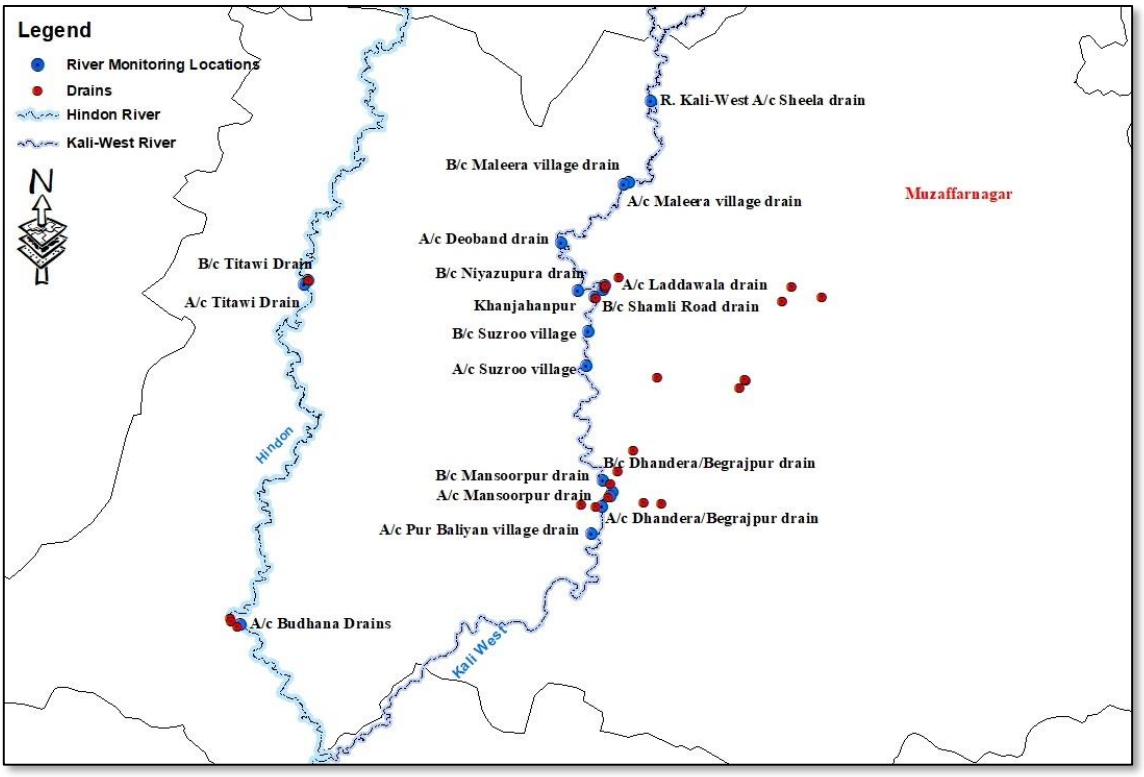
Figure 15 Flow diagram of river Krishni from origin to after confluence of Shamli drain

3.4 Muzaffarnagar District

In Muzaffarnagar district, water quality of two rivers namely river Hindon and its tributary Kali-West, their adjoining drains and STPs in the catchment were monitored. The monitoring locations on river Hindon and its tributary River Kali-West along with adjoining drains in Muzaffarnagar district are shown in **Map-5**:

River Hindon

After entering into Muzaffarnagar district, Titawi drain (Flow-2.34-4.93 MLD, BOD -190-197 mg/l and COD - 373-399 mg/l) meets the river near Titawi village at approximately 61.5 Kms downstream of Bajaj Sugar Mill drain (in Saharanpur district). Titawi drain carries domestic sewage from Titawi village along with effluent of Indian Potash Limited (Sugar Industry). DO and BOD in river b/c of Titawi village drain were 0.60-0.66 mg/l and 7-13 mg/l, respectively.



Map 5 Monitoring locations on Rivers Hindon and its tributary River Kali-West along with adjoining drains in Muzaffarnagar district

At approximately 36.6 Kms downstream, three drains namely Dhobi Ghat drain (BOD: 180-574 mg/l and COD: 455-1435 mg/l), Sabzi Mandi drain (BOD: 115-267 mg/l and COD: 273-800 mg/l) and Shamshan Ghat drain (BOD: 130-159 mg/l and COD: 344 mg/l) meet river in

Budhana town within a distance of 0.35 Kms. A STP of capacity 10 MLD is under construction at Budhana town to tap all these three drains. DO and BOD in river a/c of these three drains of Budhana town were NIL-0.5 mg/l and 5-13 mg/l, respectively. River Kali-West meets river Hindon after approximately 7.6 Kms downstream of confluence with Shamshan Ghat drain. The flow diagram of river Hindon depicting the river monitoring locations along with confluence points of drains with river Hindon are shown in **Figure 16**.

The major issues related to pollution in rivers and drains:

- Pollution (DO-NIL and BOD>10 mg/l) was observed in river Hindon near Titawi village, before and after confluence of Titawi drain. DO and BOD in this stretch were NIL-0.66 mg/l and 5-13 mg/l, respectively.

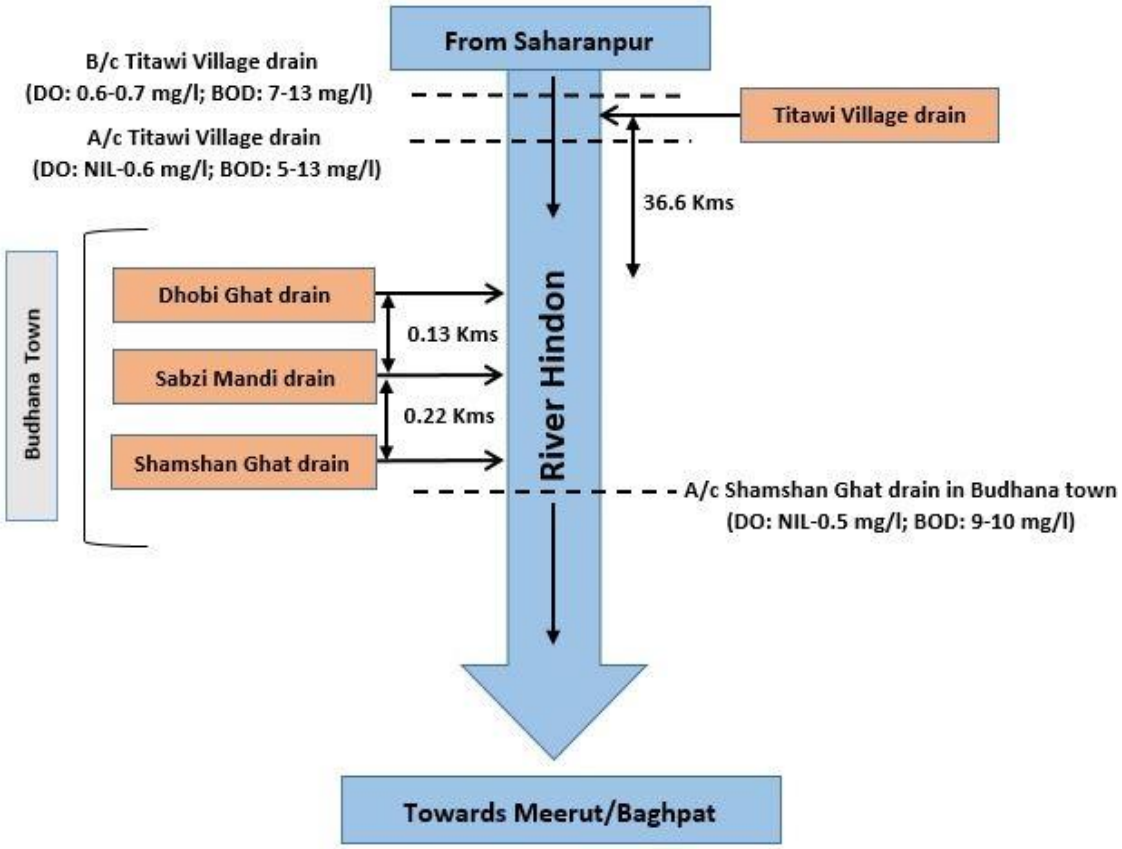


Figure 16 Flow diagram of river Hindon depicting the river monitoring locations along with confluence points of drains with river Hindon

- Pollution (BOD>150 mg/l, COD>450 mg/l and TSS>500 mg/l) in drains:

- **Titawi drain:** Titawi drain (Flow: 2.34-4.93 MLD) is an untapped drain which carries sewage of Titawi village along with effluent of Indian Potash Limited (Sugar Industry). High level of BOD in the range 190-197 mg/l was found in Titawi drain.
- **Dhobi Ghat drain:** Dhobi Ghat drain is an untapped drain which carries domestic sewage of Peerwala Mohalla, Budhana. Flow in the drain could not be measured due to less flow. Wastewater containing high BOD (180-574 mg/l), COD (455-1435 mg/l) and TSS (1551 mg/l) was found in the drain. No industries have been identified in the catchment of the drain.
- **Sabzi Mandi drain:** Sabzi Mandi drain is an untapped drain which carries domestic sewage of Sabzi Mandi, Luhsana village and Mandwada village in Budhana. Flow in the drain could not be measured due to dumping of solid waste. Wastewater containing high BOD (115-267 mg/l), COD (273-800 mg/l) and TSS (771 mg/l) was found in the drain. No industries have been identified in the catchment of the drain.
- **Shamshan Ghat drain:** Shamshan Ghat drain is an untapped drain which carries domestic sewage of Sabzi Mandi, Luhsana village and Mandwada village in Budhana. Flow in the drain could not be measured due to dumping of solid waste. Wastewater containing high BOD (130-159 mg/l) and COD (344-368 mg/l) was found in the drain. No industries have been identified in the catchment of the drain.

The photographs of river and drain monitoring locations are shown in **Figure 17-22**.

Figure 17 River Hindon b/c Titawi village drain

Figure 18 Titawi village drain

Figure 19 Dhobi Ghat drain

Figure 20 Sabzi Mandi drain

Figure 21 Shamshan Ghat drain

Figure 22 River Hindon a/c of three drains of Budhana town

- Also, high iron concentration was observed in Titawi drain (12.89 mg/l), Dhobi Ghat drain (10.66-12.88 mg/l), Sabji Mandi drain (12.93 mg/l) and Shamshan Ghat drain (3.97 mg/l).

River Kali-West

After entering the Muzaffarnagar district, Maleera village drain, which carries sewage from the Maleera village, meets the river Kali-West after approximately 18.8 Kms a/c of Sheela drain with river Kali-West. The DO and BOD levels in the river b/c with the Maleera Village drain were 5.3 mg/l and 5 mg/l, respectively (**Figure 23**).

Flow in Maleera village drain (BOD-54 mg/l and COD-187 mg/l) was less which could not be measured. After confluence of Maleera village drain, DO and BOD in the river were 4.7 mg/l and 6 mg/l, respectively. Further downstream (approximately 7.9 Kms a/c of Maleera village

drain), Badhai Khurd drain, carrying sewage from Deoband, Bahadurpur, Rankhandi, Thamana, Aakhlour, Badhai Kalan, Hoshiyarpur, Badhai Khurd, Said Nagla, Kacholli towns, and effluent from Triveni Engg. & Industries Ltd, Deoband (Sugar Industry), meets the river near Mimlana village. The DO and BOD levels in the river at Mimlana village were 4 mg/l and 7 mg/l, respectively (**Figure 24**). Further, at downstream, DO and BOD levels near Khanjahanpur village were 0.9 mg/l and 7 mg/l, respectively. Low level of dissolved oxygen in river was observed at Khanjahanpur village due to less flow and shallow depth of river (**Figure 25**).

In downstream, sewage from Niyazupura town (Flow: 17.1-17.5 MLD, BOD: 119-230 mg/l and COD: 398-552 mg/l) meets river (approximately 7.8 Kms a/c of Badhai Khurd drain) & DO and BOD in the river before confluence of Niyazupura drain were 0.4-0.7 mg/l and 6-12 mg/l, respectively (**Figure 26**). After confluence of Niyazupura drain, at approximately 0.12 Kms downstream, four domestic drains - namely Laddawala drain (Flow: 65.94-92.27 MLD, BOD: 163-259 mg/l and COD: 504-1150 mg/l), Shamli Road drain (BOD: 117-202 mg/l and COD: 291-694 mg/l), Krishnapuri drain (BOD-122 mg/l and COD-444 mg/l), Khadarwala drain (BOD-164 mg/l and COD-568 mg/l) - meet the river in the stretch of 1.4 Kms and contribute pollution in river Kali-West. Flow in Shamli Road drain, Krishnapuri drain and Khadarwala drain could not be measured as these drains were flowing via closed pipeline. The DO in the river after confluence of Lddawala drain become NIL, and BOD levels increase to 25-38 mg/l.

Figure 23 River Kali-West b/c Maleera village drain

Figure 24 River Kali-West a/c Badhai Khurd drain near Mimlana village

Figure 25 River Kali-West a/c Badhai Khurd drain at Khanjahanpur village

Figure 26 River Kali-West b/c Niyazupura drain

A Waste Stabilization Pond based Sewage Treatment Plant (STP) with a designed capacity of 32.5 MLD is installed near Suzroo village and Laddawala drain (Flow: 65.94-92.27 MLD, BOD: 163-259 mg/l and COD: 504-1150 mg/l), Khadarwala drain (BOD-164 mg/l and COD-568 mg/l), Krishnapuri drain (BOD-122 mg/l and COD-444 mg/l), and South Khalapar drain are partially tapped to STP. However, the STP was found non-complying with respect to treated sewage discharge norms and treated sewage is discharged into river via Suzroo village drain which carries sewage of Suzroo village. The colour of the treated sewage was observed green indicating high algal bloom. Nai Basti Khalapar drain (Flow-17.59 MLD, BOD-36 mg/l & COD-135 mg/l) meets Suzroo village drain, which ultimately meets the river at approximately 2.39 Kms a/c of Krishnapuri drain. Before confluence with river, the wastewater characteristics of the drain showed Flow-25.92 MLD, BOD-111 mg/l and COD-571 mg/l. After confluence with these drains in Suzroo village, the DO in the river become NIL, and BOD was 18 mg/l.

Further at downstream, the Dhandera drain meets river Kali-West at approximately 14.51 Kms a/c of Suzroo village drain. Prior to the confluence, the DO level in the river was NIL, and the BOD level was 26 mg/l. The Dhandera drain originates from upstream of the industrial cluster, nearly 9 Kms from Bhopa Road, in Muzaffarnagar where industrial units are mainly of Pulp and Paper sector. According to the information provided by the UPPCB, the treated effluent from the Tehri Pulp and Paper Limited is used for irrigation on their own land. Overflow from the land is discharged into the Dhandera drain, and the drain gains flow from this location onwards and at this location, Flow-0.58 MLD, BOD-20 mg/l, COD-90 mg/l, TDS-328 mg/l and TSS-190 mg/l were found in the drain. Further downstream, an irrigation canal from Chandpur village meets the Dhandera drain, which was dry at the confluence, with no fresh water being discharged into the drain. Dhandera drain was monitored downstream of Bhopa

Road, and flow of 19.3 MLD was observed with BOD-30 mg/l, COD-137 mg/l, TDS-1080 mg/l, and TSS-70 mg/l. The Dhandera drain was then monitored before confluence with Jatt Mujheda drain in upstream of 8 km Jansath road, near another industrial cluster, where a flow of 54.23 MLD was observed with high levels of pollution having BOD-948 mg/l, COD-2011 mg/l TDS-2808 mg/l and TSS-1188 mg/l.

Jatt Mujheda drain originates near one of the paper mill near Bhopa Marg in Muzaffarnagar, and it was dry upstream. It receives flow from the discharge of industrial units. The analysis results of the wastewater sample of Jatt Mujheda drain collected at downstream of paper mills showed a BOD of 103 mg/L, a COD of 280 mg/L, a TDS of 1096 mg/L, and a TSS of 272 mg/L. Drain contained very less flow which could not be measured. In downstream, Jatt Mujheda drain was monitored b/c with Dhandera drain. Flow of the drain was 8.06 MLD and the wastewater characteristics showed BOD-2230 mg/l, COD-4264 mg/l, TSS-1230 mg/l and TDS-4148 mg/l.

Dhandera drain a/c with Jatt Mujheda drain was monitored at Jansath Road and flow was 66.99 MLD, pH-5.9, Colour-146 Hazen, BOD: 922-1114 mg/l, COD: 2106-2413 mg/l, TDS: 3164-3548 mg/l, TSS: 924-1357 mg/l, Fe-26.72 mg/l, Pb-0.13 mg/l, Mn-3.31 mg/l & Zn-5.43 mg/l. Further downstream, Kukra drain meets Dhandera drain. Kukra drain carries sewage from the Sahawali and Sandhawali areas. According to information provided by UPPCB officials, a sewage treatment plant (STP) with a capacity of 22 MLD has been proposed to treat the untreated sewage of Kukra drain. The drain was monitored before confluence with the Dhandera drain near Sandhawali village (Flow-26.47 MLD). Analysis results showed BOD-62 mg/l, COD-219 mg/l, TDS-876 mg/l, and TSS-163 mg/l. The wastewater characteristics of the Dhandera drain a/c with Kukra drain at the Meerut-Haridwar Bypass Road were: BOD-495 mg/l, COD-2080 mg/l, TDS-2076 mg/l, and TSS-1838 mg/l.

In downstream, another drain carrying industrial effluent from Begrajpur industrial area meets Dhandera drain. Acidic fumes were detected in the vicinity of Begrajpur industrial area drain (Flow: 1.73-1.92 MLD). Analysis of the collected samples showed acidic pH (<2 – 2.3) and high levels of color (146 Hazen), BOD (936 mg/l), COD (474-3444 mg/l), TDS (2584-7884 mg/l) and metal concentration (Fe: 8.91-27.96 mg/l, Pb: 0.24-0.7 mg/l, Mn: 3.72-10.9 mg/l & Zn: 6.48-17.67 mg/l), indicating discharge from metal/battery processing/recycling units. Dhandera drain was monitored before confluence with river Kali-West and the wastewater characteristics showed BOD (547-968 mg/l), COD (1322-2214 mg/l), and TDS (1856-2452 mg/l). DO and BOD values in river Kali-West before confluence of Dhandera drain were NIL

and 26 mg/l (**Figure 27**). River Kali-West was monitored a/c of Dhandera drain and DO-NIL, BOD-348 mg/l, COD-1001 mg/l, TDS-1428 mg/l and Color-289 Hazen were found in river water (**Figure 28**).

Further downstream (at approximately 0.73 Kms a/c of Dhandera drain), Mansoorpur drain meets river Kali-West. Samples were collected from river Kali-West before and after the confluence with Mansoorpur drain, as well as from Mansoorpur drain before confluence with river Kali-West. Prior to the confluence, DO level in the river were NIL, and the BOD was 111 mg/L. Mansoorpur drain originates near Mansoorpur Sugar Mill Road area and carries sewage from the Mansoorpur Sugar Mill Road area. Two GPIs (Sir Shadi Lal Distillery & Chemical Works (ZLD) and D.S.M. Sugar) are located in the catchment of Mansoorpur drain. The Mansoorpur drain was monitored at three locations, starting at its origin, where the wastewater characteristics were BOD-60 mg/L, COD-222 mg/L, and TDS-480 mg/L. Flow at origin could not be measured as drain was covered. Thereafter, Mansoorpur drain was monitored near Husenpur Bopara village (Flow-3.13 MLD) and BOD, COD, and TDS levels were 571-579 mg/L, 1261-1426 mg/L, and 1000-2188 mg/L, respectively. Dumping of solid waste into the drain was observed at this location.

Figure 27 River Kali-West before confluence Dhandera drain

Figure 28 River Kali-West after confluence with Dhandera drain

Figure 29 River Kali-West a/c Mansoorpur drain

Figure 30 River Kali-West a/c Pur Baliyan village drain

Before confluence with river Kali-West, Mansoorpur drain had BOD-404 mg/L, COD-870 mg/L, and TDS-2024 mg/L, with a flow of 1 MLD. After the confluence, DO levels in the river were NIL, and the BOD levels were 65-87 mg/l (**Figure 29**). Further, in downstream, a drain carrying sewage from Pur Baliyan village (Flow ranged as 1.99 MLD) meets river Kali-West. Pur Baliyan village drain was monitored at its origin in Pur Baliyan village, where BOD-174 mg/L, COD-479 mg/L, and TDS-1328 mg/L. Before the confluence with the river, the flow rate was measured, and the BOD and COD levels were found to be 188-252 mg/L and 425-520 mg/L, respectively. Samples were collected from river Kali-West after confluence with Pur Baliyan village drain, and DO levels were NIL, while the BOD levels were 96-175 mg/L (**Figure 30**). The flow diagram of river Kali-West depicting the river monitoring locations along with confluence points of drains with river Kali-West are shown in **Figure 31**.

The major issues related to pollution in rivers and drains:

- Pollution (BOD>10 mg/l) was observed in river Kali-West before confluence of Niyazupura drain to after confluence of Pur Baliyan drain. DO and BOD in this stretch ranged as NIL-0.7 mg/l and 12-348 mg/l, respectively.
- Pollution (BOD>150 mg/l and Colour>60 Hazen) was observed in drains discharging into river Kali-West:
    - **Niyazupura drain:** Niyazupura drain is an untapped drain (Flow: ~17 MLD), which carries sewage of Niyazupura town. High levels of BOD (119-230 mg/l) and COD (398-552 mg/l) were found in the drain. However, inventory of industries in the catchment of the drain is not available (**Figure 32**).

- **Laddawala drain:** Laddawala drain carries sewage of Laddawala, Ramleela Tila, Abkari Mohalla and Hanumanpuri areas. The drain is tapped to 32.5 MLD STP via IPS-1 and the overflow (65.94-92.27 MLD) from the drain is directly discharged into the river. High levels of BOD (163-259 mg/l) and COD (504-1150 mg/l) were found in the drain. However, inventory of industries in the catchment of the drain is not available. Huge amount of municipal solid waste is dumped into river through Laddawala drain (**Figure 33**).
- **Shamli Road drain:** Shamli Road drain is an untapped drain which carries sewage of Shamli Road area. High levels of BOD (117-202 mg/l) and COD (291-694 mg/l) were found in the drain. Flow in the drain could not be measured as drain was flowing via closed pipeline and dumping of solid waste was observed (**Figures 34-35**). However, inventory of industries in the catchment of the drain is not available.
- **Suzroo village drain**: This drain (Flow: 25.92 MLD) carries combined sewage of Suzroo village and Nia Basti Khalapar along with treated sewage of 32.5 MLD STP, Muzaffarnagar (**Figures 37-40**). High level of COD (571 mg/l) was found in the drain. However, inventory of industries in the catchment of the drain is not available.

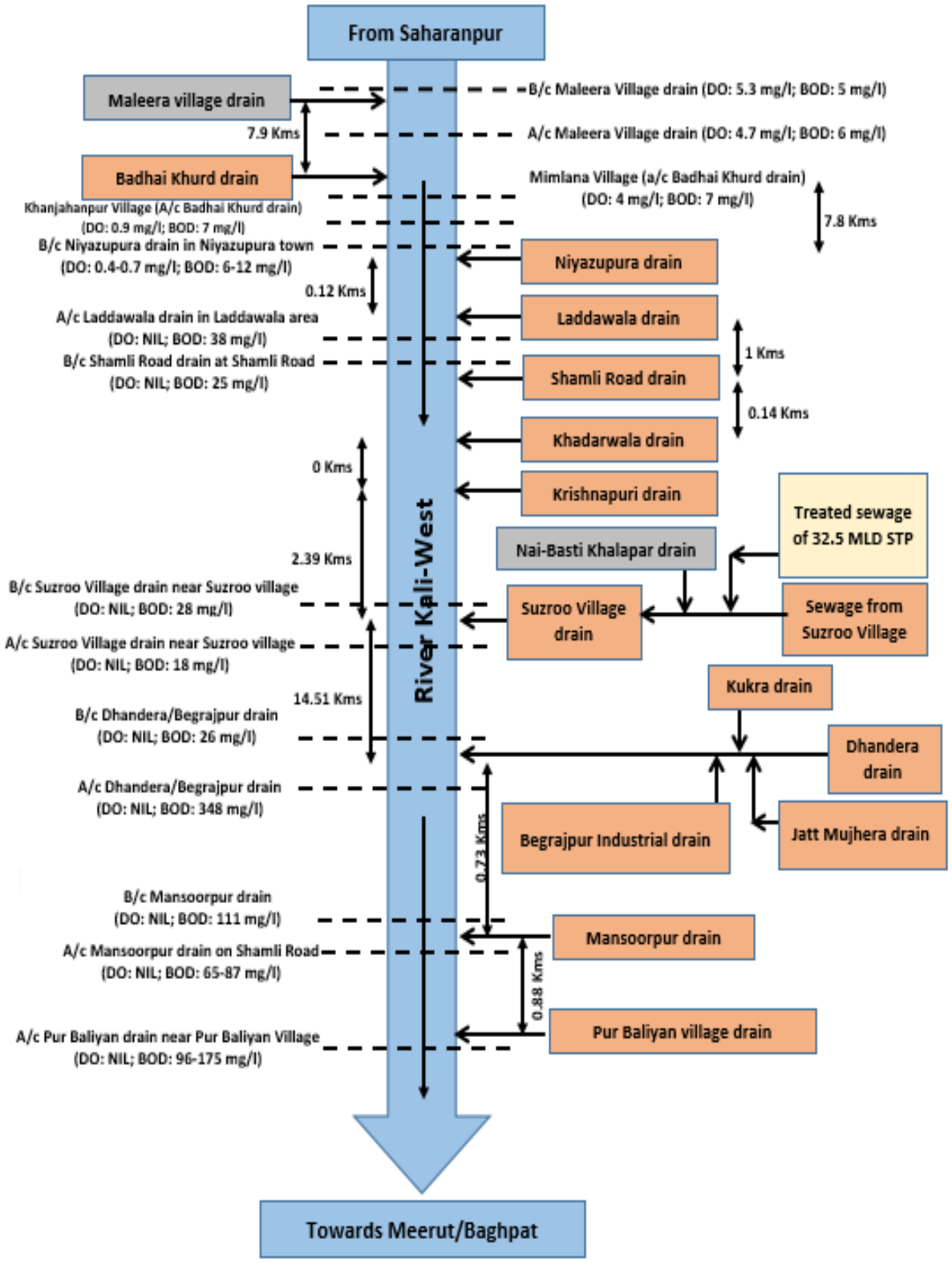


Figure 31 Flow diagram of river Hindon depicting the river monitoring locations along with confluence points of drains with river Hindon

Figure 32 Confluence point of Niyazupura drain with river Kali-West

Figure 33 Dumping of municipal solid waste into river Kali-West through Laddawala drain

Figure 34 Shamli Road drain at origin (dumping of solid waste in drain)

Figure 35 Confluence of Shamli Road drain with River Kali-West

Figure 36 Dumping of solid waste in Khadarwala drain

Figure 37 Drain carrying sewage of Suzroo village

Figure 38 Discharge of treated sewage of 32.5 MLD STP into Suzroo village drain

Figure 39 Nai Basti Khalapar drain (2nd order drain of Suzroo village drain)

Figure 40 Confluence point of Suzroo village drain with river Kali-West

- **Dhandera drain**: Dhandera drain (Flow: 112.13-148.18 MLD) carry effluents from industries located on Bhopa Road, Jolly Road, Jansath Road, Meerut Road and Begrajpur Industrial Area along with sewage of towns/colonies located at Bhopa Road, Jansath Road (via Dhandera drain), and Sahawali & Sandhawali villages (via Kukra drain) (**Figures 41-55**). High levels of color (146 Hazen), BOD (495-1114 mg/l) and COD (1322-2413 mg/l) were found in the drain before confluence with the river.
  - High pollution was observed in two subsidiary drains of Dhandera drain namely Jatt Mujheda drain (Flow: 8.06 MLD, BOD: 2230 mg/l, COD: 4264 mg/l) and Begrajpur Industrial drain (acidic pH (<2), Color: 146 Hazen, BOD: 936 mg/l, COD: 3444 mg/l). In catchment of Jatt Mujheda drain, there are industrial units comprising of Pulp & Paper (04 nos.) and Distillery (01 no.) units located on Jolly Road & Bhopa Road, Muzaffarnagar. Begrajpur Industrial drain carry effluent of Pharmaceutical (01 no.) and Dyeing industries (05 nos.) located in the Begrajpur industrial area.

UPPCB has submitted that following industries are located in the catchment of the Dhandera drain, Begrajpur Industrial drain, Kukra drain and Jatt Mujheda drain:

- **Dhandera drain:**
  1. Aristo Craft Paper Mills Pvt. Ltd. Meerut Road, Muzaffarnagar (Pulp & Paper)
  2. Bindals Papers Mills Ltd. Bhopa Road, Muzaffarnagar (Pulp & Paper)
  3. D.L.S. Papers Pvt. Ltd., 10Km Meerut Road, Dhaulapul, Begrajpur, Muzaffarnagar (Pulp & Paper)
  4. DDLS Paper Pvt. Ltd., Meerut Road, Begrajpur, Muzaffarnagar (Pulp & Paper)
  5. Galaxy Papers Pvt. Ltd. Jolly Road, Muzaffarnagar (Pulp & Paper)
  6. Garg Duplex & Paper Mills (P) Ltd. Bhopa Road, Muzaffarnagar (Pulp & Paper)
  7. K.K. Duplex Pvt. Ltd., Jansath road, Muzaffarnagar (Pulp & Paper)
  8. Krishnanchal Pulp & Papers Pvt. Ltd. (Formerly Prime Papers) Jolly Road, Muzaffarnagar (Pulp & Paper)
  9. Mahalaxmi Craft & Tissues Bhopa Road, Jansath Muzaffarnagar (Pulp & Paper)
  10. Meenu Papers (P) Ltd. Bhopa Road Muzaffarnagar (Pulp & Paper)
  11. Orient Board & Paper Mill Pvt. Ltd. Jansath Road, Muzaffarnagar (Pulp & Paper)
  12. Genus papers & Boards Ltd. (Unit-2), Jansath Road, Muzaffarnagar (Pulp & Paper)
  13. Shakti Craft & Tissues, Jansath road, Muzaffarnagar (Pulp & Paper)
  14. S.K. Paper Mills Pvt. Ltd., Jolly Road, Muzaffarnagar (Pulp & Paper)

15. Shri Bhageshwari Paper Mills (P) Ltd., Bhopa Road Unit-1 Muzaffarnagar (Pulp & Paper)

Figure 41 Dhandera drain - Dry at origin

Figure 42 Dhandera drain originating from discharge of M/s Tehri Pulp & Paper Ltd.

Figure 43 Dhandera drain d/s M/s Tehri Pulp & Paper

Figure 44 Confluence of irrigation canal (from Chandpur village) with Dhandera drain

Figure 45 Dhandera drain near M/s Silvertoan Papers Limited (Unit-1 & 2)

Figure 46 Jat Mujheda drain-Dry at origin

Figure 47 Sludge deposition in Jat Mujheda drain

Figure 48 Jat Mujheda drain after receiving discharge from M/s Bindals Duplex Ltd.

Figure 49 Jat Mujheda drain before confluence with Dhandera drain

Figure 50 Dhandera drain before confluence with Jat Mujheda drain

Figure 51 Confluence point of Dhandera drain and Jat Mujheda drain

Figure 52 Dhandera drain after confluence with Jat Mujheda drain

Figure 53 Sludge blanket formation observed in Dhandera drain at Jansath Road, Muzaffarnagar

Figure 54 Begrajpur Industrial area drain

Figure 55 Confluence of Begrajpur industrial drain with Dhandera drain

16. Shri Bhageshwari Paper Mills (P) Ltd., Bhopa Road Unit-2 Muzaffarnagar (Pulp & Paper) Siddheshwary Ind. Pvt. Ltd., Jansath Road, Muzaffarnagar (Pulp & Paper)
17. Sidhbali Papers mills Ltd,) Bhopa Road, Muzaffarnagar (Pulp & Paper)
18. Silverton Paper Ltd. (Unit-1) Bhopa Road, Muzaffarnagar (Pulp & Paper)
19. Silverton Paper Ltd. (Unit-2) Bhopa Road, Muzaffarnagar (Pulp & Paper)
20. Silverton Pulp & Paper, Bhopa Road, Muzaffarnagar (Pulp & Paper)
21. Silverton Pulp & Paper (Unit-2), Bhopa Road, Muzaffarnagar (Pulp & Paper)
22. Shri Veer Balaji Paper Mills, Vill. Tigri, Bhopa Road, Muzaffarnagar (Pulp & Paper)
23. Suyash craft & papers ltd., Velhana, Muzaffarnagar (Pulp & Paper)
24. Tehri Pulp & Papers Ltd. Bhopa Road (Unit-1) Muzaffarnagar (Pulp & Paper)
25. Tehri Pulp & Papers Ltd. Bhopa Road (Unit-2) Muzaffarnagar (Pulp & Paper)
26. Tirupati Balaji Fibres Ltd. Bhopa Road, Muzaffarnagar (Pulp & Paper)
27. Al Noor Export, Jansath road Muzaffarnagar (Slaughter House and Meat Processing)
28. H.J. Tannery Pvt. Ltd. Jolly Road Muzaffarnagar (Tannery)
29. Rati Pushp Intermediates Pvt. Ltd., Jansath Road, Muzaffarnagar (Basic Chemicals & Derivatives)
30. Gulshan Polyoles Ltd., Jansath Road, Muzaffarnagar (Food Processing & Calcium Carbonate)
31. Saral Chemtech LLP, Jansath Road, Muzaffarnagar (Basic Chemicals & Derivatives)

- **Begrajpur Industrial drain:**

1. Magma Industries, Muzaffarnagar (Pharmaceutical)

2. Jain Processors, D-1, Industrial Area Begrajpur, Muzaffarnagar (Dyeing & Washing of Jeans)
3. Noor Fashion, K-19, UPSIDC Industrial Area, Begrajpur (Dyeing & Washing of Readymade Garments & Jeans)
4. Ayman Collection, D-8, Industrial Area, Begrajpur, Muzaffarnagar (Dyeing & Washing of Readymade Garments & Jeans)
5. Shakeel Jeans, Industrial Area, Begrajpur, Muzaffarnagar (Dyeing & Washing of Readymade Garments & Jeans)
6. Bright Wash, Industrial Area, Begrajpur, Muzaffarnagar (Dyeing & Washing of Readymade Garments & Jeans)

- **Kukra drain:**
  1. Aggarwal Duplex & Board Mills Ltd. Bhopa Road, Muzaffarnagar (Pulp & Paper)
  2. Shakumbari Pulp & Paper Bhopa Road, Muzaffarnagar (Pulp & Paper)

- **Jatt Mujheda drain:**
  1. Bindals Duplex Ltd, Bhopa Road (Unit-1), Muzaffarnagar (Pulp & Paper)
  2. Bindals Duplex Ltd, Bhopa Road (Unit-2) Muzaffarnagar (Pulp & Paper)
  3. Disha paper Industries, Jolly road, Muzaffarnagar (Pulp & Paper)
  4. Parijat Paper Mills Ltd., Bhopa Road, Muzaffarnagar (Pulp & Paper)
  5. Triveni Engg. Industries Ltd. Bilaspur (Alco Chemical Complex), Jolly Road, Muzaffarnagar (Distillery)

  - **Mansoorpur drain:** Mansoorpur drain is an untapped drain which originates near Mansoorpur Sugar Mill Road area and carries sewage from the Mansoorpur Sugar Mill Road area. Acidic pH (4.9) and high levels of BOD (404-579 mg/l) and COD (870-1426 mg/l) were found in the drain. Two GPIs (Sir Shadi Lal Distillery & Chemical Works and D.S.M. Sugar) are located in the catchment of Mansoorpur drain. Dumping of solid waste in the drain was observed. The monitoring locations of Mansoorpur drain from origin to confluence with river Kali-West are shown in **Figures 56-61**.

  - **Pur Baliyan drain:** Pur Baliyan drain (Flow-1.99-2.51 MLD) is an untapped drain which carries sewage from Pur Baliyan village. High levels of BOD (174-252 mg/l) and COD (425-520 mg/l) were found in the drain. Dumping of waste by animal husbandry units was observed in the drain. However, inventory of industries in the catchment of the drain is not available.

Figure 56 Mansoorpur drain (origin) near D.S.M Sugar Mill market area

Figure 57 Deposition of sludge in Mansoorpur drain near National Highway-334

Figure 58 Yellowish coloured groundwater collected from borewell near Mansoorpur drain

Figure 59 Dumping of solid waste in Mansoorpur drain at Shamli Road

Figure 60 Mansoorpur drain near Husenpur Bopara village

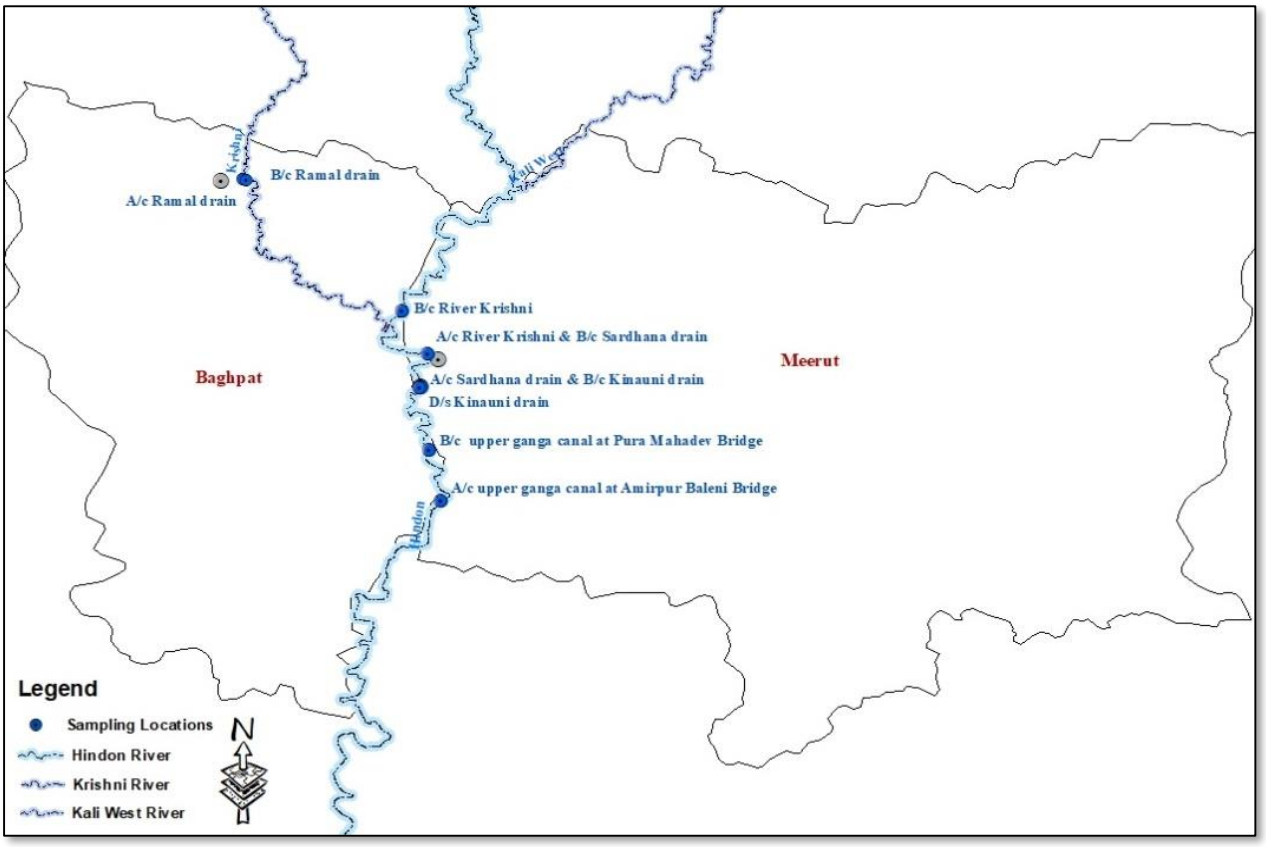
Figure 61 Confluence of Mansoorpur drain with river Kali-West

3.5 Meerut & Baghpat Districts

River Hindon

River flows at border of Meerut and Baghpat district. Two tributaries namely river Kali-west and Krishni confluence to river Hindon in Meerut & Baghpat districts, respectively. River also receives fresh water from upper Ganga canal. The flow diagram of river Hindon, Kali-West and Krishni depicting the river monitoring locations along with confluence points of drains with rivers is shown in **Figure 62**.

After entering into Meerut district, river Hindon was monitored before confluence with river Kali-West near Kutubpur village in Meerut district and DO & BOD in river were NIL and 11 mg/l, respectively. The DO was found to be NIL in the stretch of Meerut-Baghpat district before fresh water was released from Upper Ganga Canal. After confluence with river Kali-West near Pithlokar village, BOD in river Hindon increased to 123 mg/l (**Figure 63**). In downstream, river Krishni meet river Hindon near Barnawa village in Baghpat district. DO and BOD in river Krishni b/c with river Hindon & A/c Ramala drain (at Budhpur, Bhagpat) were NIL and 16 mg/l, respectively (**Figure 64**). Before and after confluence with river Krishni, BOD in river Hindon were 59 mg/l and 52-110 mg/l, respectively. Further, in downstream, Sardhana drain (BOD-263 & 460 mg/l and COD-770 & 1555 mg/l) meet river and increased the BOD of river to 147-163 mg/l (**Figure 65**). Further, in downstream, Kinauni drain was monitored. No flow was observed in the drain however the bed of the drain was wet indicating discharge through drain. DO and BOD in river Hindon after confluence of Kinauni drain were NIL and 140-163 mg/l, respectively (**Figure 66**). Further downstream, freshwater from Upper Ganga Canal was released into river Hindon near Pura village in Meerut District. 1500 cusec freshwater is released in river Hindon from Upper Ganga Canal near D/s Meerut where river Hindon act as a channel to transfer freshwater from Upper Ganga Canal to Agra Canal. The fresh water released from the Upper Ganga Canal is further discharged into River Yamuna from the barrage on the River Hindon in Ghaziabad, which is further discharged into the Agra Canal from the Okhla Barrage on River Yamuna. After intrusion of freshwater into river Hindon from Upper Ganga Canal, the DO in river Hindon increased from NIL to 5.96 mg/l and BOD decreased from 113 mg/l to 10 mg/l (**Figure 67**). The monitoring locations on River Hindon and its tributaries Rivers Krishni and Kali-West adjoining drains in Meerut and Baghpat districts are shown in **Map-6**:



Map 6 Monitoring locations on River Hindon and its tributaries Rivers Krishni and Kali-West adjoining drains in Meerut and Baghpat districts

River Kali-West

River Kali-West was monitored before confluence with river Hindon at Riawali Nagla, Meerut and DO & BOD in river were NIL and 138 mg/l, respectively (**Figure 68**).

River Krishni

In Baghpat district, Ramala drain (Flow-0.6 MLD, BOD-11 mg/l & COD-59 mg/l) meet the river near Gopalpur Khadana, Baghpat (**Figure 69**). Ramala drain originates in Kandhla town (Shamli) and carry effluent of M/s Ramala Sahkari Chini Mill and sewage of Kandhla town. Fly ash was dumped by the Sugar Mill along Ramala drain. DO in river was Nil in Baghpat stretch (**Figure 70**). BOD before and after confluence of Ramala drain was 16 mg/l. In downstream of Barnawa village, river Krishni meet river Hindon in Baghpat district.

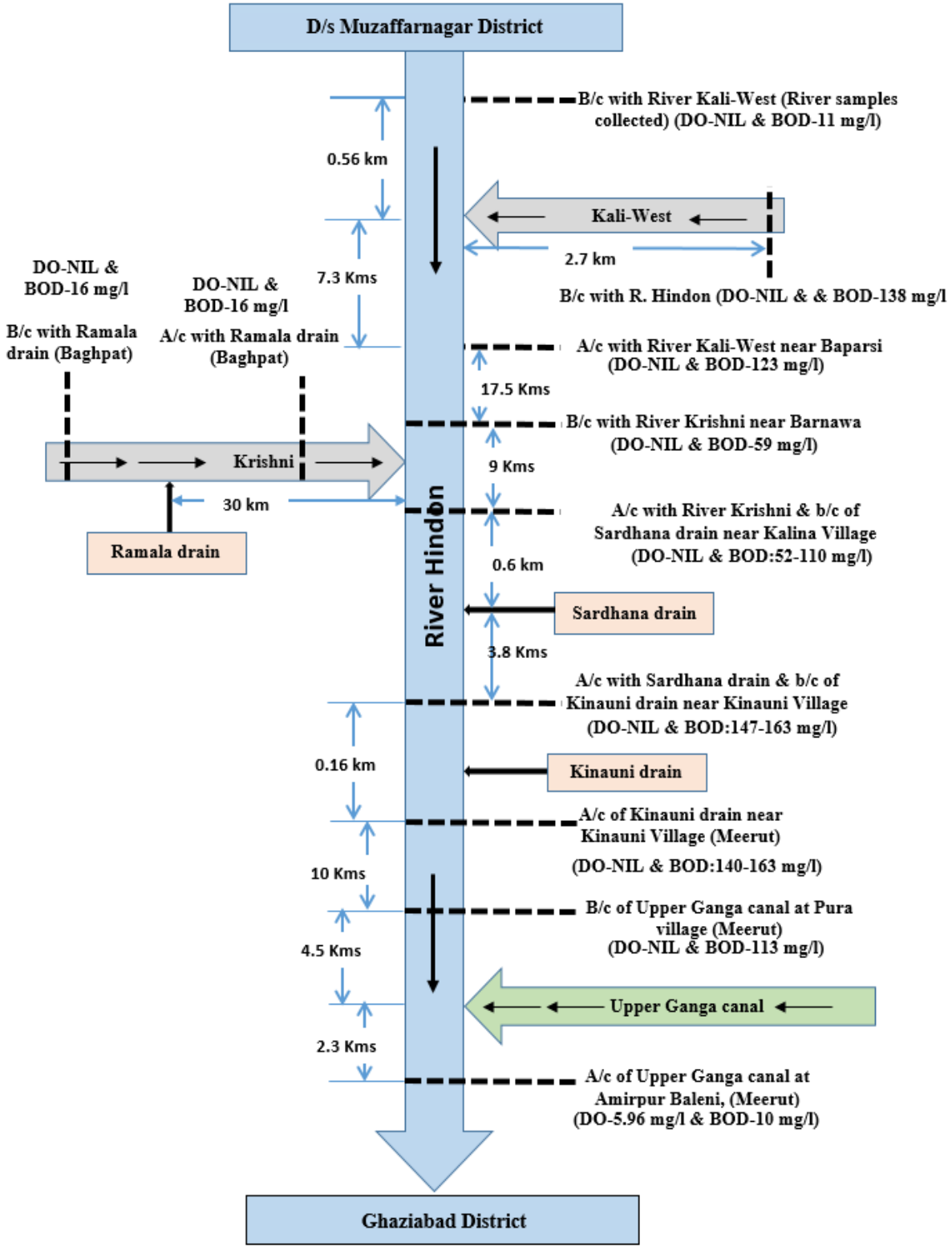


Figure 62 Flow diagram of river Hindon, Kali-West and Krishni depicting the river monitoring locations along with confluence points of drains with rivers

Issues:

- Pollution (BOD≥10 mg/l) was observed in river Hindon before confluence with river Kali-West (Pithlokar village, Meerut) to before confluence with upper Ganga canal at Pura village. In this stretch, DO was observed as NIL and BOD ranged as 11-163 mg/l.
- Pollution (BOD>150 mg/l, COD>450 mg/l and Colour>60 Hazen) in drains:
    - **Sardhana drain:** Sardhana drain is an untapped drain which originates from a pond near Sardhana town, the pond was observed dry during monitoring. The drain carries sewage of Sardhana town and adjacent villages. Huge quantity of animal dung and municipal solid waste were found dumped in the drain (**Figure 71**). High color (05-370 Hazen), BOD (263-460 mg/l) and COD (770-1555 mg/l) were found in the wastewater of drain (**Figure 72**). Monitoring team reported dairy farming and operation of textile units in the catchment of drain. As per available inventory, following industries are operating the catchment of the drain:

        1. M/s Sardhana Paper, Sardhana Meerut road, Meerut (Paper)
        2. M/s Shri Babubali Trader, Village Madiyai Sardhana Meerut road, Meerut (Textile)
        3. M/s Shree Krishna Processing Khasra No. 1142 Badruddin Nagar, Nanu Tehsil, Meerut (Textile)
        4. M/s Sardhana Dairy, Meerut Road, Sardhana (Dairy)

    - **Kinauni drain:** Kinauni drain is an industrial drain of approx. 1.0 km length which originates from Kinauni and two industries are located in catchment of drain (**Figures 73-74**). During both visits bed of drain was found wet, no significant wastewater was observed to collect the sample, indicating intermittent discharge of effluent from industrial units which are:

        5. M/s Bajaj Hindustan ltd., Kinauni, Meerut (Sugar unit)
        6. M/s Bajaj Hindustan ltd., Kinauni, Meerut (Distillery unit)

    - Pollution (BOD≥10 mg/l) was observed in river Kali-West before confluence with river Hindon in Meerut district, DO was observed as NIL and BOD 138 mg/l in river Kali-West (**Figure 68**). River carrying domestic and industrial wastewater from Roorkee, Saharanpur and Muzaffarnagar district.
    - Pollution (BOD≥10 mg/l) was observed in river Krishni before confluence with river Hindon in Baghpat district.

Figure 63 River Hindon after confluence with river Kali West

Figure 64 Ramala drain confluence with river Krishni

Figure 65 Eutrophication River Hindon After confluence of Sardhana drain/ before confluence of Kinauni drain

Figure 66 River Hindon after confluence of Kinauni drain

Figure 67 River Hindon after confluence of Upper Ganga canal at Amirpur Baleni

Figure 68 River Kali-West before confluence with river Hindon

Figure 69 Ramala drain near Gopalpur Khadana

Figure 70 River Krishni before confluence of Ramala drain

Figure 71 Sardhana drain covered with layer of cattle dung

Figure 72 Sardhana drain b/c of river Hindon near Kalina village

Figure 73 Kinauni Drain at Kinauni village

Figure 74 Kinauni Drain confluence with River Hindon

3.6 Ghaziabad District

River Hindon:

River Hindon enters Ghaziabad district and Jawli drain (BOD-33-55 mg/l and COD-107-221 mg/l) meets river near Bhenara Khurd village. Jawli drain receives treated effluent of CETP installed at Tronica City, Ghaziabad. DO and BOD in river before confluence with Jawli drain were 1.03 mg/l and 3 mg/l, respectively. After confluence with Jawli drain, DO and BOD in river were 0.87-2.32 mg/l and 3-4 mg/l, respectively (**Figure 75**). Thereafter, Raj Nagar Extension drain (BOD: 36 mg/L and COD: 117 mg/L) meets river that carries treated sewage from Noon Nagar Morty STP (56 MLD) and untreated sewage of nearby areas. The DO and BOD of the river, before and after meeting the drain is 0.57 mg/L and 4 mg/L as well as 0.71mg/L and 4 mg/L, respectively. Subsequently, Karedha drain (BOD: 139-167 mg/L and COD: 529-538 mg/L) joins the river followed by Hindon Vihar left (Flow: 11.41-16.6 MLD; BOD: 181-302 mg/L and COD: 574-803 mg/L) and right (Flow: 7.85-15.65 MLD; BOD:168-639 mg/L and COD: 656-2018 mg/L) drains. The DO and BOD of the river, before and after meeting these drains is 0.85 mg/L and 5 mg/L as well as NIL mg/L and 13 mg/L, respectively (**Figure 76**). Thereafter, Kaila Bhatta drain (Flow: 33.97 MLD; BOD: 71 mg/L and COD: 278 mg/L) meets river Hindon and the DO and BOD downstream of this drain is observed to be 5.44 mg/L and 6 mg/L (**Figure 77**). Increased DO may be due to turbulence and churning of water release from barrage. Further, Arthala drain (BOD: 52 mg/L and COD: 208 mg/L) joins the river and the DO and BOD downstream of this drain is observed to be 6.4 mg/L and 5 mg/L (**Figure 78**). Further downstream, three drains namely Indirapuram Drain (BOD: 88 mg/L and COD: 285 mg/L), Pratap Vihar Drain (Flow-27.91 MLD; BOD: 102 mg/L and COD: 422 mg/L) and Rahul Vihar Drain (BOD: 176-206 mg/L and COD: 736-743 mg/L) meets the river. DO in river Hindon after confluence with these three drains ranged from NIL-2.25 mg/L whereas, BOD from 15-28 mg/L (**Figure 79**). Sampling locations are illustrated in **Map 7**. The flow diagram of Hindon river showing the river monitoring locations along with the confluence points of the drains with river is shown in the **Figure 80**.

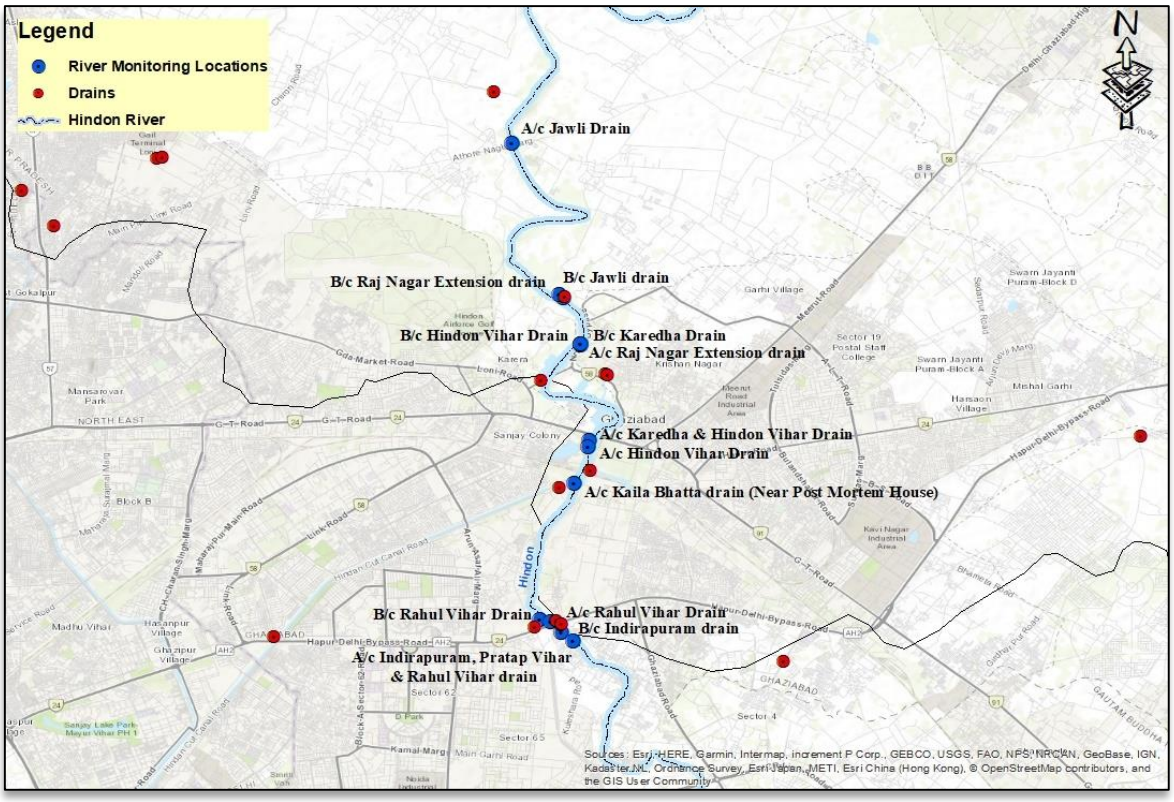
Figure 75 Hindon river downstream of Jawli drain

Figure 76 Hindon river upstream of Karedha drain

Figure 77 Hindon river downstream of Kaila Bhatta drain

Figure 78 River Hindon downstream of Arthala drain

Figure 79 River Hindon at downstream of Indirapuram drain + Pratap Vihar drain + Rahul Vihar drain



Map 7 Monitoring locations on Rivers Hindon and its tributary River Kali-West along with adjoining drains in Ghaziabad district

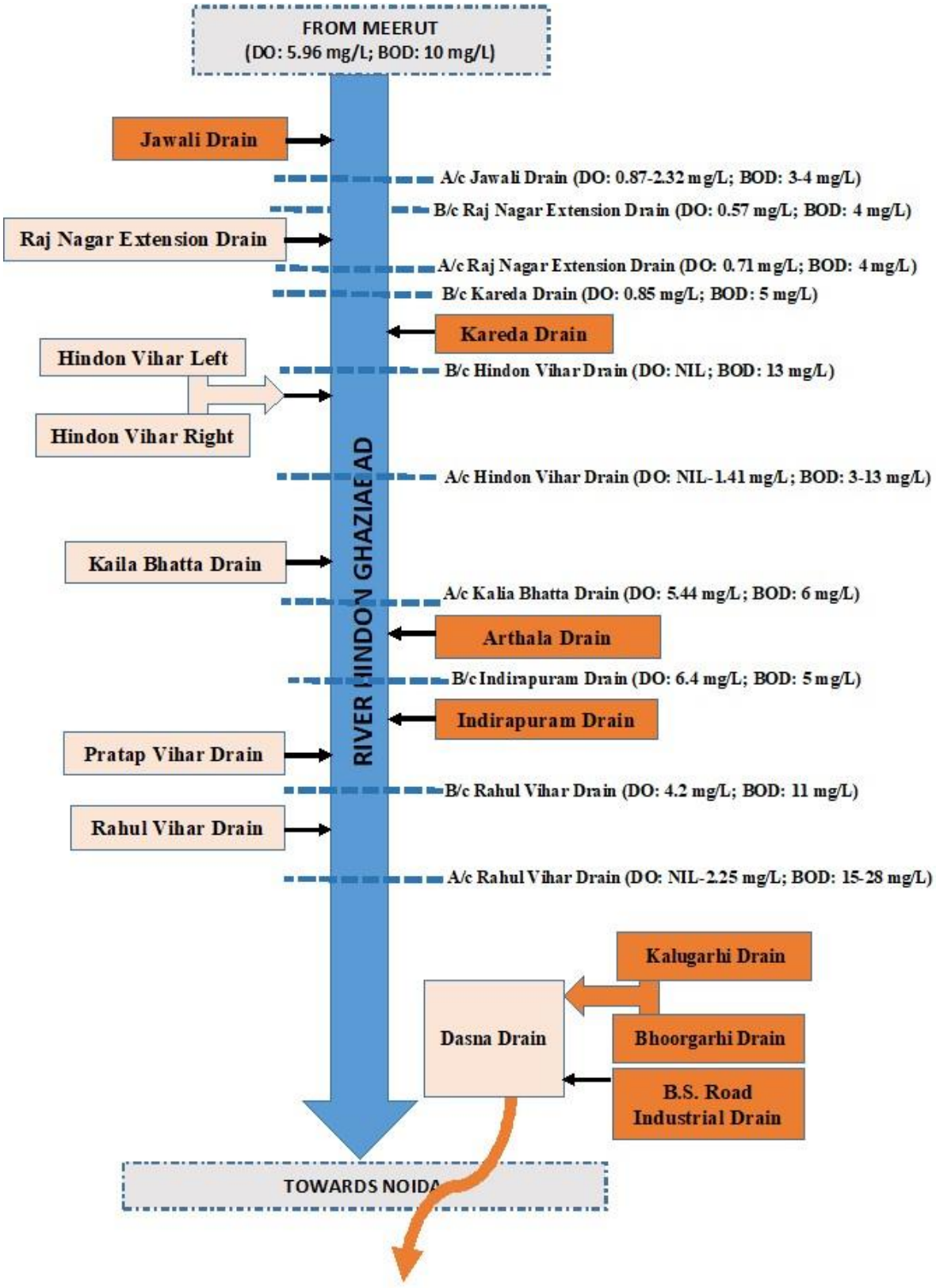


Figure 80 Flow diagram of River Hindon from Ghaziabad district to Noida district

Issues:

River Hindon

- Pollution (BOD>10 mg/l) was observed in River Hindon near Hindon Vihar and Rahul Vihar area, before and after confluence of Hindon Vihar and Rahul Vihar drains, respectively. DO and BOD in Hindon Vihar stretch (B/c and A/c of Hindon Vihar drain) were NIL and 13 mg/l, respectively, whereas, DO and BOD in Rahul Vihar stretch (B/c and A/c of Rahul Vihar drain) ranged from NIL-4.2 mg/l and 11-28 mg/l. Polluted stretch from U/s Karedha drain to D/s Hindon Vihar drain is identified.
- Pollution (BOD>150 mg/l, COD>450 mg/l, Colour>75 Hazen, TSS> 500 mg/L, Chloride >1000 mg/L, TDS>1000 mg/L and Heavy Metals > E(P)Act, 1986 discharge norms) was observed in drains discharging into river Hindon:
  - **Jawli Drain**: Jawli drain is an untapped drain which receives and carry treated effluent of CETP installed at Tronica City, Ghaziabad and sewage from nearby villages specifically Bhanera Khurd village (**Figure 81**). Therefore, the wastewater carried by this drain is mixed in nature that is ultimately discharged in River Hindon. High TDS ranging from 2216-4600 mg/L, Chloride-1049 mg/L (during first round) and Mn-4.056 mg/L (during second round) was observed. Industries in the catchment of Jawli drain comprise 43 GPIs including Textile dying (07), Yarn/Textile processing (36) and 1 Non-GPI that include a Yarn/Textile processing unit.
  - **Raj Nagar Extension Drain**: This is an untapped domestic drain that carry treated sewage from Noon Nagar Morty 56 MLD STP, and untreated sewage from open drains. High TDS 1020 mg/L was observed. However, agriculture activity around the sampling point and heaps of solid waste observed dumped in and around the drain.
  - **Karedha Drain**: This is an untapped mixed drain that carry sewage from Karedha area and probable effluent/wastewater discharge from industries in catchment of the drain (**Figure 82**). High BOD ranging from 158-167 mg/L (both rounds), COD ranging from 538-639 mg/L (both rounds), TSS-522 mg/L (during first round) TDS ranging from 1980-2376 mg/L (both rounds), Chloride-1039 mg/L (during first round), Pb ranging from 0.15-3.37 mg/L (both rounds), Fe ranging from 8.167-111.17 mg/L (both rounds) and Zn-6.32 mg/L (during first round) was observed. High metal concentration indicate discharge from metal/battery processing/recycling units. As per inventory, industries in the catchment of Karedha drain comprise 9 GPIs including Paper (01), Yarn/Textile processing (07) Metal Surface Treatment (01) and 1 Non-GPI that include a Textile -

Washing and digital printing of fabric unit. Additional paper printing, automobile service, furniture molding and fabrication, glass printing, MS wire drawing, electrical cable manufacturing and processing units reported by monitoring team.

- **Hindon Vihar Drain**: Hindon Vihar left and right are untapped concrete drains that conjoint together and form Hindon Vihar drain that ultimately discharges into the river Hindon. They carry domestic sewage from household of Hindon Vihar area. Large amount of cow dung observed in both drains. After joining of these two sub-drains, the sampling of the conjoint drain is not possible due to non-approachability.
    - Hindon Vihar Left drain: High BOD ranging from 181-302 mg/L (both rounds), COD ranging from 574-803 mg/L (both rounds), TDS-1344 mg/L (during first round) and TSS-601 mg/L (during second round) was observed (**Figure 83**).
    - Hindon Vihar Right drain: High BOD ranging from 168-639 mg/L (both rounds), COD ranging from 656-2018 mg/ L (both rounds), TSS ranging from 639-4766 mg/L (both rounds), Fe-38.02 mg/L (during first round) and Pb-0.124 mg/L (during first round) was observed (**Figure 84**).
- **Kaila Bhatta Drain**: This is an untapped mixed drain that carry wastewater from Nava Jeevan Leprosy Colony, Madhopura area. High TDS-1736 mg/L was observed in this drain. Industries in the catchment of Kaila Bhatta drain comprise 12 GPIs including Pharmaceutical (02), Metal Surface Treatment (08), Textile (01), Tannery (01) and 3 Non-GPI including Pharmaceutical (01), Engineering (01) and Others paper board (01).
- **Arthala Drain:** This is an untapped mixed drain that carry wastewater from Arthala village and industrial units established in its catchment. High TDS-2256 mg/L, Fe-65.021 mg/L and Pb- 0.198 mg/L was observed in this drain. Industries in the catchment of Arthala drain comprise 1 GPI that include a Distillery and 1 Non-GPI that include a Metal Surface Treatment unit.
- **Indirapuram Drain**: This drain carries combined discharge from three STPs in Indirapuram i.e. 74 MLD, 56 MLD and 56 MLD (**Figure 85**). Sahibabad drain, a mixed drain which also carries wastewater of Sahibabad industrial area, is partially tapped to 74 MLD STP at Indirapuram. All three STPs located in Indrapuram are non-complying w.r.t. discharge standards. High Color-98 Hazen and TDS-1320 mg/L was observed.
- **Pratap Vihar Drain**: This is an untapped drain that carry domestic sewage from household of Pratap Vihar area of Ghaziabad (**Figure 86**). High Color-123 Hazen and foaming was observed in this drain.

Figure 81 Jawali drain

Figure 82 Karedha drain

Figure 83 Hindon Vihar Left drain

Figure 84 Hindon Vihar Right drain

Figure 85 Indirapuram drain

Figure 86 Pratap Vihar drain

- **Rahul Vihar Drain**: This is an untapped domestic drain that carry domestic sewage from household of Rahul Vihar area of Ghaziabad (**Figure 87**). High Color-145 Hazen (during first round), BOD ranging from 176-206 mg/L (both rounds), COD ranging from 736-743 mg/L (both rounds), TDS ranging from 2644-2784 mg/L (both rounds), TSS ranging from 550-734 mg/L (both rounds), Chloride ranging from 1213-1940 mg/L (both rounds), Fe ranging from 2.35-5.08 mg/L (both rounds) was observed.

Figure 87 Rahul Vihar drain

As per available inventory, following industries are located in the catchment of the Jawali drain, Karedha drain, Kaila Bhatta drain and Arthala drain:

Jawali drain:

1. J.B.S. Processors, G-104, Apparel Park, Sector D-1 (P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
2. Ajay Veer Siroha, K-23, Apparel Park, Sector D-1 (P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
3. Apex Udyog, I-4, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
4. Chacha Enterprises, J-4 Appral Park, tronca city, Loni, Ghaziabad. (Yarn/Textile Processing)
5. D.K. Jain, G-262, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
6. Denim Matching, G-141, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad (Yarn/Textile Processing)

7. Ekansh Textile, K-36, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
8. Excellent Apparels Pvt. Ltd., K-52, Sec D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
9. Ghan Shyam Textiles, K-19, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
10. Galaxi Garments, K-22, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
11. Gulshan Rai Jain, G-82, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
12. Gyan Chand & Sons, G-87, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
13. Jai Mata Di Dyers, I-9, Sec D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
14. Jai Shri Dying, I-21, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
15. Krish Garments (Old Name Sanjeev Kumar), G-109, Sec D- 1(P3), Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
16. Laxmi Bleach (New Name Mani Bhadra Processors), G-102, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
17. Laxmi Processors, K-16, Sect-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad. (Yarn/Textile Processing)
18. Om Prakash Sharma, J-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
19. Pooja Pahawa, K-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
20. Puran Munjal, (New Name Adhunik Dyeing), H-12, Sector D- 1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
21. Quadri Processors, I-8, Sec D-1(P3), Apparel Park, Tronika City, Loni, Ghaziabad. (Yarn/Textile Processing)
22. R.R. Impex, G-261, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
23. Rachita Processors, K-33 & K-34, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)

24. Rajeev Kumar, G-64, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
25. Robest Infra Tech P Ltd., J-13, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
26. Roop Trading Company, E-14, Sect-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad. (Yarn/Textile Processing)
27. Roop Trading Company, K-9, sect- D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad. (Yarn/Textile Processing)
28. S.D. Garments, I-2, Sector-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad. (Yarn/Textile Processing)
29. S.S. Hosiery (Old Name is National Industries), G-264, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
30. S.T. Traders, J-5, Appral Park, Tronca city, Loni, Ghaziabad. (Yarn/Textile Processing)
31. S.V.S. Fashion, J-22, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
32. Sai Saran Garment, (New Name Lotus Knit Processing House), G- 108, Apparel Park, Sector D- 1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
33. Sandeep Tyagi, G-271, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
34. Sanjeev kumar (Shyam Washing), G-81, Apparel Park, Sector D-1 (P3), Tronica City, Loni (Textile Dyeing)
35. Sara International, G-265-266, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
36. Shafali Dyeing, G-84, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
37. Shri Paras coloration (U.B. Dyeing), G-117, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
38. Siddhi Vinyak, G-103, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Textile Dyeing)
39. Supreme Industries, J-2, Appral Park, Tronca City, Loni, Ghaziabad. (Yarn/Textile Processing)
40. Tiwari Feb, G-255, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)

41. Tusar Garments (Spectrum Dye Studio), J-3, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
42. Vaishali Hosiery, I-17, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
43. Vedanta Estate, I-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)
44. Vedanta Estate, (New Name A.N. Processors), I-12, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad. (Yarn/Textile Processing)

Karedha drain:

1. Ashoka Pulp & Paper Pvt. Ltd., 11, Loni Road Ind. Area, Mohan Nagar, Ghaziabad. (Pulp & Paper)
2. Laxmi Dyeing & Printing works Pvt.Ltd., S-81, Loni Road I.A., Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
3. Shahi Exports P Ltd., 30-Site-2, Loni Road Ind.area Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
4. A & A, S-50, Site-2, Loni Road Ind.area, Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
5. A.N. Fabric Dyers, 5/6, Site-2, Loni Road Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
6. N.G. Textiles., 13A/10, Site-2, Loni Road I.A., Mohan NGR, Ghaziabad. (Yarn/Textile Processing)
7. Non Stop Colour, S-3, Site-2, Loni Road I.A., Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
8. Sai Processing, 7/37, Site-2, Loni Road Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
9. Sunny Prints, 5/7, Site-2, Loni Road, Ind.area, Mohan Nagar, Ghaziabad. (Yarn/Textile Processing)
10. Shivam Cotage P Ltd., S-110/1Site-2, Loni Road Ind. Area, Ghaziabad. (Metal Surface Treatment)

Kaila Bhatta drain:

1. Dev Tara Industries Ltd., Meerut Road Duhai, Muradnagar, Ghaziabad (Dyeing & Textile)

2. JKG, Kathuria Brothers, Leather section, A-12 Meerut Road Industrial Area, Ghaziabad (Tannery)
3. Agrawal Galvenizing, A-8/6, Sect.22 Meerut Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
4. Albert David Ltd., B-12/13, Meerut Road, Ghaziabad (Pharmaceutical)
5. Chemo Pulp Tissues Pvt Ltd, A-4, sect-22, Meerut Road Industrial Area, Ghaziabad (Other)
6. Cosmos Auto India, 21 mainapur Meerut Road, Ghaziabad. (Metal Surface Treatment)
7. Hamdard (Wakf) Laboratories, (1 &2) B-2 & 3, Meerut Road, Ghaziabad. (Pharmaceutical)
8. Kathuria Brothers (Cycle section), A-12, Meerut Road Ind. Area. Ghaziabad. (Metal Surface Treatment)
9. Manohar Lal Hira Lal Ltd., 28 KM Stone Meerut Road, Duhai, Ghaziabad. (Metal Surface Treatment)
10. North Land Cycle Co. D-21, Meerut Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
11. Ramsons Enterprises, D-21 Meerut Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
12. Shri Ram Piston & Rings Ltd., Meerut Road Industrial Area, Ghaziabad (Engineering)
13. Techno Enterprises, A-13/12, Meerut Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
14. Ultra Electropletores, 46 Meerut Road Ind. Area Ghaziabad. (Metal Surface Treatment)
15. Unichem Laborateries, C-31, Meerut Road Ind. Area Ghaziabad. (Pharmaceutical)

Arthala drain:

1. Mohan Meakin Ltd. Mohan Nagar Ghaziabad (Distillery)
2. Balaji wire Pvt. Ltd., 139-A, Anand Ind. Estate, Mohan Nagar, Ghaziabad. (Metal Surface Treatment)

Dasna Drain: It's a first order drain of River Hindon that discharges its content into the river in Noida-Greater Noida district. Two drains namely Bhoorgarhi – Kalugarhi Drain and B.S. Road Drain have been monitored that discharge their content into the Dasna drain in the Ghaziabad district.

- **Bhoorgarhi – Kalugarhi Drain:** Kalugarhi drain joins Bhoorgarhi drain and forms Dasna drain (**Figure 88**). This is an untapped mixed drain that carry untreated domestic sewage from Bhoorgarhi village and Kalugarhi village and industrial units established in its catchment. High Colour- 167 Hazen, TDS- 1552 mg/l and Fe-7.698 mg/l was observed. Industries in the catchment of this drain comprise 07 GPIs including Pulp & Paper (01), Tannery (02), Metal Surface Treatment (01), Slaughter Houses (03).
- **B.S. Road Drain:** This is an untapped mixed drain that carry untreated effluents and sewage from B.S. Road Industrial area and discharges into Dasna drain (**Figure 89**). High Fe-5.296 mg/l was observed. However, inventory of industries in the catchment of the drain is not available.

Figure 88 Bhoorgarhi – Kalugarhi confluence drain

Figure 89 B.S. Road drain before confluence with Dasna drain

As per available information, following industries are located in the catchment of the Dasna drain and Bhoorgarhi – Kalugarhi Drain:

Dasna drain in Ghaziabad district:

1. Amko Export, A-1, B.S. Road Ind. Area Ghaziabad. (Dyeing & Textile)
2. Batik India, D-13, Udyog kunj. Dasna, Ghaziabad. (Yarn/Textile processing)
3. Indian Textiles company, E-49, B.S. Road Ind. Area, Ghaziabad. (Yarn/Textile processing)
4. N.G. Tex Prints P.Ltd., E-13/2, Kavi Nagar Ind. Area, Ghaziabad. (Yarn/Textile processing)

5. A.B. Cycle Parts Pvt.Ltd., S-24, S.S. of G.T. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
6. A.C.E. Hardware, B-5, B.S. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
7. A.S.T. Pipes, B-33, B.S. Road Ind. Area, Ghaziabad. (Other)
8. Balaji Engineering works, 351, Pandav Nagar, Mehrauli, Ghaziabad. (Metal Surface Treatment)
9. Balaji Enterprises, B-22/1/15, B.S. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
10. Continental Carbon India Ltd., A- 14, S.S. of G.T. Road Cosmos Engine, Ghaziabad. (Other)
11. Component P Ltd., A-7, Electro Steel Compound, S.S. of G.T. Road, Ghaziabad. (Metal Surface Treatment)
12. Gourang Products Pvt. Ltd, GT Road, Industrial Area Ghaziabad. (Metal finishing)
13. J.D.M. Enterprises, C-223/1, B.S. Road Ind.area Ghaziabad. (Metal Surface Treatment)
14. Malik Niddles & allide products, C-108, B.S. Road Ind. Area Ghaziabad. (Metal Surface Treatment)
15. Manav Beverage P Ltd, C-128, BSR Ind.area, Ghaziabad. (Beverage)
16. Northern India cyco Parts, E-2, S.S. of G.T. Road, Ind. Area, Ghaziabad. (Metal Surface Treatment)
17. S.D. Industries (Old Name is S.D. Enterprises), E-124, B.S. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
18. S.S. Enterprises, 363, Pandav Nagar, B.S. Road Maharauli, Ghaziabad. (Metal Surface Treatment)
19. Sakshi Metal Works, D-1/A, Kavi Nagar Ind. Area, Ghaziabad. (Metal Surface Treatment)
20. Sara Exports, 35, S.S. of G.T. Road Ind. Area, Ghaziabad. (Chemical)
21. Shanti Nath Manufactures, A- 2/14, Kavi Nagar Ind. Area Ghaziabad. (Metal Surface Treatment)
22. Shital Industries, S-40, S.S. of G.T. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)
23. Shivam Engineering, 282, S.S. of G.T. Road Industrial Area, Ghaziabad. (Metal Surface Treatment)
24. Shivam Fab Tech P Ltd., 22/9, S.S. of G.T. Road Ind. Area, Ghaziabad. (Metal Surface Treatment)

25. Shri Balaji Metal, E-17, Kavi Nagar Ind. Area, Ghaziabad. (Metal Surface Treatment)
26. Usha Cycle, S.S. of G.T. Road Ind.Area, Ghaziabad. (Metal Surface Treatment)

Bhoorgarhi – Kalugarhi Drain:

1. Shri Ganga paper Mills Pvt. Ltd., Hapur Road Dasna, Ghaziabad. (Pulp & Paper)
2. Exclusive Leather, Khasra no.2751, Village Bhurgari, Dasna, Ghaziabad. (Tannery)
3. Triyash Enterprises, Khasra no.2751, Village Bhoor Gari, Dasna, Ghaziabad. (Tannery)
4. Futuro Components Pvt. Ltd. Dasna Hapur Road, Ghaziabad. (Metal Surface Treatment)
5. Al Naseer Export Pvt.Ltd., 2761, Bhoor Gari, Dasna, Ghaziabad. (Slaughter House)
6. International Agro Food, Vill. Bhoor gari, Dasna, Ghaziabad. (Slaughter House)
7. Karan Frozen Food, Bhoor gari, Dasna, Ghaziabad. (Slaughter House and Meat Processing)

River Yamuna

Shahdara drain: It is a first order drain of River Yamuna that discharges its content into the river in NCT of Delhi near Okhla Barrage. Three drains namely Sahibabad Drain, Indirapuri drain and Banthala drain that discharge wastewater into Shahdara drain in Ghaziabad district have been monitored. Pollution (BOD>150 mg/l, COD>450 mg/l, Colour>75 Hazen, TSS> 500 mg/L, Chloride >1000 mg/L, TDS>1000 mg/L and Heavy Metals > E(P)Act, 1986 discharge norms) was observed in drains discharging into river Yamuna:

- **Sahibabad Drain**: This drain carry mixed untreated/partially treated industrial effluent as well as domestic sewage into the recipient drain (**Figure 90**). The domestic sewage is from unauthorized and authorized colonies of Vaishali area whereas the industrial effluent is from industrial units established in its catchment. Further, solid waste was also observed being dumped nearby the drain. High BOD- 155 mg/L, COD- 489 mg/L, TDS-2408 mg/L and Fe-14.971 mg/l was observed Although, it is tapped into 74 MLD STP Indirapuram, however, the tapping boundary wall was found damaged and overflow was observed during the monitoring. Visually black coloured sewage was observed at the inlet of Indirapuram 74 MLD STP. Further, the STP is non-complying, indicating partially treated wastewater outflow from the same. Industries in the catchment of Sahibabad drain comprise 73 GPIs including Dairy (02), Engineering (01), Metal Surface Treatment (19), Pharma (01), Pulp & Paper (01), Slaughter house and Meat (06), Yarn/Textile processing

(41), Textile Dyeing (02) and 2 Non-GPIs including Metal Surface Treatment (01) and Yarn/Textile processing (01).

- **Indirapuri drain:** This is an untapped mixed drain that carry industrial effluent and sewage from its adjoining areas into Shahdara drain (**Figure 91**). Highly septic conditions evident from high gaseous formations and huge solid waste dumping was observed in the drain. High TDS-2112 mg/L, Mn-3.668 mg/l and Sulphate-182 mg/L was also observed. UPPCB has not provided any information about the industries located in the catchment of the drain.
- **Banthala drain:** This is an untapped mixed drain that discharge into Shahdara drain which finally meets river Yamuna (**Figure 92**). The wastewater characteristics of Banthala drain showed acidic pH-2.5 (during first round), high BOD ranging from 175-234 mg/L (both rounds), COD ranging from 460-673 mg/L (both rounds), TDS ranging from 1580-19352 mg/L (both rounds), TSS ranging from 756-833 mg/L (both rounds), Sulphate-471 mg/L (during first round), Cr-12.7 mg/L (during first round), Cu-52.2 mg/L (during first round), Fe ranging from 12.48-6035.98 mg/L (both rounds), Pb ranging from 0.27-2.4 mg/L (both rounds), Mn-58.2 mg/L (during first round), Ni-19.8 mg/L (during first round), Zn-791.2 mg/L (during first round) and Co-0.98 mg/L (during first round). UPPCB informed that no authorized units are running in catchment of Banthala drain but illegal industries are being operated in Loni area of Ghaziabad. Inspections and actions are being carried out by joint team of District Administration, Ghaziabad Development Authority, Electricity Department & UPPCB for closure of these units. During CPCB inspection, four unauthorized units carrying out metal processing treatment by using acids, one soap manufacturing unit & one garment washing unit without ETP were found operational. Locals informed that there are many more garment washing units located in catchement of Banthala drain. Dumping of municipal solid waste & animal waste by large number of dairy units in the drain was also observed.

Figure 90 Sahibabad drain

Figure 91 Indirapuri drain

Figure 92 Banthala drain carrying industrial effluent

UPPCB has submitted the list of following industries which are located in the catchment of the **Sahibabad Drain**:

1. Shree Balaji Processors, (Old Name Hanuman Textiles), 1, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
2. Krishana Washing Service, 72/14, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
3. Prem Processors, 52 Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
4. R.B. Enterpirses, 180/2 & 180/4, Rajiender Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)

5. Right Wash Udyog, 72/19, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
6. Krishna Enterprises (Old Name Vidhi Ventuer), Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
7. Vardhman Engg. Works, 72/10-B, Gali No-6, Rajinder Ind. Area, Mohan Nagar, Ghaziabad. (Metal Surface Treatment)
8. Magnum Ventures Ltd, 18/41, Site-4 Sahibabad, Ghaziabad. (Pulp & Paper)
9. Aiden Jeans, B-49/5, Site-4 Ind. Area, Sahibabad, Ghaziabad. (Yarn/Textile processing)
10. Balaji Industry, Plot No. 7, Gali No. 1, Rajinder Nagar Ind. Area, Mohan NGR., Ghaziabad. (Yarn/Textile processing)
11. Beauty Art Prints India Pvt.Ltd.,54/4, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
12. Colour Tuch, 56/28, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
13. G.S.Das Apprarals Pvt.Ltd., 4/44, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
14. Ganga Processors, 18/11, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
15. Ganpati Creation, C-19/1, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
16. Global Industries, A-38/1/9, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
17. Goyal Canvas Pvt.Ltd., 18/43, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
18. Goyal Processors, 42/50, Site-4, Ind. Area, Sahibabad, Ghaziabad. (Yarn/Textile processing)
19. Jyoti Dyeing, 18/8, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
20. K.K. Industries, 7/5, Site-4, Ind Area, Sahibabad, Ghaziabad. (Textile Dyeing)
21. Kanhiya Enterprises, A-48/11, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
22. Krishna Print Pvt. Ltd., A-47, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
23. M.A. Garments, 20/6/21, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)

24. M.J. Allied Enterprises, E-4, Site-4 Ind. Area, Sahibabad, Ghaziabad. (Yarn/Textile processing)
25. M.Y. Garments, 20/6/14, Site-4, Sahibabad, Ghaziabad. (Yarn/Textile processing)
26. Maha Shakti Threads mills, 56/12, Site-4 Sahibabad Ind. Area. Ghaziabad. (Yarn/Textile processing)
27. Mahalaxmi Dyers, 49/24, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
28. Shri Mahaveer Enterprises, 28/1/15, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
29. Nandni Processors, 4/27, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
30. Neelam Tex Prints Pvt.Ltd., 41/1, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
31. Pal Nit Fab, 54/14, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
32. Pooja Processors, 62/2/3, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
33. Ratan Garments, 56/29, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
34. Ritika Enterprises, 18/32, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
35. S.B. Feb Tech P Ltd., 28/1/24, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
36. S.S. Prints, 56/14-15, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
37. Sahibabad Printers, 182/3, G.T. Road, Mohan Nagar, Ghaziabad. (Yarn/Textile processing)
38. Shiv Kumar Pawan Kumar,57/1/13, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
39. Shiva Processors, 18/6, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
40. Singhal Paulings Industries, 56/32, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
41. SPD RAINBOW (Lavya Udyog), 56/17, Site-4, Sahibabd Ind. Area, Ghaziabad. (Yarn/Textile processing)

42. Tanzeem Dyeing 261, Rajaendra Nagar Ind. Area Ghaziabad. (Yarn/Textile processing)
43. V.S. Garments, 20/6/10, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
44. Vaishno Garments, 20/6/3, Site-4, Ind Area, Sahibabad, Ghaziabad. (Textile Dyeing)
45. Ventkesh Enterprises, 48/1/7, Site-4, Sahibabad Ind. Area, Ghaziabad. (Yarn/Textile processing)
46. Versha Washing, 49/25, Site-4, Ind. Area, Sahibabad, Ghaziabad. (Yarn/Textile processing)
47. Advance Steel Tube Ltd. 45/3, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
48. Ajay Industrial Corporation, 20/11, Site-4, Ind. Area, Sahibabad, Ghaziabad. (Metal Surface Treatment)
49. Anuradha Fabricators, 42/10, Site-4, Sahibabad, Ghaziabad. (Metal Surface Treatment)
50. Bharat Electronics Ltd., Bharat Nagar, Sahibabad Industrial Area, Ghaziabad. (Metal Surface Treatment)
51. Tata Steel Ltd., 23, Site-4, Sahibabad, Ghaziabad. (Engineering)
52. Dabur India Ltd, P-22, Site 4 Sahibabad, Ghaziabad. (Pharmaceutical)
53. Dream Bath, 28/1/21, Site-4, Sahibabad Industrial Area, Ghaziabad. (Metal Surface Treatment)
54. Empire Fastners, 48/1/22, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
55. Ipsa Business India Pvt.Ltd., 57/1/17-18, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
56. Machino Tech, 48/1/1-A, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
57. National Engg. Works (Old Name Mange Ram), 115, Prakash Ind. Area, Sahibabad, Ghaziabad. (Metal Surface Treatment)
58. Paharpur-3 P, Plot No 19, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
59. Rachna Metal Industries Pvt. Ltd., 18/42, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
60. Rama Steel Tube Ltd., B-21, & B-3, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)

61. Regency Cycles P Ltd., 16/1-B- 3&4, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
62. Sage Metal Ltd., B-7, Site-4, Shaibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
63. Shri Giri Raj Enterprises, 24-25, Prakash Ind. Estate, Sahibabad, Ghaziabad. (Metal Surface Treatment)
64. Singla Engrayours Pvt.Ltd., 7/26, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
65. Sona Industry, Plot No- 56/7, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
66. Spark Electrose P Ltd., A-48/9, Site-4, Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
67. United Polygenious Pvt.Ltd., B- 13/1, Site-4 Sahibabad Ind. Area, Ghaziabad. (Metal Surface Treatment)
68. V.R.S. Food Ltd., (Vedram & Sons), Unit-1, B-56, Site-4, Sahibabad Ind. Area, Ghaziabad. (Dairy)
69. V.R.S. Food Ltd. (Vedram & sons), Unit-2, B-33, Site-4, Sahibabad Ind. Area, Ghaziabad. (Dairy)
70. Al-Aali Exports (P) Ltd., B-37, Site- 4, Ind. Area, Sahibabad, Ghaziabad. (Slaughter House and Meat Processing)
71. Arshiya Export Pvt. Ltd.) B-67, Site-4, Sahibabad, Ghaziabad. (Slaughter House and Meat Processing)
72. Fair Export (India) Pvt. Ltd., 20/1, Site-4 Ind. Area, Sahibabad, Ghaziabad. (Slaughter House and Meat Processing)
73. Firgo Riffico Alana Ltd., A-15, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Slaughter House and Meat Processing)
74. Frigo Rifico Alana Ltd., Unit-2, A- 14/1, Site-4, Sahibabad Ind. Area, Ghaziabad. (Slaughter House and Meat Processing)
75. Mirha Export Pvt.Ltd., B-36, Site- 4, Sahibabad Ind. Area, Ghaziabad. (Slaughter House and Meat Processing)

3.7 Gautam Buddha Nagar District

River Hindon

After entering into Gautam Buddha Nagar district, Dasna drain meets the river Hindon at Yusufpur village in Greater Noida which carries domestic sewage from Gaur City residential area (in Greater Noida-West) along with discharge of industrial and domestic wastewater of Ghaziabad district. The flow diagram of the Hindon river showing the river monitoring locations along with the confluence points of the drains is shown in the **Figure 93**.

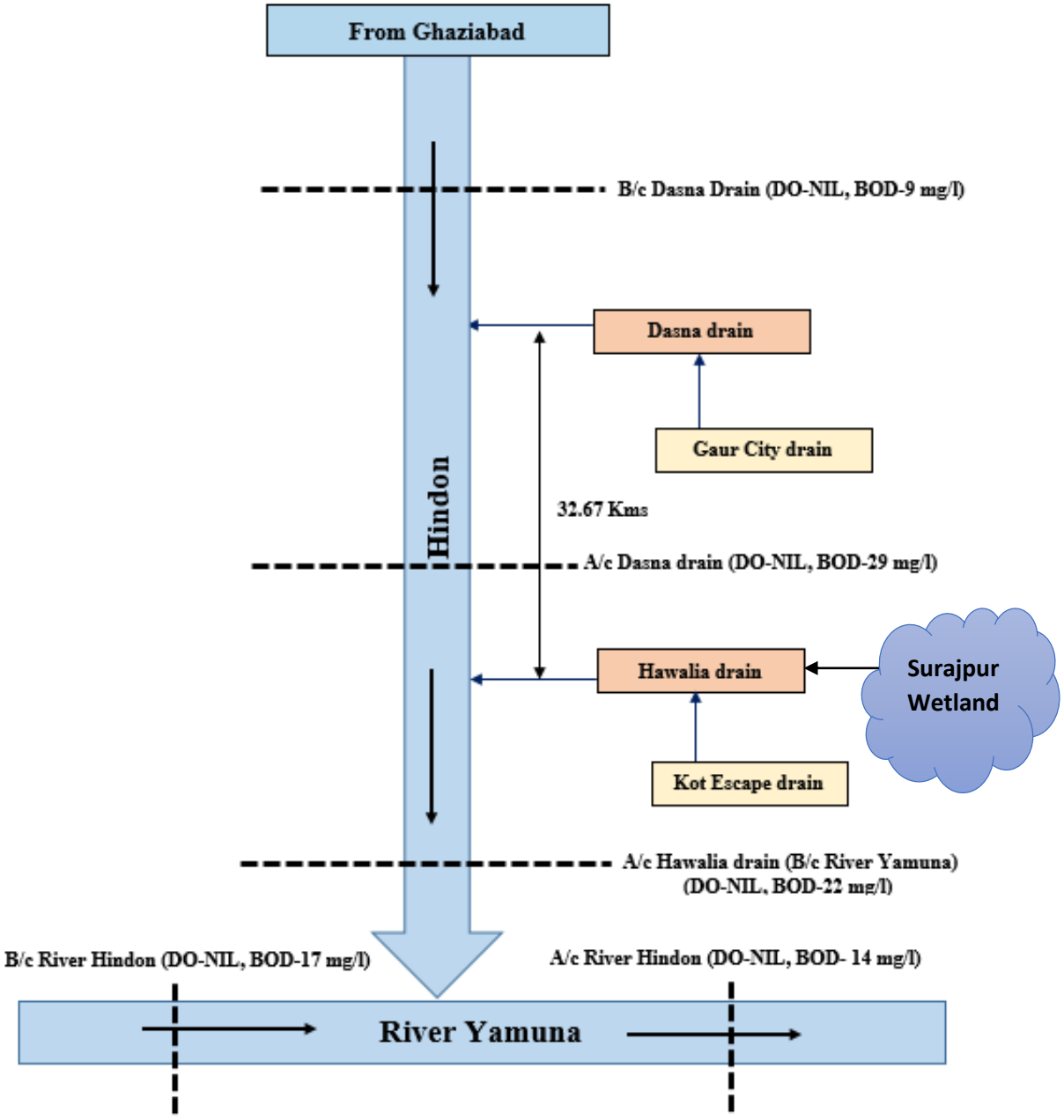
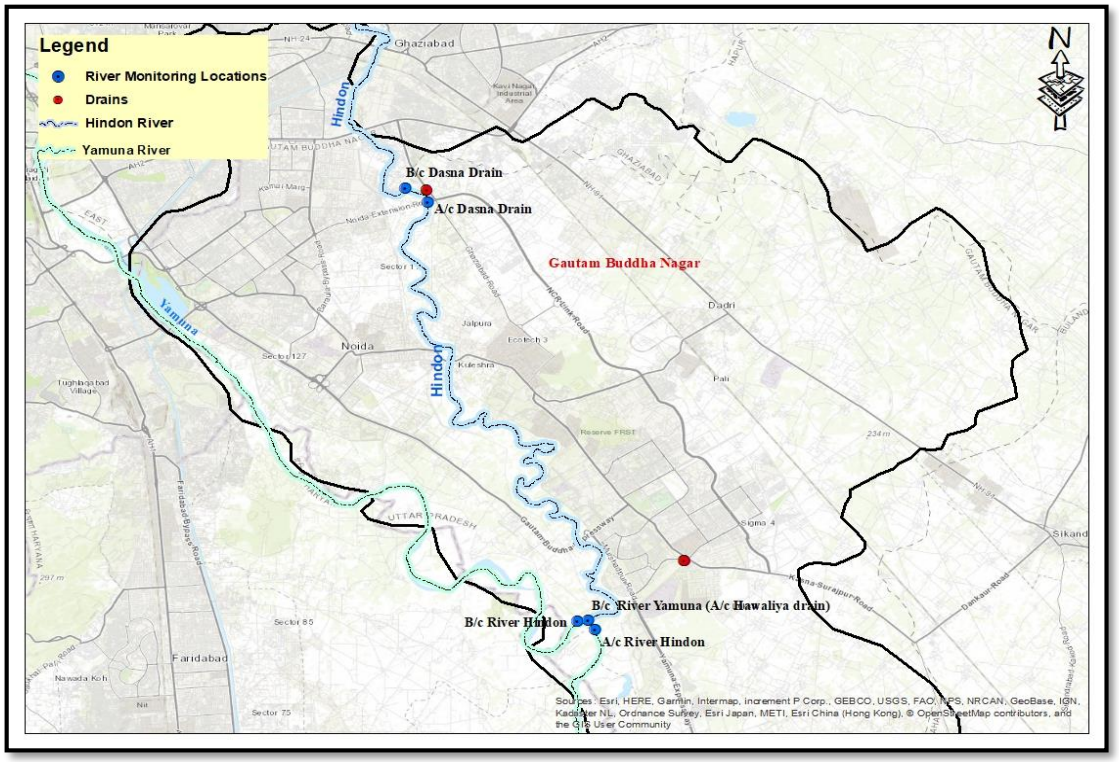


Figure 93 Flow diagram of river Hindon depicting the river monitoring locations along with confluence with river Yamuna

The monitoring locations on Rivers Hindon and Yamuna along with adjoining drains in Gautam Buddha Nagar district are shown in **Map-8**.



Map 8 Monitoring locations on Rivers Hindon and Yamuna along with adjoining drains in Gautam Buddha Nagar district

Dasna drain originates from district Ghaziabad which carries untreated sewage and treated industrial effluent coming from various industrial area and residential area of Distt. Ghaziabad. Dasna drain carry treated effluent of industrial units situated at G.T. Road and untreated sewage from nearby areas and enters Greater Noida West via G.T. Road. Gaur city drain, which carries domestic sewage of Gaur city area, also merges with the Dasna drain. Dasna drain meets river Hindon near Yusufpur village. Flow, BOD and COD in Dasna drain were 412.06 MLD, 73 mg/l and 356 mg/l, respectively. DO and BOD in river near under Hindon Bridge, Greater Noida were NIL-0.6 mg/l and 9 mg/l, respectively.

Hawalia drain originates from Surajpur Wetland, Surajpur (**Figure 98**). The domestic untreated sewage generated from Surajpur village and treated industrial effluent of Surajpur Industrial Area Site - C and Site – B, Site-V is being discharged in this drain. Some local drains i.e. Lohiakhar Nala, Palla Chithehara Nala, Dhoom Dujana drains and Sadopur drain also discharges into Hawaliya drain near Surajpur Wetland. Further, Domestic sewage of Udyog Vihar, Udyog Kendra and Ecotech –I, Industrial Area Site - IV, Udyog Vihar Extension,

Gamma-1, Knowledge Park- 1, 2 & 3, Sector-Omega-2, 4, Sector-P-3 & 4, goes to GNIDA STP (capacity- 137 MLD, 15 MLD, 20 MLD). Treated effluent from these STPs meets with Hawaliya drain through Kot Escape at village Kasna. Hawaliya drain ultimately meets in Hindon River at village Gharbara. In downstream, Hawaliya drain (BOD: 19 mg/l and COD: 97 mg/l) meet river in village Gharbara which is outlet of Surajpur wetland. DO and BOD in river a/c Hawaliya drain were NIL-22 mg/l, respectively. The photographs of river Hindon and drain monitoring locations are shown in **Figures 94-103**.

Figure 94 Hindon River B/c Dasna drain

Figure 95 Dasna and Gaur city drain

Figure 96 Gaur city drain

Figure 97 Hindon A/c Dasna drain

Figure 98 Inlet of Surajpur wetland

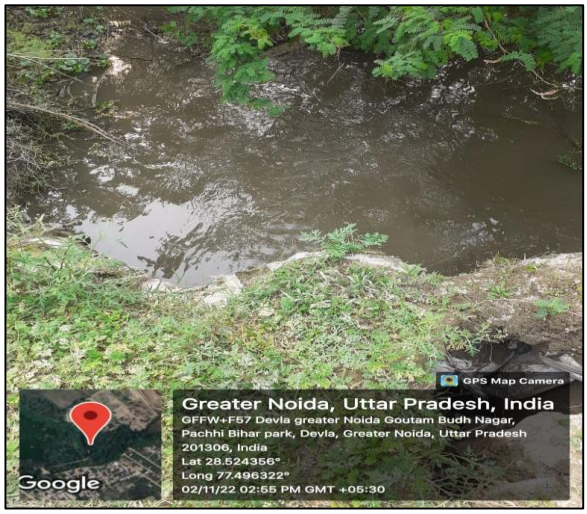


Figure 99 Outlet of Surajpur wetland (Origin of Hawaliya drain)

Figure 100 Hawaliya drain B/c Hindon river

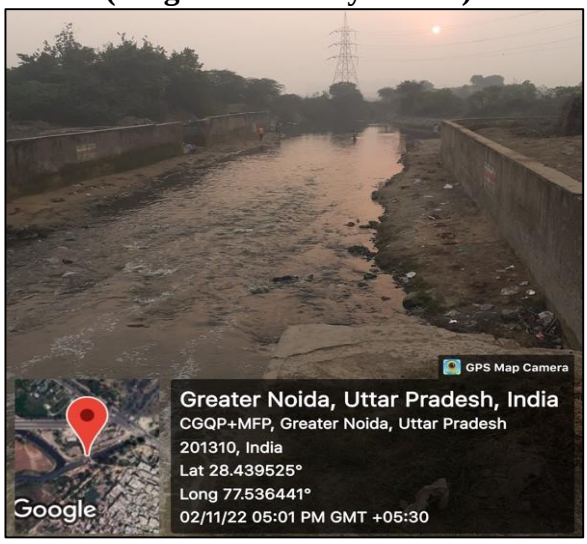


Figure 101 Kot escape canal drain

Figure 102 Hindon river A/c Hawaliya drain

Figure 103 Hindon river B/c Yamuna river

River Yamuna:

Finally, Hindon meets with river Yamuna near village Gharbara, Greater Noida. Samples was taking before and after confluence with river Yamuna. DO was found NIL and BOD was 17 mg/l and 14 mg/l before and after confluence of river Hindon.

The photographs of river Yamuna monitoring locations are shown in **Figures 104-105**.

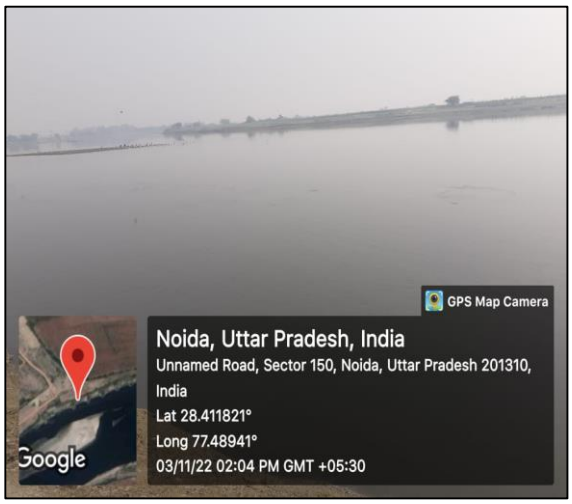


Figure 104 Yamuna river B/c Hindon river

Figure 105 Yamuna river A/c Hindon river

CHAPTER-4: ACTION REQUIRED FOR POLLUTION ABATEMENT

4.1 Saharanpur and Shamli District

Table 1 Action required to improve water quality of River Hindon and its tributaries namely Rivers Dhamola, Krishni and Kali-West in Saharanpur and Shamli districts

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
1.	Hindon (At origin)	Not available	Not available	(DO-10.8 mg/l BOD & COD- NIL) • River Hindon originates from around 3 to 4 km from Barsani Falls inside a dense forest area. • River is recharged by small freshwater streams from its origin to Barsani Falls. • Freshwater was observed at the origin.		No industrial unit identified	No sewage discharge	Inadequate flow in river	• Restoration of flow to be considered. • Vegatation development in catchment of river Hindon along its course.
2.	Hindon (at Kaluwala village) (~ 5.5 km)	Not available	Not available	• Pond fed by waterfall has clean water full of fishes		No industrial unit identified	No sewage discharge	Pond is silted	• Restoration of pond via desiltation. • The desilted material should be used for strentheging the enbankments and the embankments should be vegetated.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
									• Embankments of river Hindon should be vegetated all along the course.
3.	Hindon (at Pur ka Tanda) (~ 21 km)	Not available	Not available	• Bunds have been constructed on the River Hindon at Pur ka Tanda, Saharanpur by the Irrigation Department to revive the river • River is dry at this location		No industrial unit identified	No sewage discharge	Dry stretch	• Restoration of flow to be considered. • Increase in source of freshwater by making check dams
4.	Hindon (at Khujnawar bridge and Harora village) (~ 46 km)	Not available	Not available	• River was found dry.		No industrial unit identified	No sewage discharge	• Dry stretch • River bed encroached.	• Restoration of flow to be considered. • Removal of encroachment in river bed. • Increase in source of freshwater by making check dams.
5.	Hindon (at Janta Road Bridge) (~ 47.5 km)	Not available		***Round I:*** DO-NIL, BOD-291 mg/l, & COD:763 mg/l ***Round II:*** DO-NIL, BOD-369 mg/l & COD: 612 mg/l (Stagnant polluted wastewater)		Slaughter House and Board Mills namely Anant Board Mill, Balaji Board Mill, Ekta Board Mill, and Krishna Board Mill	No sewage discharge	• High impact due to industrial discharge. • First polluted stretch observed at Janta Road Bridge, before that river stretch is dry. • River bed encroached.	• Action on industries discharging untreated/partially treated effluent in the catchment area. • Removal of encroachment in river bed.
6.	Hindon	Sewage from Gagelheri and	Not available	DO-NIL, BOD-80 mg/l &	Not available	No industrial unit identified	Sewage from Gagelheri and Dinapur village	• Untreated sewage discharge	• Decentralized low-cost treatment system like stabilization pond,

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
		Dinapur village through drains at U/s of Daya Sugar Mill		COD-305 mg/l				(water quality deteriorated) • River bed encroached.	Constructed Wetland, oxidation ditches etc. • Removal of encroachment in river bed.
7.	Hindon	Daya Sugar Mill drain (~ 48.5 km*)	Dry	Not available	DO-NIL, BOD-73 mg/l & COD-292 mg/l	GPI-01 (Daya sugar Naya Bans, Saharanpur)			
8.	Hindon	Nagdehi drain (~ 56 km)	***Round I:*** Dry ***Round II:*** BOD-34 mg/l & COD-103 mg/l ***Round III:*** Flow-0.74 MLD, BOD-237 mg/l & COD-349 mg/l	Dry	Dry	02 GPIs (Dairy & Textile) & 01 Non-GPI (Board Mill) (*Conforming area*) 01 Unit (Board Mill)	Sewage under Saharanpur-Dehradun road bridge	• Drain water quality deteriorated due to industrial and untreated sewage discharge • River stretch dry. • River bed encroached.	• Removal of solid waste. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. • Action on industries discharging untreated/partially treated effluent in the Nagdehi drain. • Desilting of river bed. • Removal of encroachment in river bed.
9.	Hindon	Star Paper Mill drain (~ 60 km)	***Round I:*** Flow-23.76 MLD, BOD-61 mg/l, COD-181 mg/l &	Dry	***Round I:*** DO-0.8 mg/l, BOD-61 mg/l & COD-181 mg/l	GPI-01 (Star Paper Mill) (*Conforming area*)	Sewage from Shantagarh area	Impact due to industrial and untreated sewage discharge	• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. for

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
			TDS-2796 mg/l ***Round II:*** BOD-83 mg/l, COD-195 mg/l, TDS-3404 mg/l & Chloride-1261 mg/l ***Round III:*** Flow-20.75 mg/l, **Color-107 Hazen,** BOD-198 mg/l, COD-338 mg/l, TDS-3024 mg/l & Chloride-1147 mg/l	Dry	(The only water source at this river location is discharge of Star Paper Mill drain, therefore, it has the same characteristic as of drain)				treatment of Star Paper Mill drain.
River Dhamola									
10.	Dhamola (Origin at Sansarpur village)	Not available	Not available	• Dhamola River originates from a pond in Sansarpur village • Pond is dry • The river is recharged by groundwater at Salempur Bhugdi village		No industrial unit identified	No sewage discharge	Dry stretch	• Restoration of flow to be considered. • Pond should be desilted and the desilted material should be used for strentheging the enbankments and the

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
									embankments should be vegetated. • Embankments of river Dhamola should be vegetated all along the course.
11.	Dhamola	Madh Village drain (~ 20 km)	Flow-1.71 MLD, BOD-17 mg/l & COD-100 mg/l	***Round I:*** DO-8.04 mg/l, BOD-1.6 mg/l & COD- 7 mg/l ***Round II*** DO-13.9 mg/l, BOD-3 mg/l & COD-14 mg/l	Not available	No industrial unit identified	Sewage from Madh village	-	• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc.
12.	Dhamola	Numaesh camp drain (~ 26 km)	***Round I:*** Flow- 10 MLD, BOD-76 mg/l & COD-197 mg/l ***Round II:*** BOD-63 mg/l & COD-258 mg/l	***Round I:*** DO-0.36 mg/l & BOD-23 mg/l	***A/c of both drains*** ***Round I:*** DO-0.95 mg/l, BOD-37 mg/l & COD- 117 mg/l ***Round II:*** DO-NIL, BOD-42 mg/l	No industrial unit identified	Sewage from Numaish Camp Area	• Impact due to industrial and untreated sewage discharge. • First polluted stretch of river Dhamola.	• Removal of solid waste. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc.
13.	Dhamola	Kamdhenu complex drain (~ 26 km)	***Round I:*** BOD-204 mg/l, COD-545 mg/l,			04 Nos. GPIs (Textile)	Sewage from Balmiki Basti		• Action on industries discharging untreated/partially treated

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
			TSS-1066 mg/l, TDS-1496 mg/l, Cd-7.09 mg/l, Cu-15.95 mg/l & Fe-97.05 mg/l ***Round II:*** BOD-28 mg/l, COD-142 mg/l & Fe-6.49 mg/l		& COD- 155 mg/l				effluent into Kamdhenu Complex Drain. • Removal of solid waste. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. • New STP along with sewage network with future projection shall be installed.
14.	Dhamola	Paondhoi drain (~ 28 km)	BOD-64 mg/l & COD-170 mg/l	Not available	A/c of both drains at Sadoli Hariya ***Round I:*** DO-NIL, BOD-22 mg/l & COD-126 mg/l ***Round II:*** DO-NIL, BOD-47 mg/l & COD-159 mg/l	No industrial unit identified	Sewage from Saharanpur city	Impact due to untreated sewage discharge.	• Interception, diversion and treatment of sewage. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc.
15.	Dhamola	Kishanpur drain (~29 km)	Flow-95 MLD, BOD-206 mg/l & COD-347 mg/l	Not available		No industrial unit identified	Sewage from Saharanpur city and Ram Nagar market area		
16.	Hindon	Dhamola (~ 52 km from origin	Flow-250.56 MLD, BOD-8	Not approachable,	***Round I:*** DO-NIL,	04 Nos. GPIs (Textile)	Sewage discharge from Madh village,	• River is polluted.	• Decentralized low-cost treatment system like stabilization pond,

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
		to confluence of river Hindon)	mg/l, COD-86 mg/l	lean flow in river	BOD-7 mg/l & COD-92 mg/l ***Round II:*** DO-NIL, BOD-24 mg/l & COD- 95 mg/l		Numaish camp area, Saharanpur city and Ram Nagar market area	• Mixed impact from industrial and untreated sewage discharge.	Constructed Wetland, oxidation ditches etc. in river Hindon b/c and a/c of river Dhamola. • Upgradation and ensuring compliance of 38 MLD STP at Saharanpur near Mahilpur Road. • Action on industries discharging untreated/partially treated effluent into river Dhamola. • New CETP with adequate capacity shall be installed for industrial clusters in catchment of river Dhamola & KD Complex drain.
17.	Hindon	Bajaj Sugar Mill drain (~ 90 km)	***Round I:*** BOD-20 mg/l, COD-82 mg/l ***Round II:*** BOD-74 mg/l, COD-211 mg/l	Not applicable	At Village Maheshpur ***Round I:*** DO-0.9 mg/l, BOD-14 mg/l & COD- 77 mg/l ***Round II:*** DO-0.35 mg/l, BOD-21 mg/l & COD-83 mg/l	02 Nos. GPI (Bajaj Hindustan Sugar Mill & Distillery)	No sewage discharge	River is polluted	• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. • Desiltation of drain.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
River Kali-West									
18.	Kali-West (Originate from wetlands at Gangali and Kalalhati village)	Not available	Not available	• Wetland at origin is eutrophicated.		No industrial unit identified	No sewage discharge	River bed is silted and encroached by farmers	• Restoration of flow to be considered. • Rejuvenation of wetland • Desiltation of river bed and the desilted material should be used for strentheging the enbankments and the embankments should be vegetated. • Embankments of river Kali-West should be vegetated all along the course. • Removal of encroachment in river bed.
19.	Kali-West (Shivpur village)	Not available	Not available	• River feeds into a pond at Shivpur village. (water quality sample not collected)		No industrial unit identified	Domestic sewage from nearby villages	• Pond is highly silted and polluted due to discharge of sewage from nearby villages.	• Desiltation of pond. • The desilted material should be used for strentheging the enbankments and the embankments should be vegetated.
20.	Kali-West (Dharampur)	Not available	Not available	Not available	Not available	No industrial unit identified	No sewage discharge	• River bed is encroached by farmers • Inadequate flow in river • Highly eutrophicated	• Removal of encroachment in river bed. • Desilting of river bed. • The desilted material should be used for strentheging the enbankments and the embankments should be vegetated.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
									• Restoration of flow to be considered.
21.	Kali-West (u/s Rastam village)	Ganga Canal	Not available	• DO-10.2 mg/l, BOD-1.1 mg/l & COD-6 mg/l were found in river Kali-West. • Fresh water discharged into river Kali-West from Ganga canal.		No industrial unit identified	No sewage discharge	River is not polluted	-
22.	Kali-West (Chandpur village) (~ 9 km)	Not available	Not available	A small fresh water stream joins the river 5 km upstream of the location. (water quality sample not collected)		No industrial unit identified	No sewage discharge	-	-
23.	Kali-West (Miragpur village) (~ 12 km)	Not available	Not available	DO-9.92 mg/l, BOD- 3 mg/l & COD-10 mg/l were found in river Kali-West.		No industrial unit identified	No sewage discharge	River is not polluted	-
24.	Kali-West	Deoband drain (~ 16 km)	Flow-12.51 MLD, BOD-21 mg/l & COD-77 mg/l	-	At Sapla Khatri village ***Round I:*** DO-2 mg/L, BOD-1.1 mg/L & COD-7 mg/l ***Round II:*** DO-0.7 mg/L, BOD-6	No industrial unit identified	Domestic sewage from Deoband town	Water quality of river Kali-West deteriorated in terms of dissolved oxygen	• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. on Deoband drain.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
					mg/L & COD-25 mg/l				
25.	Kali-West	Sheela drain at Lakhnauta (Haridwar) (~ 22 km) (Sheela drain was monitored at Lakhnauta, Uttarakhand before confluence of channel of Ganga canal with the drain)	Flow-20.04 MLD, **BOD-365 mg/L, COD 702 mg/L**	***Round I:*** DO-1.2 mg/L, BOD-5 mg/l & COD-28 mg/l	***Round I:*** DO-1 mg/L, BOD-4 mg/L & COD-20 mg/l	12 (nos.) industries namely Finolex Kebles Ltd., Roorkee, Carborandom Universal Ltd., Roorkee, Inwing Industries, Sagar Paper Mills, UMRB Electronics, ASAHI India Glass Ltd. (AIS), AIS outglass, Air Liquid India Facility, Roorkee, Aroma-Craft & Tissue Pvt. Ltd., Aadharshree Paper Mills Pvt. Ltd., Uttaranchal Pulp & Paper Pvt. Ltd., Saraswati Paints Pvt. Ltd.	Domestic sewage from nearby villages (Libaheri, Jhabrera, Tikkolakala, Kbalpura etc.) and Roorkee	Impact in terms of dissolved oxygen which might affect the aquatic life	• Action on industries discharging untreated/partially treated effluent into Sheela drain • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. on Sheela drain b/c to river Kali-West.
River Krishni									
26.	Krishni (Origin at Savalpur Navada)	Not available	Not available	• Krishni river originates from the wetland at Savalpur Navada near Krishni village in Saharanpur district		No industrial unit identified	Sewage from surrounding village	-	• Restoration of pond via desiltation and floating wetlands.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
				• The source of water is a spring that feeds the river Krishni					• The desilted material should be used for strentheging the enbankments and the embankments should be vegetated. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc.
27.	Krishni	Thaska drain (~ 36 km*)	BOD-98 mg/L, COD 354 mg/L	River dry before confluence	DO- NIL, BOD-98 mg/l & COD-354 mg/l (The only water source at this river location is discharge of Thaska drain, therefore, it has the same characteristic as of drain)	Conforming GPI-03 (Sugar, Milk processing, Distillery)	Sewage from Nanauta town to Village Bhanera Khemchand	• First polluted stretch observed D/s Thaska drain before that river is dry. • Polluted stretch from D/s Thaska drain to D/s Shamli drain due to industrial and untreated sewage discharge. • Drain was highly eutrophicated.	• Removal of solid waste. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. • Action on industries discharging untreated/partially treated effluent into Thaska drain. • Constructed Wetland in Thaska drain B/c with river Krishni or in river Krishni A/c with Thaska drain.
28.	Krishni	Sikka drain (~ 75 km*)	BOD-48 mg/L, COD 256 mg/L, TDS-1948 mg/L,	DO-NIL, BOD-57 mg/l & COD-228 mg/l	Not available	Non-conforming GPI-01(Maruti papers Pvt. Ltd.)	Domestic sewage from Village Sikka and Jalalpur		• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key Issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
29.	Krishni	Shamli drain (~92 km*)	Flow-93.41 MLD, BOD-48 mg/L & COD- 254 mg/L	Not applicable	DO-NIL, BOD-57 mg/L & COD- 297 mg/l	Non-conforming GPI-02 (Distillery & Sugar); Conforming GPI-01 (Pulp & paper)	Domestic sewage from Shamli town		• Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. • Action on industries discharging untreated/partially treated effluent into Shamli drain. • New STP along with sewage network with future projection shall be installed. • Proper tapping and diversion structure for tapping of drain. • Constructed Wetland in Shamli drain B/c with river Krishni or in river Krishni A/c with Shamli drain.

4.2 Muzaffarnagar District

Table 2 Action required to improve water quality of river Hindon in Muzaffarnagar district

S. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD, COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
1.	Hindon	Titawi village drain (Untapped) 151.5 Kms	At Titawi village ***Round I*:** Flow-4.93 MLD, BOD-197 mg/l & COD-399 mg/l ***Round II:*** Flow-2.34 MLD, BOD-190 mg/l & COD-373 mg/l	At Titawi village ***Round I:*** DO-0.6 mg/l, BOD-13 mg/l & COD-51 mg/l ***Round II:*** DO-0.66 mg/l, BOD-7 mg/l & COD-47 mg/l	At Titawi village ***Round I:*** DO-NIL, BOD-5 mg/l & COD-36 mg/l ***Round II:*** DO-0.6 mg/l, BOD-13 mg/l & COD-54 mg/l	Indian Potash Limited, Titawi (Sugar Industry)	Domestic sewage from Titawi village	Impact observed- Insufficient dissolved oxygen in river	• Installed ETP shall be upgraded at Indian Potash Limited, Titawi to improve quality of treated effluent. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. on Titawi village drain.
2.	Hindon	Dhobi Ghat drain-Budhana town (Untapped) 188.1 Kms	***Round I:*** BOD-180 mg/l & **COD-455 mg/l** ***Round II:*** **BOD-574 mg/l, COD-1435 mg/l &** TSS-1551 mg/l (*Flow in the drain could not be measured due to less flow*)	Not available	Not available	No industrial unit identified	Domestic sewage from Parsi Basti, Budhana	Industrial impact observed- Discharge of wastewater containing high BOD and COD in river through Dhobi Ghat drain	• Removal of solid waste. • Action on industries discharging untreated/partially treated effluent into Dhobi Ghat drain. • To expedite construction of 10 MLD Budhana STP & tap Dhobi Ghat drain to the STP.
3.	Hindon	Sabzi Mandi drain-Budhana town (Untapped)	***Round I:*** BOD-115 mg/l & COD-273 mg/l ***Round II:*** BOD-267 mg/l, **COD-800 mg/l** & TSS-771 mg/l	Not available	Not available	No industrial unit identified	Domestic sewage from Sabji Mandi, Luhsana village, Mandwada	Industrial impact observed- Discharge of wastewater containing high	• Removal of solid waste. • Action on industries discharging untreated/partially treated effluent into Sabzi Mandi drain.

S. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD, COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
		188.2 Kms	(*Flow in the drain could not be measured due to dumping of solid waste*)				village, Budhana	COD in river through Sabzi Mandi drain	• To expedite construction of 10 MLD Budhana STP & tap Sabzi Mandi drain to the STP.
4.	Hindon	Shamshan Ghat drain-Budhana town (Untapped) 188.4 Kms	***Round I:*** BOD-130 mg/l & COD-368 mg/l ***Round II:*** BOD-159 mg/l & COD-344 mg/l (*Flow in the drain could not be measured due to dumping of solid waste*)	Not available	***Round I:*** DO-NIL, BOD-9 mg/l & COD-51 mg/l ***Round II:*** DO-0.5 mg/l, BOD-10 mg/l & COD-47 mg/l	No industrial unit identified	Domestic sewage from Sabji Mandi, Luhsana village, Mandwada village, Budhana	River impacted (Insufficient dissolved oxygen in river) Insufficient dissolved oxygen in river	• Removal of solid waste. • To expedite construction of 10 MLD Budhana STP & tap Shamshan Ghat drain to the STP. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. in river Hindon a/c of Shamshan Ghat drain. • Constructed Wetland in river Kali-West A/c with three drains of Budhana namely Dhobi Ghat drain, Sabzi Mandi drain and Shamshan Ghat drain.

Table 3 Action required to improve water quality of river Kali-West in Muzaffarnagar district

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
1.	Kali-West	Maleera village drain (Untapped) 40.8 Kms	BOD-54 mg/l & COD-187 mg/l (*Flow in Maleera village drain was less which could not be measured*)	DO-5.3 mg/l, BOD-5 mg/l & COD-9 mg/l	DO-4.7 mg/l, BOD-6 mg/l & COD-18 mg/l	No industrial unit identified	Sewage from Maleera village	River impacted (deterioration in dissolved oxygen)	Decentralized low cost treatment system like stabilization pond, constructed wetlands, oxidation ditches, etc. to treat wastewater of Maleera village drain.
2.	Kali-West	Badhai Khurd drain (Untapped) 48.7 Kms	At village Rankhandi, Saharanpur: ***Round I:*** Flow-41.85 MLD, BOD-45 mg/l & COD-161 mg/l ***Round II:*** Flow-6.75 MLD, BOD-104 mg/l & COD-298 mg/l B/c with river Kali-West, Muzaffarnagar: Flow-33.32 MLD, BOD-30 mg/l & COD-106 mg/l	Not available	At Mimlana village (DO-4 mg/l, BOD-7 mg/l & COD-19 mg/l) At Khanjahanpur village (DO-0.9 mg/l, BOD-7 mg/l & COD-24 mg/l)	Triveni Engg. & Industries Ltd, Deoband (Sugar Industry) *(Conforming)*	Sewage from Deoband, Bahadurpur, Rankhandi, Thamana, Aakhlour, Badhai Kalan, Hoshiyarpur, Badhai Khurd, Said Nagla, Kacholli towns	River impacted (Low level of dissolved oxygen in river at Khanjahanpur village due to low flow and shallow depth)	Decentralized low cost treatment system like stabilization pond, constructed wetlands, oxidation ditches, etc. to treat wastewater of Badhai Khurd drain.
3.	Kali-West	Niyazupura drain (Untapped) 56.5 Kms	***Round I:*** Flow-17.5 MLD, BOD-119 mg/l & COD-398 mg/l ***Round II:*** Flow-17.07 MLD, BOD-230 mg/l & COD-552 mg/l	***Round I:*** DO-0.4 mg/l, BOD-6 mg/l & COD-13 mg/l ***Round II:*** DO-0.7 mg/l, BOD-12 mg/l & COD-32 mg/l	Not available	No industrial unit identified	Sewage from Niyazupura town	River impacted (Low level of dissolved oxygen in river due to low flow and shallow depth)	• Removal of solid waste. • Decentralized low cost treatment system like stabilization pond, constructed wetlands, oxidation ditches, etc. to treat wastewater of Niyazupura drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
4.	Kali-West	Laddawala drain (Tapped with overflow) 56.6 Kms	***Round I:*** Flow-92.27 MLD, BOD-163 mg/l & **COD-504 mg/l** ***Round II:*** *Origin (*BOD-222 mg/l & COD-508 mg/l) & b/c river Kali-East (Flow-65.94 MLD, BOD-259 mg/l, COD-**1150 mg/l** & TSS-1230 mg/l) • Inadequate tapping arrangement at Laddawala drain leads to overflow of sewage reaching to river Kali-West. • Huge amount of municipal solid waste is dumped into river through Laddawala drain.	Not available	DO-NIL, BOD-38 mg/l & COD-115 mg/l	No industrial unit identified	Sewage from Laddawala, Ramleela Tila, Abkari Mohalla, Hanumanpuri	Industrial impact observed (Discharge of wastewater containing high COD and solid waste in river through Laddawala drain)	• Complete tapping of Laddawala drain to 32.5 MLD STP. • Removal of solid waste. • Action on industries discharging untreated/partially treated effluent into Laddawala drain.
5.	Kali-West	Shamli Road drain (Untapped) 57.6 Kms	***Round I:*** BOD-202 mg/l & **COD-694 mg/l** ***Round II:*** BOD-117 mg/l & COD-291 mg/l (*Flow in the drain could not be measured as drain was flowing*	DO-NIL, BOD-25 mg/l & COD-60 mg/l	Not available	No industrial unit identified	Sewage from Shamli Road area	Industrial wastewater discharge (River stretch polluted-DO is NIL)	• Removal of solid waste. • Action on industries discharging untreated/partially treated effluent into Shamli Road drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			via closed pipeline and dumping of solid waste)						
6.	Kali-West	Khadarwala drain (Tapped with overflow) 57.8 Kms	BOD-164 mg/l & **COD-568 mg/l** • *Inadequate tapping arrangement at Khadarwala drain leads to overflow of sewage reaching to river Kali-West.* • *Flow in the drain could not be measured as drain was flowing via closed pipeline.*	Not available	Not available	No industrial unit identified	Sewage from Krishnapuri and Khalapar towns	Discharge of wastewater containing high COD and solid waste in river through Khadarwala drain	• Complete tapping of Khadarwala drain. • Removal of solid waste.
7.	Kali-West	Krishnapuri drain (Tapped with overflow) 57.9 Kms	BOD-122 mg/l & COD-444 mg/l • *Inadequate tapping arrangement at Krishnapuri drain leads to overflow of sewage reaching to river Kali-West.* • *Flow in the drain could not be measured as drain was flowing via closed pipeline.*	Not available	Not available	No industrial unit identified	Sewage from Krishnapuri and Khalapar towns		• Complete tapping of Krishnapuri drain. • Removal of solid waste.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
8.	Kali-West	Suzroo village drain (Suzroo village drain + Nai-Basti Khalapar drain + treated sewage of 32.5 MLD STP) (Untapped) 60.3 Kms	Flow-25.92 MLD, BOD-111 mg/l, **COD-571 mg/l** & Fe-26.8 mg/l	DO-NIL, BOD-28 mg/l & COD-103 mg/l	DO-NIL, BOD-18 mg/l & COD-72 mg/l	No industrial unit identified	Untreated sewage from Suzroo village drain, Nai-Basti Khalapar drain and treated sewage of 32.5 MLD Waste Stabilization Pond based STP	Polluted river stretch (DO is NIL)	• Tapping of sewage from Suzroo village & Nai-Basti Khalapar to 32.5 MLD STP. • Removal of solid waste. • Ensuring compliance and upgradation of 32.5 MLD Waste Stabilization Pond based STP.
9.	Suzroo village drain (Suzroo village drain + Nai-Basti Khalapar drain + treated sewage of 32.5 MLD STP) (Untapped)	Suzroo village drain (2nd order & untapped)	Flow-6.48 MLD, BOD-63 mg/l & COD-224 mg/l	Not available	Not available	No industrial unit identified	Suzroo village	Untreated sewage discharged into river via Suzroo village drain	• Removal of solid waste. • Adoption of decentralized low cost treatment system like stabilization pond, constructed wetlands, oxidation ditches, etc. to treat wastewater of Suzroo village drain.
		Nai Basti Khalapar drain (2nd order & untapped)	Flow-17.59 MLD, BOD-36 mg/l & COD-135 mg/l	Not available	Not available	No industrial unit identified	Sewage from Nai-Basti Khalapar area	Untreated sewage discharged into river via Nai-Basti Khalapar drain	• Removal of solid waste. • Adoption of decentralized low cost treatment system like stabilization pond, constructed wetlands, oxidation ditches, etc. to treat wastewater of Nai Basti Khalapar drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
10.	Kali-West	Dhandera drain (Untapped) 74.8 Kms	At origin (near Tehri Pulp & Paper Ltd.) Flow-0.58 MLD, BOD-20 mg/l & COD-90 mg/l *Drain at this location receive discharge from Tehri Pulp & Paper Ltd. In downstream, an irrigation canal from Chandpur village meets Dhandera drain, which was found dry at the confluence, with no fresh water being discharged into the drain.* D/s Bhopa Road (near Silvertoan Papers Ltd.) Flow-19.3 MLD, BOD-30 mg/l, COD-137 mg/l & TDS-1080 mg/l B/c Jatt Mujhera drain Flow-54.23 MLD, **BOD-948 mg/l, COD-2011 mg/l, TDS-2808 mg/l & TSS-1188 mg/l**	DO-NIL, BOD-26 mg/l & COD-65 mg/l	DO-NIL**, BOD-348 mg/l & COD-1001 mg/l**	45 units in catchment of Dhandera drain (32), Jatt Mujhera drain (5), Kukra drain (2) & Begrajpur Industrial drain (6)	Sewage from towns/colonies located at Bhopa Road, Jansath Road, and Sahawali & Sandhawali villages (via Kukra drain).	Industrial impact observed (DO is NIL & significant increase in BOD and COD in river due to discharge of high BOD, COD, TSS & TDS bearing wastewater into river via Dhandera drain)	• Action on industries discharging untreated/partially treated effluent into Dhandera drain. • Upgradation of ETPs installed in industries located in catchment of the drain. • Series of CWs in Dhandera drain B/c with river Kali-West.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			Round 1: Flow-148.18 MLD, **BOD-547 mg/l, COD-1322** mg/l & TDS-1856 mg/l ***Round 2:*** Flow-112.13 MLD, **BOD-968 mg/l, COD-2214 mg/l, TDS-2452 mg/l & TSS-1622 mg/l** *(Drain carry effluents from industries located on Bhopa Road, Jolly Road, Jansath Road, Meerut Road and Begrajpur industrial area)*						
11.	Dhandera drain (Untapped)	Jatt Mujhera drain (2rd order & untapped)	At origin (D/s Bindal Duplex Pvt. Ltd.) BOD-103 mg/l, COD-280 mg/l & TDS-1096 mg/l *(Drain contained very less flow which could not be measured)*	Not available	Not available	05 non-conforming GPIs (Pulp & Paper and Distillery)	No discharge of domestic sewage/STP/ CETP	Industrial impact observed (discharge of high BOD, COD, TSS & TDS bearing wastewater into river via Jatt Mujhera drain)	• Action on industries discharging untreated/partially treated effluent into Jatt Mujhera drain.
			B/c Dhandera drain Flow-8.06 MLD, **BOD-2230 mg/l, COD-4264 mg/l,**	Not available	Not available				

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			TSS-1230 mg/l & TDS-4148 mg/l						
	Dhandera drain (Untapped) *At Jansath Road (a/c with Jatt Mujhera drain)*	-	***Round 1:*** Flow-66.99 MLD, pH-5.9, Colour-146 Hazen, **BOD-922 mg/l, COD-2106 mg/l, TSS-1357 mg/l, TDS-3548 mg/l, Fe-26.72 mg/l, Pb-0.13 mg/l, Mn-3.31 mg/l & Zn-5.43 mg/l** ***Round 2:*** **BOD-1114 mg/l, COD-2413** mg/l, TDS-3164 mg/l & TSS-924 mg/l *(Formation of sludge blanket and solid waste deposition)*	Not available	Not available	32 non-conforming units (GPIs-29 & non-GPIs-3) comprising of Pulp & Paper, Slaughter House, Tannery, Pharmaceuticals & Food Processing industries	No discharge of domestic sewage/STP/ CETP	Industrial impact observed (discharge of high BOD, COD, TSS, TDS and metals bearing wastewater into river via Dhandera drain)	• Action on industries discharging untreated/partially treated effluent into Dhandera drain.
	Dhandera drain (Untapped)	Kukra drain (2nd order & untapped)	Near village Sandhawali (b/c with Dhandera drain) Flow-26.47 MLD, BOD-62 mg/l & COD-219 mg/l	Not available	Not available	02 non-conforming GPIs (Pulp & Paper)	Sewage from Sahawali & Sandhawali towns	Impact observed (discharge of untreated sewage into river via Kukra drain	• To expedite construction of proposed 22 MLD STP to treat the sewage of Kukra drain & tap the drain to the STP.
	Dhandera drain (Untapped) *(A/c Kukra drain at*	-	**BOD-495 mg/l, COD-2080 mg/l, TDS-2076 mg/l & TSS-1838 mg/l**	Not available	Not available	45 units in catchment of Dhandera drain (32), Jatt Mujhera drain (5), Kukra drain (2)	No discharge of domestic sewage/STP/ CETP	Industrial impact observed (discharge of high BOD, COD, TSS &	• Action on industries discharging untreated/partially treated effluent into Dhandera drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
	Meerut-Haridwar Bypass Road)		*(Flow not measured due to unapproachable site)*			& Begrajpur Industrial drain (6)		TDS bearing wastewater into river via Dhandera drain)	
12.	Dhandera drain (Untapped)	Begrajpur Industrial Area drain (2nd order & untapped)	B/c Dhandera drain ***Round 1:*** Flow-1.92 MLD, **pH-2.3, Colour-146 Hazen, BOD-936 mg/l, COD-3444 mg/l, TDS-7884 mg/l,** Fe-27.96 mg/l, Pb-0.24 mg/l, Mn-3.72 mg/l & Zn-6.48 mg/l ***Round 2:*** Flow-1.73 MLD, **pH-<2, BOD-187 mg/l, COD-474 mg/l, TDS-2584 mg/l, Fe-8.91 mg/l, Pb-0.7 mg/l, Mn-10.9 mg/l & Zn-17.67 mg/l** *(Acidic fumes felt in Begrajpur Industrial Area drain)*	Not available	Not available	06 conforming non-GPIs (Pharmaceuticals & Dyeing)	No discharge of domestic sewage/STP/ CETP	Industrial impact observed (discharge of highly acidic and high color, BOD, COD, TDS and metals bearing wastewater into river via Begrajpur Industrial Area drain)	• Action on industries discharging untreated/partially treated effluent into Begrajpur Industrial Area drain.
13.	Kali-West	Mansoorpur drain (Untapped) 75.5 Kms	***Round 1:*** Near Husenpur Bopara village (**pH-4.9, BOD-571 mg/l, COD-1426 mg/l & TDS-1000 mg/l)**	Not available	***Round 1:*** **DO-NIL, BOD-65 mg/l & COD-293 mg/l**	02 non-conforming GPIs (Sugar-01 & Distillery-01)	Sewage from Mansoorpur Sugar Mill Road area	Industrial impact observed on river (DO-NIL & high BOD/COD)	• Removal of solid waste. • Action on industries discharging untreated/partially treated effluent into Mansoorpur drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			(Flow could not be measured due to deposition of solid waste) ***Round 2:*** Origin (BOD-60 mg/l & COD-222 mg/l) Near Husenpur Bopara village (Flow-3.13 MLD, **BOD-579 mg/l, COD-1261** mg/l, TDS-2188 mg/l) B/c river Kali-West (Flow-0.98 MLD, **BOD-404 mg/l, COD-870 mg/l, TDS-2024 mg/l** & Fe-15.13 mg/l)	***Round 2:*** DO-NIL, **BOD-111 mg/l & COD-436 mg/l**	***Round 2:*** DO-NIL, **BOD-87 mg/l & COD-302 mg/l**				
14.	Kali-West	Pur Baliyan drain (Untapped) 76.4 Kms	***Round 1:*** Flow-1.99 MLD, BOD-188 mg/l & COD-425 mg/l ***Round 2:*** Origin (BOD-174 mg/l, COD-479 mg/l & TDS-1328 mg/l) B/c river Kali-West (Flow-2.51 MLD,	Not available	***Round 1:*** DO-NIL, BOD-175 mg/l & COD-374 mg/l ***Round 2:*** DO-NIL, BOD-96 mg/l & COD-272 mg/l	No industrial unit identified	Sewage from Pur Baliyan village	River impacted (DO is NIL & high BOD and COD)	• Removal of solid waste, animal waste & cow dung at origin of the drain. • Decentralized low-cost treatment system like stabilization pond, Constructed Wetland, oxidation ditches etc. in river Hindon in Pur Baliyan drain.

S. No.	River/Drain	Tributary/ Drains/ Canal	Drain (Flow, BOD, COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			BOD-252 mg/l & COD-520 mg/l)						

4.3 Meerut and Baghpat Districts

Table 4 Action required to improve water quality of river Hindon in Meerut and Baghpat districts

Sl. No.	River	Tributary/ Drains/Canal	Drains/Canal (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c	A/c	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
1.	Hindon	Kali-West (~196.04 km)	Flow-285.24 MLD, DO-NIL, **BOD-138 mg/l, & COD-336 mg/l**	***Round II:*** DO-NIL, BOD-11 mg/l & COD-50 mg/l (~195.43 km)	***Round II:*** DO-NIL, **BOD-123 mg/l & COD-287 mg/l** (~203.49 km)	Discharge from industrial units located in the catchment of river Kali West.	Sewage discharged from Muzaffarnagar city and nearby town/villages	• High impact due to discharge of R. Kali-West carrying industrial and domestic wastewater (water quality deteriorated) • Polluted stretch from b/c & a/c of Kali West	• Action on industrial units discharging untreated/partially treated effluent. • Domestic sewage diverted to nearby STP. • Treatment of domestic sewage of nearby villages by using decentralize low cost sewage treatment system. • Constructed Wetland in river

Sl. No.	River	Tributary/ Drains/Canal	Drains/Canal (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c	A/c	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
									Kali-West B/c with river Hindon near Baparsi village, Meerut.
2.	Krishni	Ramala drain (Baghpat) (~118.57 Km)	At Budhpur village Flow-0.6 MLD, BOD-11 mg/l & COD-59 mg/l	**Near Budhpur village** DO-NIL, BOD-16 mg/l & COD-71 mg/l	**Near Gopalpur Khandwa** DO-NIL, BOD-16 mg/l, & COD-74 mg/l	**GPI-01 No.** M/s Ramala Sahkari Chini Mill (Conforming area)	Sewage discharging from Ramala village and Budhpur village and agricultural runoff and there is possibility of discharge from sugar Mill	• Untreated sewage discharge and agricultural runoff (water quality deteriorated). • Polluted stretch from b/c & a/c of Ramala drain.	Treatment of domestic sewage of nearby villages by using decentralize low cost sewage treatment system.
3.	Hindon	River Krishni (Baghpat) (~223.13 km)	At Gopalpur Khadana (Baghpat) DO-NIL, BOD-16 mg/l, & COD-74 mg/l	Near Barnawa village (Baghpat) DO-NIL, BOD-59 mg/l & COD-185 mg/l (~221.13 km)	Near Kalina Village (Meerut) DO-NIL, BOD-52 mg/l & COD-159 mg/l (~230.43 km)	Discharge from industrial units located in the catchment of river Krishni.	Sewage discharging from nearby village	• River is polluted. • Discharge of Untreated sewage. • Polluted stretch from b/c & a/c of river Krishni.	Treatment of sewage of nearby villages by using decentralize low cost sewage treatment system.
4.	Hindon	Sardhana drain at Kalina village (Meerut)	At Kalina Village ***Round I:*** Flow- 33.43 MLD, **Color-370 Hazen BOD-263 mg/l, COD-770 mg/l &** Fe-4.527 mg/l	At Kalina Village ***Round I:*** DO-NIL, BOD-52 mg/l & COD-159 mg/l ***Round II:***	At Kinauni Vill. (b/c of Kinauni drain) ***Round I:*** DO-NIL, **BOD-147 mg/l & COD-268 mg/l**	**GPIs-03 Nos.**: (Paper-01, &Textile-02) **Non-GPI-01 No.**: Dairy-01	• Discharge of sewage from Sardhana town, Kalina Village and nearby village	• High impact due to discharge of industrial effluent and disposal of cattle dung,	• Action on industries discharging untreated/partially treated effluent. • Treatment of sewage of nearby

Sl. No.	River	Tributary/ Drains/Canal	Drains/Canal (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c	A/c	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
		(~230.63 km)	At Kalina Village ***Round II:*** Flow- 16.85 MLD, Colour- 5 Hazen, **BOD- 460 mg/l, COD- 1555 mg/l, TSS-1173** & **Fe-10.74 mg/l** (~230.43 km)	DO-NIL, **BOD-110 mg/l & COD-286 mg/l** (~234.13 km)	At Kinauni Vill. (a/c of Sardhana drain & Kinauni Drain-Dry) ***Round II:*** DO-NIL, **BOD-163 mg/l & COD-348 mg/l** (~234.63 km)	04(nos.) industries namely M/s Sardhana Paper, M/s Shri Babubali Trader, M/s Shree Krishna Processing, & M/s Sardhana Dairy, Sardhana Road Meerut.	and Industrial effluents. • Drain was filled with Municipal Solid Wastes at various locations • Large number of dairy farm along drain and deposition of huge quantity of animal dung in the drain.	solid waste and sewage. • Polluted stretch from b/c & a/c of Sardhana drain.	villages by using decentralize low cost sewage treatment system. • Solid waste should be removed from the drain. • Cow dung and animal wastes should be removed from drain and follow up of guideline by dairy farms for disposal of animal dung. • STP of adequate capcity in Sardhana town. • Tapping of drains & inventory of industrial units in the catchment of drain. • Constructed Wetland in Sardhana drain B/c with river Hindon.

Sl. No.	River	Tributary/ Drains/Canal	Drains/Canal (Flow, BOD COD or any specific pollution)	Water quality of river stretch		Pollution sources		Key issues	Action Points
				B/c	A/c	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
5.	Hindon	Kinauni drain (~234.51 km)	At Kinauni village **Round 1:** Dry **Round 2:** Dry	Near Kinauni village **Round 1:** DO-NIL, BOD-147 mg/l & COD-268 mg/l (~234.45 km) **Round 2:** Sampling not done	Near Kinauni village **Round 1:** DO-NIL, BOD-140 mg/l & COD-288 mg/l **Round 2:** DO-NIL, BOD-163 mg/l & COD-348 mg/l (~234.63 km)	**GPI-02 No.** (Conforming area) M/s Bajaj Hindustan Ltd, (Sugar Unit) Village Kinauni, Meerut M/s Bajaj Hindustan Ltd, (Distillery Unit) Village Kinauni, Meerut	No significant flow, bed of drain was wet indicating industrial discharge	-	Inventory of drains carrying domestic wastewater from Kinauni village and treatment of sewage by using decentralized low cost sewage treatment system.
6.	Hindon	Upper Ganga canal (~249.33 km)	Not available	Near Pura village **Round 1:** DO-NIL, BOD-113 mg/l & COD-215 mg/l (~244.73 km)	at Amirpur Baleni **Round 1:** DO-5.96 mg/l, BOD-10 mg/l & COD-30 mg/l (~251.63 km)	No industrial unit identified	Upper Ganga canal is a fresh water source from river Ganga.	• Small drains from Pura village discharging into river. • Improvement observed in river water quality due to release of fresh water from Upper Ganga Canal.	• Inventory of drains discharging from Pura village and Amirpur Baleni. and treatment of sewage by using decentralize low cost sewage treatment system. • Constructed Wetland in river Hindon before intrusion of freshwater from the Upper Ganga Canal.

4.4 Ghaziabad District

Table 5 Action required to improve water quality of river Hindon in Ghaziabad district

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
1	Hindon	Jawli drain (First Order) Untapped (Approx. 300.13 km)	***Round I:*** BOD-33 mg/L, COD-107 mg/L, **TDS-2216 mg/L Chloride-1049** mg/L ***Round II:*** BOD-55 mg/L, COD-221 mg/L, **TDS-4600 mg/L Mn-4.056** mg/L Flow could not be measured because depth measurement not possible/less flow	Not available ***Round II:*** DO: 1.03 mg/l BOD: 3 mg/l COD: 25 mg/l Pb: 0.23 mg/l	***Round I:*** DO: 2.32 mg/l BOD: 4 mg/l COD: 21 mg/l ***Round II:*** DO: 0.87 mg/l BOD: 3 mg/l COD: 27 mg/l Pb: 0.25 mg/l	**Total-44** 43 GPIs: Textile dying (07), Yarn/Textile processing (36) 1 Non-GPI: Yarn/Textile processing (01)	Carries discharge of CETP Tronica city and sewage from nearby villages	• Polluted stretch due to industrial impact. • Low DO observed may be due to stagnant water of the river	• Removal of Solid waste • Action on industries in catchment of the drain • Upgradation and ensuring compliance of CETP Tronica city. • Constructed Wetlands on Jawali drain B/c with river Hindon.
2	Hindon	Raj Nagar extension drain (First Order) Untapped (Approx. 307.09 km)	Flow-48 MLD, BOD- 36 mg/L, COD- 117 mg/L **TDS-1020 mg/L**	DO: 0.57 mg/l BOD: 4 mg/l COD: 38 mg/l Pb: 0.15 mg/l	DO: 0.71 mg/l BOD: 4 mg/l COD: 30 mg/l Pb: 0.51 mg/l	No industrial unit identified	Carries treated sewage from Noon Nagar Morty 56 MLD STP, and sewage from open drains	Low impact observed due to untreated sewage discharge	• Removal of Solid waste. • Interception & diversion of drain to Noon Nagar Morty 56 MLD STP before confluence of treated sewage.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
									• Ensuring compliance of Noon Nagar Morty 56 MLD STP.
3	Hindon	Karedha Drain (First Order) Untapped (Approx. 309.44 km)	***Round I:*** BOD-167 mg/l, **COD-538 mg/l**, TSS-522 mg/l, **TDS-2376 mg/l, Chloride-1039 mg/l,** NH_3-N- 54 mg/l, **Fe-111.17 mg/l, Pb- 3.37 mg/l, Zn- 6.315mg/l** ***Round II (1st Occasion):*** BOD-139 mg/L, **COD-529 mg/L, TDS-2608 mg/L Pb- 0.251 mg/l** ***Round II (2nd Occasion):*** BOD-158 mg/L, **COD-639 mg/L, TDS-1980 mg/L** Fe-8.167 mg/l Pb- 0.149 mg/l (Flow measurement not possible because no straight line	DO: 0.85 mg/l BOD: 5 mg/l COD: 22 mg/l	Not available	**Total – 10** 9 GPIs: Paper (01), Yarn/Textile processing (07) Metal Surface Treatment (01) 1 Non-GPI: Textile (01) (Washing and digital printing of fabric) Paper printing, automobile service, furniture moulding and fabrication, glass printing, MS wire drawing, electrical cable manufacturing and processing units were observed operating in catchment of drain	Sewage from Karedha area	• Polluted stretch from U/s Karedha drain to D/s Hindon Vihar drain. • Mixed impact due to discharge of untreated sewage and industrial discharge.	• Removal of Solid waste • Action on industries in catchment of the drain • Inventory of non-GPI water polluting industries in catchment of drain including metal recycling/processing /fabricating/galvanizing/painting/moulding. • Constructed Wetland on Karedha drain B/c with river Hindon.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			stretch available and there was dumping of solid waste)						
4	Hindon	Hindon Vihar Left (First Order) Untapped (Approx. 310.73 km)	***Round I:*** Flow-11.41 MLD, BOD- **181** mg/l, **COD- 574 mg/l, TDS-1344 mg/l** ***Round II:*** Flow-16.6 MLD, **BOD- 302 mg/l, COD- 803 mg/l,** TSS-601 mg/l	***Round II*** U/s Hindon Vihar Drain **DO: NIL BOD: 13 mg/l** COD: 60 mg/l Fe-4.77 mg/l	***Round I*** D/s Karedha + Hindon Vihar Drain DO: 1.41mg/l BOD: 3 mg/l COD: 21 mg/l ***Round II*** D/s Hindon Vihar Drain **DO: NIL BOD: 13** mg/l COD: 74 mg/l Fe-3.75 mg/l	No industrial unit identified	• Hindon Vihar left and right are concrete drains that conjoint together and form Hindon Vihar drain that ultimately discharges into the river Hindon after joining. After joining, the sampling is not possible due to non-approachability • Carry **domestic sewage** from household of Hindon vihar area • Large amount of cow dung observed		• Removal of Solid waste • Remediation using low-cost decentralized wastewater treatment systems such as series of constructed wetlands in both Hindon Vihar drains. • Inventory of water polluting industries in catchment of both Hindon Vihar drains. • Series of Constructed Wetlands in river Hindon A/c with Hindon Vihar drain.
5	Hindon	Hindon Vihar Right (First Order) Untapped (Approx. 310.73 km)	***Round I:*** Flow-15.65 MLD, **BOD- 639 mg/l, COD- 2018 mg/l, TSS-4766 mg/l,** Fe-38.021 mg/l, Pb- 0.124 mg/l ***Round II:*** Flow-7.85 MLD, **BOD- 168 mg/l**, **COD- 656 mg/l** TSS-639 mg/L						
6	Hindon	Kaila Bhatta Drain (First Order) Untapped	Flow-33.97 MLD, BOD- 71 mg/l, COD- 278 mg/l, **TDS-1736 mg/l,**	Not available	(*Downstream Hindon Barrage*) DO: 5.44* mg/l BOD: 6 mg/l	**Total-15** 12 GPIs: Pharmaceutical (02), Metal Surface	Carry sewage from Nava Jeevan Leprosy Colony, Madhopura area	Improvement in river water quality	• Action on industries in catchment of the drain • Remediation using low-cost

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
		(Approx. 313.07 km)			COD: 22 mg/l *Increased DO maybe due to turbulence and churning of water release from barrage	Treatment (08), Textile (01), Tannery (01) 3 Non-GPI: Pharmaceutical (01), Engineering (01) and Others paper board (01)			decentralized wastewater treatment system on kaila Bhatta drain.
7	Hindon	Arthala Drain (First Order) Untapped (Approx. 313.63 km)	BOD- 52 mg/l, COD- 208 mg/l, **TDS-2256 mg/l, Fe-65.021 mg/l, Pb- 0.198 mg/l**	Not available		**Total – 2** 1 GPI: Distillery- Mohan Meakin Ltd. Mohan Nagar Ghaziabad 1 Non-GPI: Metal Surface Treatment- Balaji wire Pvt ltd., 139-A, Anand Ind. Estate, Mohan Nagar, Ghaziabad.	Carry sewage from Arthala village	-	• Action on industries in catchment of the drain. • Remediation using low-cost decentralized wastewater treatment system on Arthala drain.
8	Hindon	Indirapuram Drain (First Order) Untapped (Approx. 316.86 km)	Colour- 98 Hazen, BOD- 88 mg/L, COD- 285 mg/L, **TDS-1320 mg/L**	U/s Indirapuram Drain DO: 6.4 mg/l BOD: 5 mg/l COD: 21 mg/l	Not available	No industrial unit identified	Carries combined discharge from 03 STPs in Indirapuram i.e. 74 MLD, 56 MLD and 56 MLD (***Sahibabad drain, which is an industrial drain, is also tapped to 74 MLD STP at*	-	• Ensuring compliance and upgradation of all STPs whose wastewater is carried by Indirapuram drain. • Action on industries in catchment of the Sahibabad drain**.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
							Indirapuram. All three STPs located in Indrapuram are non-complying w.r.t. discharge standards.)		• Constructed Wetlands on Indirapuram drain B/c with river Hindon. • CETP of adequate capacity shall be installed.
9	Hindon	Pratap Vihar Drain (First Order) Untapped (Approx. 317.03 km)	Flow-27.91 MLD, Colour- 123 Hazen, BOD- 102 mg/L, COD- 422 mg/L	Not available		No industrial unit identified	Domestic sewage from household of Pratap vihar area	-	• Remediation using low-cost decentralized wastewater treatment systems on Pratap Vihar drain. • New STP along with sewage network with future projection shall be installed. • Interception & diversion of Pratap Vihar drain to STP.
10	Hindon	Rahul Vihar Drain (First Order) Untapped (Approx. 317.24 km)	***Round I*** Colour- 145 Hazen **BOD- 206 mg/L,** **COD- 736 mg/L,** **TDS- 2664 mg/L,** TSS- 734 mg/L, **Chloride-1940** mg/L, Fe-3.254 mg/l ***Round II***	Not applicable ***Round II***	***Round I*** D/s Indirapuram + Pratap Vihar + Rahul Vihar drain DO: 2.25 mg/l **BOD: 15 mg**/l COD: 44 mg/l ***Round II***	Industrial impact observed but no industrial unit identified	Domestic sewage from household of Rahul Vihar area	• Integrated impact from untreated wastewater carried by prior drains namely Indirapuram, Pratap Vihar and Rahul Vihar drain • Deterioration of water quality in stretch from U/s	• Removal of Solid waste. • Action on industries in catchment of the drain. • Remediation using low-cost decentralized wastewater treatment systems on Rahul Vihar drain.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			BOD- 176 mg/L, **COD- 743 mg/L, TDS- 2784 mg/L,** TSS- 550 mg/L, **Chloride-1213** mg/L, Fe-5.084 mg/l (Flow measurement not possible because no straight line stretch available and due to solid waste dumping)	U/s Rahul Vihar drain DO: 4.2 mg/l BOD: 11 mg/l COD: 45 mg/l	D/s Rahul Vihar drain DO: NIL **BOD: 28 mg/**l COD: 139 mg/l			to D/s Rahul Vihar drain	• Series of Constructed Wetlands in river Hindon A/c with Rahul Vihar drain.
11	Dasna Drain (First Order)	Bhoorgarhi – Kalugarhi Drain (Second Order) Untapped *Kalugarhi drain joins Bhoorgarhi drain and forms Dasna drain*	Colour-167 Hazen BOD-97 mg/L, COD-329 mg/L, TDS-1552 mg/L, Fe-7.698 mg/l Flow could not be measured because depth measurement not possible	Not available		**Total – 7** 07 GPIs: Pulp & Paper (01), Tannery (02), Metal Surface Treatment (01), Slaughter House (03)	Untreated sewage from households of Bhoorgarhi village and Kalugarhi village	-	• Removal of Solid waste • Action on industries in catchment of the drain. • Remediation using low-cost decentralized wastewater treatment systems on Dasna drain.
12	Dasna Drain (First Order)	B.S. Road Drain (Second Order) Untapped	BOD- 84 mg/L, COD- 259 mg/L Fe-5.296 mg/l	Not available		No industrial unit identified	Carry untreated sewage from B.S. Road Industrial area	-	• Removal of Solid waste.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
			Flow could not be measured because depth measurement not possible						• Inventorization of small-scale industrial units.

Sl. No.	River	Tributary/ Drains/Canal	Drain (Flow, BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/ Domestic sewage from towns		
1	Shahdara drain (First Order of River Yamuna)	Sahibabad Drain (Second Order of River Yamuna) Tapped	Flow-111.81 MLD (overflow)** BOD-155 mg/L, COD-489 mg/L, TDS-2408 mg/L, Fe-14.971 mg/l **97 MLD measured from tapping channel + 5 MLD approx. from Vaishali drain + 10% considered for overflow + 5 MLD approx. from Vaishali drain; Total 111.8 MLD (97+5=102 MLD is tapped to 74 MLD Indirapuram STP and rest is discharged into Shahdara drain)	Not available		**Total – 75** 73 GPIs: Dairy (02), Engineering (01), Metal Surface Treatment (19), Pharma (01), Pulp & Paper (01), Slaughter house and Meat (06), Yarn/Textile processing (41), Textile Dyeing (02) 2 Non-GPI: Metal Surface Treatment (01), Yarn/Textile processing (01)	• Domestic sewage of unauthorized and authorized colonies, and solid waste being dumped by the residents nearby • Tapped into 74 MLD STP Indirapuram that is non-complying • Visually black coloured sewage at inlet of Indirapuram 74 MLD STP	Carry mixed untreated effluent into recipient drain	• Removal of Solid waste. • Action on industries in catchment of the drain. • New STP along with sewage network with future projection shall be installed. • CETP of adequate capacity shall be installed.
2	Shahdara drain (First Order of River Yamuna)	Indirapuri Drain (Second Order of River Yamuna) Untapped	BOD- 90 mg/L, COD- 242 mg/L, TDS-2112 mg/L, Mn-3.668 mg/l, Sulphate-182 mg/L	Not available		Not reported/ No industrial unit identified	Domestic sewage of unauthorized and authorized colonies, and solid waste being dumped by the residents nearby	Carry mixed untreated effluent into recipient drain	• Removal of Solid waste. • Inventorization of small-scale industrial units. • New STP along with sewage network with future projection shall be installed.

3	Shahdara drain (First Order of River Yamuna)	Banthala drain (Third Order of River Yamuna) Untapped ***Location near receiving Industrial effluent***	***Round I:*** pH-2.5 BOD- 234 mg/L, COD-460 mg/L TDS- 13060 mg/L TSS- 833 mg/L Sulphate-471 mg/L Cr-12.698 mg/l Cu-52.199 mg/l Fe-6035.98 mg/l Pb-2.398 mg/l Mn- 58.199 mg/l Ni-19.798 mg/l Zn-791.793 mg/l Co-0.98 mg/l ***Round II:*** Flow-2.3 MLD pH-<2 COD- 633 mg/L TDS- 19352 mg/L TSS- 756 mg/L Fe-15.86 mg/l Pb-0.265 mg/l	Not available	Illegal industrial units operating in the catchment of Banthala drain: Soap manufacturing unit (01) (Non-operational); Metal processing (04) treatment by using acids; Garment washing unit without ETP (01). **Ponding of wastewater near soap factory was observed. Samples of wastewater were collected and analysis results showed BOD-762 mg/l, COD-1748 mg/l, TSS-1118 mg/l, TDS-3004	Solid waste dumping was observed.	Carry mixed untreated effluent into recipient drain	• Removal of Solid waste. • Inventory of water polluting industries (GPIs & non-GPIs). • Action on unauthorized industrial units. • Identification and action against the source of discharge of high metal bearing acidic effluent into Banthala drain. • Preparation of an action plan for interception, diversion and treatment of Banthala drain. • CETP of adequate capacity shall be installed.

4	Shahdara drain (First Order of River Yamuna)	Banthala drain (Third Order of River Yamuna) Untapped ***Location before confluence with Indirapuri drain***	***Round I*** BOD- 175 mg/L, COD- 611 mg/L TDS- 1604 mg/L TSS- 862 mg/L Sulphate-136 mg/L Fe-12.483 mg/l ***Round II*** BOD-119 mg/l COD- 673 mg/L TDS- 1580 mg/L TSS- 568 mg/L Sulphate-150 mg/L Fe-19.34 mg/l Mn-2.041 mg/l	Not available	mg/l, Chloride-485 mg/l, Sulphate-650 mg/l and high concentrations of metals (Cr-2.378 mg/l, Cu-10.53 mg/l, Fe-1732 mg/l, Pb-0.724 mg/l, Mn-12.84 mg/l, Ni-12.84 mg/l and Zn-168.6 mg/l) which indicated that industries in the catchment discharge wastewater outside their premises which formed a pond of wastewater on land in the vicinity of Banthala drain			

4.5 Noida & Greater Noida Districts

Table 6 Action required to improve water quality of river Hindon in Noida and Greater Noida districts

Sl. No.	River	Tributary/ Drains/Canal	Drain/River (flow , BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
1.	Hindon (323.01 km)	Dasna Drain near Yusufpur village	**Flow- 412.06** MLD BOD-73 mg/l COD-356 mg/l (*High organic load is contributed by Dasna drain i.e. 30.07 TPD)*	DO- NIL BOD-9 mg/l COD-48 mg/l	DO-NIL BOD-29 mg/l COD-93 mg/l	**Conforming Area** **GPI-01**(Pulp & Paper)/ **Non-GPI-03** (Metal Surface Treatment)	Sewage from Ghaziabad town	River water quality is deteriorating due to the impact of drain discharge into river which carried industrial and sewage discharge.	• Action on industries discharging untreated effluent in the catchment area.
2.	Dasna Drain	Gaur City (2nd Order- Meets to Dasna Drain)	Flow- Not Measured due to unapproachable site BOD-90 mg/l COD-280 mg/l	**Not available**	**Not available**	**Not available**	Sewage from Gaur city's residential areas.	Impact was observed as high BOD due to sewage discharges.	• Action on industries discharging untreated effluent in the catchment area. • STP may shall install for treatment of sewage discharges from Gaur City residential area. • Series of Constructed Wetlands on Dasna drain B/c with river Hindon.

Sl. No.	River	Tributary/ Drains/Canal	Drain/River (flow , BOD COD or any specific pollution)	Polluted river stretch		Pollution sources		Key issues	Action Points
				B/c (in case of drain)	A/c (in case of drain)	Industrial Unit (GPI/Non-GPI and Conforming/ Non-Conforming area)	STP/CETP/Domestic sewage from towns		
3.	Hindon (355.68 km)	Hawaliya Drain	Flow- Not Measured due to unapproachable site BOD-19 mg/l COD-97 mg/l *It originates from Surajpur wetland which carries industrial area site-B & site-4 and residential areas like-Gamma-1 Knowledge park-II etc*	**Not available**	DO-NIL BOD-22 mg/l COD-74 mg/l	**Conforming Area** **GPI-16** (Textile/Dyeing, Paper Mill, Tannery)/ **Non-GPI-47** (Metal Surface Treatment, Security Hologram Stickers, Dyeing, Paint & Varnishes, Yarn/Textile Processing, Anodizing, Beverage (Carbonated, Soft Drinks, Soda., Food Industry, Plastic Moulded Components with Electroplating, Rice Mill, Automobile, Slaughter House)	Sewage from Gr. Noida and nearby villages	Low Impact	• Action on industries discharging untreated effluent in the catchment area. • Adoption of interim bio/phyto-remediation measures in the drain. • Remediation of unchannellized sewage through Constructed Wetland system.
4.	Hawaliya Drain	Kot Escape (2nd Order)	Flow-Not Measured BOD-5 mg/l COD-57 mg/l	**Not available**	**Not available**	**Conforming Area** **GPI-01** (Power Plant)/	Sewage from NTPC dadri, Kot Village, kasana, omnicorn, Sigma, Xu and 137 MLD STP Kasana.	No Impact	• Remediation of unchannellized sewage through Constructed Wetland system.
5.	Yamuna	Hindon (approx. 357.55 Km)	**Not available**	DO-Nil BOD- 17 mg/l COD-67 mg/l	DO-Nil BOD- 14 mg/l COD-52 mg/l	**Not available**	Discharge of River Hindon.	No Impact	No Action required

CHAPTER-5: GROUNDWATER QUALITY ASSESSMENT

To assess groundwater quality, total 31 samples of groundwater were collected from borewell/ hand pumps and tube wells from six districts – Saharanpur (8 Samples), Muzaffarnagar (8 Samples), Meerut (3 Samples), Baghpat (2 Samples), Ghaziabad (7 Samples), and Noida/ Greater Noida (3 Samples) within 500 meters' radius of river Hindon and its tributaries. All samples were analysed for general parameters as well as heavy metals. The groundwater samples were compared with prescribed specification of ionic concentration in groundwater by WHO standards (1996). The determination of Physio-chemical parameters of groundwater samples was carried out by standard protocol given by APHA, 2012.

5.1 Criteria for Classification of Groundwater

The classification of groundwater is carried out on basis of Total Dissolved Solids (TDS), Total Hardness (TH) and sodium adsorption ratio (SAR). On the basis of TDS values, as TDS<300 mg/l, 300-600 mg/l, 600-900 mg/l, 900-1200 and >1200mg/l, designated as excellent good, fair, poor and unacceptable respectively (Ahouansou et al., 2018; **Annexure-I**). Classification based on total hardness (TH) values, as TH<75 mg/l, 75-150 mg/l, 150-300 mg/l and >300mg/l, designated as soft, moderately hard, hard and very hard respectively (Sawyer and McCarty, 1967). The sodium adsorption ratio (SAR) calculated for all groundwater samples. It is an indicator of the suitability of water for use in agricultural irrigation, as determined from the concentrations of the Sodium, Calcium and Magnesium ratio. The value <10, 10-18, 18-26 and >26 suggest excellent, good, doubtful and unsuitable water quality for irrigation purpose. Groundwater quality index was calculated based on Ramakrishnaiah et al. 2009 (**Annexure-II**). For quality rating BIS standard as reference concentration were taken in calculation and for parameter where limits are in certain range, the higher value of the BIS standard was taken into consideration. The classification of groundwater is carried out district wise.

5.2 Saharanpur & Shamli Districts

8 groundwater samples collected from Saharanpur district. The analysis result are as follows;

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.0 to 7.6, all sample falls under neutral pH range of water (6.5 - 8.5). Colour was not found in any of the sample. COD varied from BDL to 35 mg/l, the high value of COD 35 mg/l found at Sadoli Hariya village, Saharanpur near river Dhamola b/c to river Hindon. The Chloride and Fluoride varies from 12 to 298 mg/l and BDL to 0.5 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.067 to 34.23 mg/l and Mn from BDL to 1.53 mg/l.

TDS Classification

The total dissolved solids content of groundwater varied from BDL to 1186 mg/l. 50% of the total groundwater samples are of excellent water quality (<300 mg/l), 12.5% of good water quality (300-600 mg/l), 25% of fair water quality (600-900 mg/l) and rest 12.5% under poor water quality (900 – 1200 mg/l), indicated that groundwater quality good to fair in terms of TDS (**Table 7**).

Table 7 Classification of groundwater quality in Saharanpur and Shamli districts based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	4	50
300 - 600	Good	1	12.5
600 - 900	Fair	2	25
900 -1200	Poor	1	12.5
>1200	Unacceptable	0	0

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, 37.5% samples belongs to hard water and rest 62.5% samples comprises very hard water (**Table 8**). The result indicates that the groundwater quality in the study area is hard to very hard. Alkalinity has direct relation with hardness and pH of the groundwater. It ranged from 207 to 573 mg/l.

Table 8 Classification of groundwater quality in Saharanpur and Shamli districts based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
<75	Soft	0	0
75-150	Moderately hard	0	0
150-300	Hard	3	37.5
>300	Very hard	5	62.5

SAR Classification

SAR value for Saharanpur groundwater ranged from 0.2 to 2.9, thus indicating excellent water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index suggest that around 37.5% of sample collected is of excellent water quality, 25% of samples falls under poor water quality, whereas all other water quality like, good water, very poor and water unsuitable for drinking has equal share of 12.5% respectively (**Table 9**).

Table 9 Water Quality Index of groundwater in Saharanpur and Shamli districts

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	3	37.5
50-100	Good water	1	12.5
100-200	Poor water	2	25
200-300	Very poor water	1	12.5
>300	Water unsuitable for drinking	1	12.5

5.3 Muzaffarnagar District

8 groundwater samples collected from Muzaffarnagar district. The analysis result are as follows;

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.5 to 8.0, which falls under neutral pH range of water (6.5 - 8.5). Colour ranged from BDL to 78 Hazen. COD varied from BDL to 15 mg/l. The Chloride and Fluoride varies from 8 to 66 mg/l and 0.1 to 0.6 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.01 to 7.9 mg/l and Mn from BDL to 1.34 mg/l.

TDS Classification

The total dissolved solids content of groundwater varied from 207 to 907 mg/l. According to the classification criteria, 50% of the total groundwater samples are of excellent water quality (<300 mg/l), 12.5% of fair water quality (600-900 mg/l) and rest 12.5% of poor water quality (900 - 1200 mg/l), indicated that groundwater quality varies from excellent to fair in terms of TDS (**Table 10**).

Table 10 Classification of groundwater quality in Muzaffarnagar district based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	6	75
300 - 600	Good	0	0
600 - 900	Fair	1	12.5
900 -1200	Poor	1	12.5
>1200	Unacceptable	0	0

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, 75% samples belongs to hard water and rest 25% samples comprises very hard water. The result indicates that the groundwater quality in the study area is hard to very hard. Alkalinity ranged from 182 to 544 mg/l (**Table 11**).

Table 11 Classification of groundwater quality in Muzaffarnagar district based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
75	Soft	0	0
75-150	Moderately hard	0	0
150-300	Hard	6	75
>300	Very hard	2	25

SAR Classification

SAR value for Muzaffarnagar groundwater ranged from 0.1 to 1.7, thus indicating excellent water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index suggest that around 50% of sample collected is of excellent water quality, 37.5% of good water quality and rest 12.5% of poor water quality (**Table 12**).

Table 12 Water quality index of groundwater in Muzaffarnagar district

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	4	50
50-100	Good water	3	37.5
100-200	Poor water	1	12.5
200-300	Very poor water	0	0
>300	Water unsuitable for drinking	0	0

5.4 Meerut District

3 groundwater samples collected from Meerut district. The analysis result are as follows;

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.3 to 7.4 which falls under neutral pH range of water (6.5 - 8.5). Colour and COD of groundwater fall under BDL. The Chloride and Fluoride varies from 16 to 66 mg/l and 0.3 to 0.4 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.405 to 2.28 mg/l and Mn from 0.043 to 0.059 mg/l.

TDS Classification

The total dissolved solids content of groundwater varied from 432 to 578 mg/l. According to the classification criteria, 100% of the groundwater samples comes under good water quality (300 – 600 mg/l) (**Table 13**).

Table 13 Classification of groundwater in Meerut district based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	0	0
300 - 600	Good	3	100
600 - 900	Fair	0	0
900 -1200	Poor	0	0
>1200	unacceptable	0	0

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, 100% of groundwater samples belongs to hard water. Alkalinity ranged from 266 to 419 mg/l (**Table 14**).

Table 14 Classification of groundwater in Meerut district based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
<75	**Soft**	0	0
75-150	**Moderately hard**	0	0
150-300	**Hard**	3	100
>300	**Very hard**	0	0

SAR Classification

SAR value for Meerut groundwater ranged from 1.0 to 1.6, thus indicating all groundwater samples under excellent water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index indicates that around 100% of sample falls under excellent water quality (**Table 15**).

Table 15 Water Quality Index of groundwater in Meerut district

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	3	100
50-100	Good water	0	0
100-200	Poor water	0	0
200-300	Very poor water	0	0
>300	Water unsuitable for drinking	0	0

5.5 Baghpat District

2 groundwater samples collected from Baghpat district. The analysis result are as follows;

Physio-chemical Characterization

Both groundwater samples show pH of 7.7 which falls under neutral pH range of water (6.5 - 8.5). Colour and COD of groundwater fall under BDL. The Chloride and Fluoride varies from 14 to 18 mg/l and 0.2 to 0.3 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.045 to 0.114 mg/l and Mn from 1.1 to 7.8 mg/l.

TDS Classification

The total dissolved solids content of groundwater for both samples was 404 and 829. According to the classification of groundwater based on TDS (Ahouansou et al., 2018), 50% of the groundwater samples falls under good water quality (300 – 600 mg/l) and rest 50% under fair water quality (600 – 900 mg/l) (**Table 16**).

Table 16 Classification of groundwater quality in Baghpat district based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	0	0
300 - 600	Good	1	50
600 - 900	Fair	1	50
900 -1200	Poor	0	0
>1200	unacceptable	0	0

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, as TH<75 mg/l, 75-150 mg/l, 150-300 mg/l and >300mg/l, designated as soft, moderately hard, hard and very hard respectively (Sawyer and McCarty, 1967). Thus, 50% belongs to moderately hard water and rest 50% samples comprises hard water. The result indicates that the groundwater quality in the study area is moderately hard. Alkalinity values were 79 and 112 mg/l (**Table 17**).

Table 17 Classification of groundwater quality in Baghpat district based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
<75	Soft	0	0
75-150	Moderately hard	1	50
150-300	Hard	1	50
>300	Very hard	0	0

SAR Classification

SAR values for Baghpat groundwater sample were 1.1 and 7.8, thus indicating groundwater samples under excellent water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index indicates that around 50% of sample falls under excellent water quality and rest 50% under good water quality (**Table 18**).

Table 18 Water Quality Index of groundwater in Baghpat district

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	1	50
50-100	Good water	1	50
100-200	Poor water	0	0
200-300	Very poor water	0	0
>300	Water unsuitable for drinking	0	0

5.6 Ghaziabad District

7 groundwater samples collected from Ghaziabad district. The analysis result are as follows;

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.2 to 8.0 which falls under neutral pH range of water (6.5 - 8.5). Colour ranged from BDL to 37 Hazen. COD varied from BDL to 14 mg/l. The Chloride and Fluoride varies from 50 to 645 mg/l and BDL to 1.7 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.029 to 8.35 mg/l and Mn from BDL to 0.174 mg/l.

TDS Classification

The total dissolved solids content of groundwater varied from 431 to 1470 mg/l. According to the classification of groundwater, 43% of the total groundwater samples are of good water quality (300 – 600 mg/l), 28.5% of poor water quality (900 - 1200 mg/l) and rest 28.5% of unacceptable water quality (>1200 mg/l), indicated that groundwater quality good to unacceptable in terms of TDS (**Table 19**).

Table 19 Classification of groundwater in Ghaziabad district based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	0	0
300 - 600	Good	3	43
600 - 900	Fair	0	0
900 -1200	Poor	2	28.5
>1200	Unacceptable	2	28.5

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, 57% samples belongs to hard water and rest 43% samples comprises very hard water. The result indicates that the groundwater quality in the study area is hard to very hard. Alkalinity has direct relation with hardness and pH of the groundwater. It ranged from 183 to 477 mg/l (**Table 20**).

Table 20 Classification of groundwater in Ghaziabad district based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
<75	Soft	0	0
75-150	Moderately hard	0	0
150-300	Hard	4	57
>300	Very hard	3	43

SAR Classification

SAR value for Ghaziabad groundwater ranged from 0.2 to 14.3, thus indicating 86% of sample under excellent water quality and 14% under doubtful water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index suggest that around 57.2% of sample collected is of excellent water quality, 14.3% of good water quality and rest 28.5% of poor water quality (**Table 21**).

Table 21 Water Quality Index of groundwater in Ghaziabad district

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	4	57.2
50-100	Good water	1	14.3
100-200	Poor water	2	28.5
200-300	Very poor water	0	0
>300	Water unsuitable for drinking	0	0

5.7 Gautam Buddha Nagar District

3 groundwater samples collected from Noida and Greater Noida in Gautam Buddha Nagar district. The analysis result are as follows;

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.6 to 7.8 which falls under neutral pH range of water (6.5 - 8.5). Colour and COD of groundwater fall under BDL. The Chloride and Fluoride varies from 16 to 66 mg/l and 0.3 to 0.4 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.034 to 10.71 mg/l and Mn from 0.033 to 0.2 mg/l.

TDS Classification

The total dissolved solids content of groundwater varied from 498 to 665 mg/l. According to the classification of groundwater based on TDS (Ahouansou et al., 2018), 66.66% of the groundwater samples falls under good water quality (300 – 600 mg/l) and rest 33.33% under fair water quality (600 – 900 mg/l) (**Table 22**).

Table 22 Classification of groundwater in Gautam Buddha Nagar district based on TDS

TDS Value	Water Quality	No. of samples	Percentage of samples
<300	Excellent	0	0
300 - 600	Good	2	66.66
600 - 900	Fair	1	33.33
900 -1200	Poor	0	0
>1200	Unacceptable	0	0

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, 100% of groundwater samples belongs to hard water. Alkalinity has direct relation with hardness and pH of the groundwater. It ranged from 116 to 290 mg/l (**Table 23**).

Table 23 Classification of groundwater in Gautam Buddha Nagar district based on Total Hardness

TH Value	Water Quality	No. of samples	Percentage of samples
<75	Soft	0	0
75-150	Moderately hard	0	0
150-300	Hard	3	100
>300	Very hard	0	0

SAR Classification

SAR value for Noida and Greater Noida groundwater ranged from 2.8 to 6.6, thus indicating all groundwater samples under excellent water quality for irrigation purpose based on SAR value.

Groundwater Quality Index

Groundwater quality index indicates that around 66.66% of sample falls under excellent water quality and rest 33.33% under poor water quality (**Table 24**).

Table 24 Water Quality Index of groundwater in Gautam Buddha Nagar district

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	2	66.66
50-100	Good water	0	0
100-200	Poor water	1	33.33
200-300	Very poor water	0	0
>300	Water unsuitable for drinking	0	0

5.8 Overall Groundwater Quality

Physio-chemical Characterization

The pH of the groundwater in the study area varied from 7.0 to 8.0 thus all groundwater samples falls under neutral pH range of water (6.5 - 8.5).

TDS Classification

The total dissolved solids content of groundwater varied from BDL to 1470 mg/l. According to the classification of groundwater based on TDS (Ahouansou et al., 2018), 32.25% of the total groundwater samples are of excellent water quality (<300 mg/l), 32.25% falls under good water quality (300 – 600 mg/l), 16% of fair water quality (600 - 900 mg/l), 13% under poor water quality (900 - 1200 mg/l) and rest 6.5% of unacceptable water quality (>1200 mg/l), indicated that groundwater quality excellent to unacceptable in terms of TDS (**Table 25**).

Table 25 Classification of overall groundwater quality based on TDS

TDS Value	Water Quality	No of samples	Percentage of samples
<300	Excellent	10	32.25
300 - 600	Good	10	32.25
600 - 900	Fair	5	16
900 -1200	Poor	4	13
>1200	Unacceptable	2	6.5

Total Hardness Classification

Groundwater classification based on total hardness (TH) values, as TH<75 mg/l, 75-150 mg/l, 150-300 mg/l and >300 mg/l, designated as soft, moderately hard, hard and very hard respectively (Sawyer and McCarty, 1967). Thus, 3.25% belongs to moderately hard water, 64.5% under hard water and rest 32.25% samples comprises very hard water. The result indicates that the groundwater quality in the study area is moderately hard to very hard. Alkalinity has direct relation with hardness and pH of the groundwater. It ranged from 79 to 573 mg/l (**Table 26**).

Table 26 Classification of overall groundwater quality based on Total Hardness

TH Value	Water Quality	No. of sample	Percentage of samples
<75	Soft	0	0
75-150	Moderately hard	1	3.25

TH Value	Water Quality	No. of sample	Percentage of samples
150-300	Hard	20	64.5
>300	Very hard	10	32.25

SAR Classification

The sodium adsorption ratio (SAR) calculated for all groundwater samples. It is an indicator of the suitability of water for use in agricultural irrigation, as determined from the concentrations of the Sodium, Calcium and Magnesium ratio. The value <10, 10-18, 18-26 and >26 suggest excellent, good, doubtful and suitable water quality for irrigation purpose. SAR value for Ghaziabad groundwater ranged from 0.1 to 14.3, thus almost all groundwater samples under excellent water quality except one sample under doubtful water quality for irrigation purpose based on SAR value.

Colour ranged from BDL to 78 Hazen. COD varied from BDL to 35 mg/l. The Chloride and Fluoride varies from 8 to 648 mg/l and BDL to 1.7 mg/l respectively.

The heavy metal concentration of As, Cd, Co, Cr, Cu, Ni and Pb were mostly below detectable limit or below WHO standard. Concentration of Fe varied from 0.001 to 34.23 mg/l and Mn from BDL to 1.53 mg/l.

Groundwater Quality Index

Groundwater quality index were calculated based on Ramakrishnaiah et al. 2009. For quality rating BIS standard as reference concentration were taken in calculation and for parameter where limits are in certain range, the higher value of the BIS standard was taken into consideration.

Groundwater quality index suggest that around 55% of sample collected is of excellent water quality, 19.3% of good water quality, 19.3% of poor water quality, 3.2% of very poor water quality and rest 3.2% of water unsuitable for drinking (**Table 27**).

Table 27 Overall Water Quality Index of groundwater

WQI value	Water quality	No. of samples	Percentage of samples
<50	Excellent	17	55
50-100	Good water	6	19.3
100-200	Poor water	6	19.3
200-300	Very poor water	1	3.2

>300	Water unsuitable for drinking	1	3.2

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CHAPTER-6: SEWAGE TREATMENT PLANTS

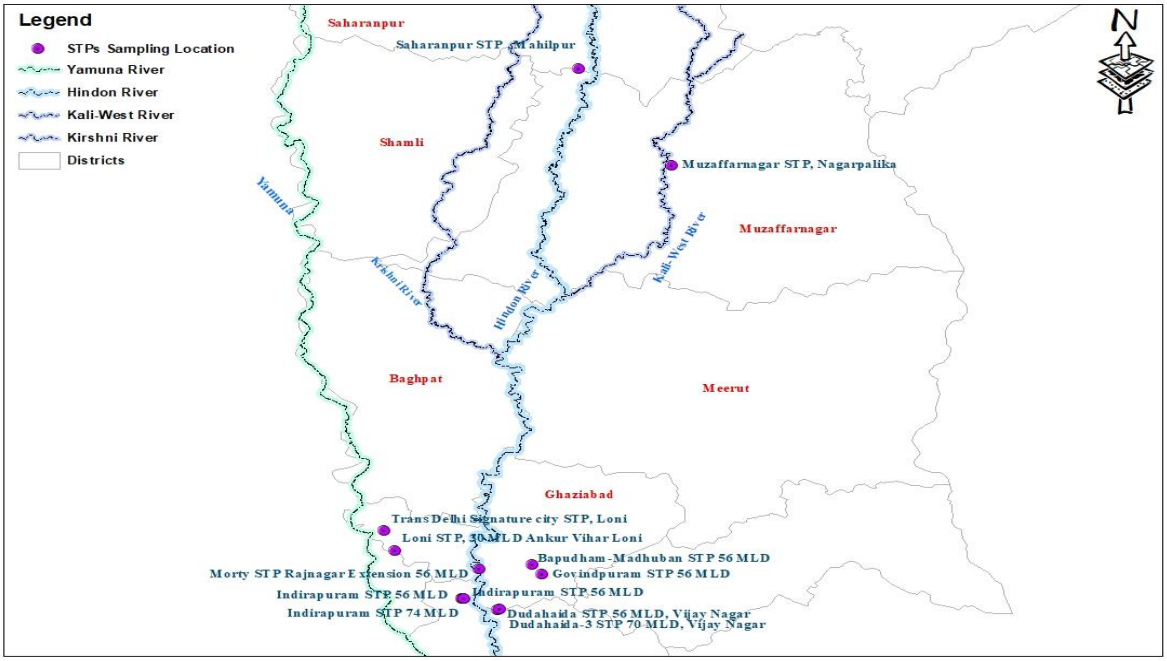
Hindon river originates from foot hills of Shivalik Range at Kaluwala village, Saharanpur and travels through cities like Saharanpur, Muzaffarnagar, Shamli, Meerut, Baghpat, Ghaziabad and Noida covering a distance of 300 km before it confluence with Yamuna in the downstream of Okhla barrage (NCR of Delhi). In course of flow from origin to confluence with river Yamuna, it has two major tributaries – Krishni and West Kali rivers.

For the treatment of the generated sewage 15 STPs with total installed capacity of 759.5 MLD have been installed. Utilized capacity of the commissioned STPs is approximately 495.4 MLD. The details of STPs in Hindon basin is provided in **Table 28**:

Table 28 Details of STPs in Hindon basin

District/Town	*No. of STPs*	*Designed capacity (MLD)*	*Utilized Capacity (MLD)*	*Discharge to Hindon*
Saharanpur	01	38	38	1
Muzaffarnagar	01	32.5	17	1
Ghaziabad	08	480	342.4	08
Noida	01	35	28	01
Greater Noida	04	174	70	04

STPs located in Hindon basin are receiving sewage with BOD ranging from 15 mg/l to 157 mg/l, COD ranging from 95 mg/l to 467 mg/l as compared to typical municipal wastewater (BOD: 200-250 mg/l, COD: 350-500 mg/l), As per inspections conducted in November, 2022, the STPs are mostly found non-complying with respect to the discharge norms. Weak strength sewage was received at inlet (BOD - 15 mg/l) of 56 MLD STP Bapudham, Ghaziabad. The compliance status of the STPs is tabulated in **Tables 29 and 30**. The map showing locations of STPs monitored in the Hindon basin are shown in **Map-9**.



Map 9 Map showing STPs located in the Hindon basin (STPs located in Noida and Greater Noida are not shown)

Table 29 Compliance status of STPs in Ghaziabad

S. No.	Name of STPs	Treatment Technology	Designed Capacity (MLD)	Utilized capacity (MLD)	Compliance Status as per NGT standards
1.	Indirapuram STP 74 MLD	SBR	74	74	NC w.r.t. BOD, COD, TSS, TN, FC
2.	Indirapuram STP 56 MLD	SBR	56	50	NC w.r.t. BOD, COD, FC
3.	Indirapuram STP 56 MLD	UASB	56	56	NC w.r.t. BOD, COD, TSS, TN, FC
4.	Dudahaida-3 STP 70 MLD, Vijay Nagar	UASB	70	70	NC w.r.t. COD, BOD, TSS, total nitrogen, FC
5.	Dudahaida STP 56 MLD, Vijay Nagar	SBR	56	56	NC w.r.t. COD & FC
6.	Morty STP Rajnagar Extension 56 MLD	SBR	56	22.5	Non-Complying w.r.t. FC
7.	Govindpuram STP 56 MLD	SBR	56	12.38	Complying
8.	Bapudham-Madhuban STP 56 MLD	SBR	56	1.5	Complying

Table 30 Compliance status of STPs in Saharanpur and Muzaffarnagar districts

S. No.	Name of STPs	Treatment Technology	Designed Capacity (MLD)	Utilized capacity (MLD)	Compliance Status as per NGT standards
1.	Saharanpur STP , Mahilpur	UASB	38	38	Non-complying w.r.t. COD, TSS, FC
2.	Muzaffarnagar STP, Nagar Palika	Oxidation Pond	32.5	17	Non-complying w.r.t. BOD, COD, TSS & FC

Performance Assessment of the STP

In **Table 31**, values of BOD at outlet have been analysed against inlet BOD range. It can be observed from the table that out of 10 STPs, only 6 are achieving BOD less than 10 mg/l rest 4 were having outlet BOD higher than 10 mg/l. Out of 5 STPs have inlet BOD range 50 – 100 mg/l only 3 STPs were found to achieve outlet BOD less than 10 mg/l. Out of 4 STPs having inlet BOD greater than 100 mg/l only 1 was found to achieve BOD less than 10 mg/l (**Table 31**). It indicates that operation and maintenance of 5 STPs requires improvement.

Table 31 Inlet BOD range and compliance of outlet BOD

S. No	Inlet BOD	No.	Outlet BOD		
			≤10 mg/l	10-30 mg/l	>30 mg/l
1	10 -50	1	1	-	-
2	50 - 100	5	3	-	2
3	100 - 150	2	1	-	1
4	>150	2	-	1	1
Total		**10**	**5**	**1**	**4**

Table 32 shows technology wise compliance for BOD of treated sewage. The median BOD value at inlet of SBR (6 no.) based STPs were 103.5 mg/l, where 4 STPs were found complying for BOD norms of 10 mg/l. Whereas, for UASB (3 no.) based STPs median BOD value at inlet was 119 mg/l and only 1 STP was complying for BOD norms of 10 mg/l, one OP based STP was found non-complying for BOD norms of 10 mg/l.

Table 32 Technology wise distribution of STP

Technology	Inlet BOD Range	Median BOD Value	Compliance for BOD of treated sewage (10 mg/l)	
			Complying	Non-complying
SBR (6)	15-157	103.5	4	2
UASB (3)	57-157	119	1	2
OP (1)	57	57	-	1
Total	**-**	**-**	**5**	**5**

The reduction in the BOD was found to range between 28.07 % and 97 %. Similarly, reduction in the COD was found to range from 20.12 % to 95 % and reduction in TSS was found to range between 63 % to 96 %. Technology wise performance of STPs w.r.t BOD, COD and TSS has been evaluated in the **Table 33, 34 & 35**, respectively.

Table 33 Performance of STPs with respect to BOD removal efficiency

S. No	Technology	Range of BOD Removal Efficiency			
		<50	50-70	70-90	>90
1	SBR (6)	1	1		4
2	UASB (3)		2	1	
4	OP (1)	1			
	Total	**2**	**3**	**1**	**4**

Table 34 Performance of STPs with respect to COD removal efficiency

S. No	Technology	Range of COD Removal Efficiency			
		<50	50-70	70-90	>90
1	SBR (6)	1	1	3	1
2	UASB (3)			3	
4	OP (1)	1			
	Total	**2**	**1**	**6**	**1**

Table 35 Performance of STPs with respect to TSS removal efficiency

S. No	Technology	Range of TSS Removal Efficiency			
		<50	50-70	70-90	>90
1	SBR (6)	-	1	2	3
2	UASB (3)	-	1	2	-
4	OP (1)	-	-	1	-
	Total	**0**	**2**	**5**	**3**

Discharge norm for Faecal Coliform (230 MPN/100ml) is not achieved in 8 STPs. No disinfection system was found at 3 STPs namely, Nagar Palika STP, Muzaffarnagar, 56 MLD STP (UASB) Indirapuram, Ghaziabad and 70 MLD STP Dudaheda, Ghaziabad. Hence to achieve the norms there is requirement of upgradation/optimization of the existing disinfection system or installation of new disinfection system (if no disinfection system is present). The relevant analysis data is provided at **Annexure-III**.

Few major observations with respect to operation and maintenance of STPs during monitoring are as follows:

Saharanpur STP

- Chlorination system was found non-operational.

Muzaffarnagar STP

- Two ponds of WSP/OP based STP not in use (STP operating on half capacity).
- No flowmeter at outlet of STP only V-notch at inlet however, no logbook is available for same.
- No disinfection system & no OCEMS installed.
- Household discharge points from nearby houses directly discharge to STP ponds.

Ghaziabad STPs

- **Very less flow** received at Govindpuram STP (14/56MLD), Bapudham STP (1.5/56MLD) and Morty Raj Nagar Extension STP (26/56MLD) due less sewerage network/household connections.
- No flow measuring device at outlet of Indirapuram (3 STPs), Bapudham STP, Dudahaida (02 STPs) and Govindpuram 56 MLD STP.
- No disinfection system at 56 MLD UASB STP Indirapuram and 70 MLD UASB STP Dudahaida.
- No OCEMS installed at Govindpuram and Bapudham 56 MLD STPs, Ghaziabad, 56 MLD SBR and UASB STPs at Indirapuram.

The action plan for the existing STPs installed in Saharanpur, Muzaffarnagar and Ghaziabad is attached as **Annexure-IV**.

CHAPTER-7: GROSSLY POLLUTING INDUSTRIES

CPCB organizes annual inspection of Grossly Polluting Industries (GPIs) in river Ganga main stem since 2017 through third party technical institutes and State Pollution Control Boards (SPCBs). Grossly Pollution Industries are defined as the industry which is discharging pollution load of equal to or more than 100 kg/day and/or handling hazardous chemicals as specified under the Schedule-I, Part-II of The Manufacture, Storage and Import of Hazardous Chemical Rules of 1989 under Environment (Protection) Act, 1986.

Year 2020 onwards, GPIs located in river Yamuna main stem including river Hindon sub-basin were included for annual inspection.

During 2021-22, total 373 GPIs operating in river Hindon stem states (Uttarakhand-10; Uttar Pradesh-363) were inventoried in consultation with concerned SPCBs. The state and sector-wise distribution of GPIs are shown in **Tables 36 and 37.**

Table 36 State and sector wise distribution of GPIs (2021-22)

Sector	Uttar Pradesh	Uttarakhand	Grand Total
Distillery	8	1	9
Food & Beverages	7	1	8
Others	4	0	4
Pharmaceutical	1	0	1
Pulp & Paper	45	6	51
Slaughter House	8	0	8
Sugar	13	2	15
Tannery	6	0	6
Textile	271	0	271
Total	**363**	**10**	**373**

Table 37 District and sector wise distribution of GPIs (2021-22)

Sector / District	Bagh-pat	G.B. Nagar	Ghazia-bad	Hapur	Meerut	Muzaffar-nagar	Saha-ranpur	Shamli	Hari-dwar	Total
Distillery	0	0	1	0	1	2	3	1	1	9
Food & Beverages	1	1	2	1	0	0	2	0	1	8
Others	0	0	4	0	0	0	0	0	0	4
Pharma-ceutical	0	0	1	0	0	0	0	0	0	1
Pulp & Paper	2	2	3	0	0	34	2	2	6	51

Sector / District	Bagh-pat	G.B. Nagar	Ghazia-bad	Hapur	Meerut	Muzaffar-nagar	Saha-ranpur	Shamli	Hari-dwar	Total
Slaughter House	0	0	4	0	0	1	3	0	0	8
Sugar	1	0	0	0	1	5	4	2	2	15
Tannery	0	2	3	0	0	1	0	0	0	6
Textile	3	15	230	4	2	0	17	0	0	271
Total	**7**	**20**	**248**	**5**	**4**	**43**	**31**	**5**	**10**	**373**

Compliance status of GPIs in river Hindon: 2021-22

During annual inspections 2021-22, out of 373 GPIs, 258 (Uttarakhand-10; Uttar Pradesh-248) were found operational and 115 (Uttarakhand-0; Uttar Pradesh-115) were found non-operational (self-closed).

Out of 258 operational GPIs, 157 (Uttarakhand-09; Uttar Pradesh-148) were found complying and 101 GPIs (Uttarakhand-01; Uttar Pradesh-100) were found non-complying. Out of 101 non-complying GPIs, show-cause notices were issued to 84 GPIs (Uttar Pradesh-84) and closure directions were issued to 17 GPIs (Uttarakhand-01; Uttar Pradesh-17). The state, sector and district-wise compliance status of GPIs are shown in **Tables 38, 39 & 40,** respectively.

Table 38 State wise compliance status of GPIs (2021-22)

State	No. GPIs	Complying	Non-Complied		Self-Closed
			Show Cause	Closure	
Uttarakhand	10	09	0	01	0
Uttar Pradesh	363	148	84	16	115
Total	**373**	**157**	**84**	**17**	**115**

Table 39 Sector wise compliance status of GPIs (2021-22)

Sector	No. GPIs	Complying	Non-Complied		Self-Closed
			Show Cause	Closure	
Distillery	9	5	1	1	2
Food & Beverages	8	4	3	1	0
Others	4	1	2	0	1
Pharmaceutical	1	0	1	0	0
Pulp & Paper	51	49	0	0	2
Slaughter House	8	5	1	0	2

Sugar	15	11	4	0	0
Tannery	6	3	1	0	2
Textile	271	79	71	15	106
Total	**373**	**157**	**84**	**17**	**115**

Table 40 District wise compliance status of GPIs (2021-22)

District	No. GPIs	Complying	Non-Complied		Self-Closed
			Show Cause	Closure	
Baghpat	7	1	4	0	2
Ghaziabad	248	69	62	15	102
Hapur	5	1	2	0	2
Meerut	4	4	0	0	0
Muzaffarnagar	43	39	2	1	1
Saharanpur	31	21	7	0	3
Shamli	5	4	1	0	0
GB Nagar	20	9	6	0	5
Haridwar	10	9	0	1	0

Pollution load discharge:

During 2021-22, effluent discharge and BOD load in River Hindon basin by 258 operational GPIs was found 44.4 MLD and 1.87 TPD respectively. The sector and district-wise pollution load of GPIs is shown in **Tables 41 and 42**.

Table 41 Sector-wise pollution load of GPIs (2021-22)

Sector	No. GPIs	Effluent Discharge (KLD)	BOD load (kg/day)
Distillery	9	0	0
Food & Beverages	8	1676.74	360.7
Others	4	1453.55	51.47
Pharmaceutical	1	170.97	3.59
Pulp & Paper	51	22310.01	473.17
Slaughter House	8	1041.46	28.02
Sugar	15	10648.47	315.5
Tannery	6	87	1.81
Total	373	44365.93	1873.45
		44.4 MLD	**1.87 TPD**

Table 42 District-wise pollution load of GPIs (2021-22)

District	no of units	Discharge (KLD)	BOD load (kg/day)
Baghpat	7	820.35	47.56
Ghaziabad	248	6958.65	655.06
Hapur	5	492.4	10.29
Haridwar	10	2622	399.2
Meerut	4	1403	32.58
Muzaffarnagar	43	15711.11	402.72
Saharanpur	31	11545.63	210.98
Shamli	5	1976	51.41
GB Nagar	20	2836.79	63.69
Total	373	44365.93	1873.49
		44.4 MLD	**1.87 TPD**

Annual inspections 2022-23

During 2022-23, total 375 GPIs (Uttar Pradesh-365; Uttarakhand-10) were inventoried in consultation with concerned SPCBs (List attached as **Annexure-V**). The state, sector and district-wise distribution of GPIs are shown in **Tables 43 and 44**.

Table 43 State and sector wise distribution of GPIs (2022-23)

Sector	Uttar Pradesh	Uttarakhand	Total
Distillery	9	1	10
Food & Beverages	12	1	13
Others	3	0	3
Pharmaceutical	1	0	1
Pulp & Paper	47	6	53
Slaughter House	17	0	17
Sugar	13	2	15
Tannery	6	0	6
Textile	257	0	257
Total	**365**	**10**	**375**

Table 44 District and sector wise distribution of GPIs (2022-23)

District	Distillery	Food & Beverages	Others	Pharma-ceutical	Pulp & Paper	Slaughter House	Sugar	Tannery	Textile	Total
Baghpat	0	1	0	0	2	0	1	0	3	7
Gautam Budh Nagar	0	6	0	0	3	0	0	2	25	36
Ghaziabad	1	2	3	1	3	13	0	3	204	230
Hapur	0	1	0	0	0	0	0	0	4	5

Haridwar	1	1	0	0	6	0	2	0	0	10
Meerut	1	0	0	0	0	0	1	0	2	4
Muzaffarnagar	3	0	0	0	35	1	5	1	0	45
Saharanpur	3	2	0	0	2	3	4	0	19	33
Shamli	1	0	0	0	2	0	2	0	0	5
Total	**10**	**13**	**3**	**1**	**53**	**17**	**15**	**6**	**257**	**375**

Inspection of these GPIs were carried out during February – June 2023. Inspection reports and action taken by SPCBs is under process.

In the year 2023, UPPCB provided a list of industries 412 (278 GPIs, 82 Non-GPIs & 42 industrial units closed/dismantled/surrendered/other) in river Hindon basin **(Annexure-VI)**. The district-wise distribution of industrial units is shown in **Table 45**. Additionally, some other industrial units have also been reported which were identified by the monitoring teams during inspection.

Table 45 Inventory of GPIs provided by UPPCB in the year 2023

District	Number of GPIs			Number of non-GPIs			Total number of industrial units	Remarks
	Conforming	Non-conforming	Total	Conforming	Non-conforming	Total		
Saharanpur	37	0	37	12	0	12	49	-
Muzaffarnagar	0	43	43	6	3	9	52	-
Shamli	1	4	5	0	0	0	5	-
Meerut	5	0	5	1	0	1	6	-
Baghpat	1	0	1	0	0	0	1	-
Ghaziabad	169	0	169	10	0	10	179	Closed-12; Dismantled-23; Self-closed-4; Surrendered-1; Status not mentioned-2 *Total units in Ghaziabad=221 (179+42)
Greater Noida	18	0	18	50	0	50	68	-
TOTAL	**231**	**47**	**278**	**79**	**3**	**82**	**360**	-

The non-GPI units include Automibile, Anodizing, Beverage, Board Mill, Dairy, Yarn/Textile Processing, Dyeing, Food Processing, Galvanizing, Metal Surface Treatment, Pharma, Paint, Slaughter House, Tannery, Rice Mills, Plastic Moulding Component, Electronic & Engineering.

CHAPTER-8: ACTION PLAN

Industrial Pollution Control:

1. Textile, Sugar, Pulp & Paper, Distillery and Tannery units operating in the River Hindon basin shall implement the Charter for Water Recycling and Pollution Prevention in Textile/Sugar/ Pulp & Paper Industries (sector specific) in the Ganga River Basin". [Action: SPCB & concerned industrial units]
2. Inventory of unauthorized/unregistered industrial/processing units (water-polluting small and medium-scale industries, including board mills, dyeing/bleaching/printing/textile processing, paint, recycling/processing units for metal, battery including lead-acid, e-waste, and other hazardous waste). Closure/sealing of such units till they obtain CTO & have adequate functional effluent treatment system. [Action: SPCB, District Administration and Municipal Corporation]
3. Small & medium scale industries in industrial clusters (BOD>100 mg/l and COD>250 mg/l) shall not be permitted to operate using batch effluent treatment process until a continuous secondary biological wastewater treatment system is installed or they should be shifted on ZLD/dry process or should connect to CETP. [Action: NMCG, UPPCB & Industrial Development Corporation]
4. Installation of CETP for small-scale industrial units located industrial clusters in Hindon basin. [Action: NMCG, UPPCB & Industrial Development Corporation]

S. No.	District	Industrial Cluster	Type	No. of Units
1.	Saharanpur	Catchment of river Dhamola & KD Complex drain	Mixed	~15 (Textile) and others
2.	Ghaziabad	Roop Nagar & Arya Nagar (Loni)	Textile	~ 80
3.	Ghaziabad	Sahibabad Site-4	Mixed	~ 60
4.	Ghaziabad	Karedha Industrial Area	Mixed	~ 10 and many recycling/processing units
5.	Gautam Buddha Nagar	Surajpur Industrial Area	Mixed	~14 (Textile) and others

5. Immediate action should be taken to address pollution hotspots in drains/river stretches (attached as **Annexure-VII**) caused by discharge of untreated/partially treated effluent by water polluting industries. SPCBs (UPPCB/UKPCB) shall prepare action plan in consultation with industries in catchment of hotspot drain/river stretches until water quality is improved (BOD < 10 mg/l in river and BOD < 150 mg/l & COD < 450 mg/l in drains). The SPCBs should collaborate with technical experts to devise action plan. [Action: SPCBs & Industries]

6. Collective accountability of industrial units in hotspot river stretch/drain should be fixed by UPPCB in case river/drain water characteristics indicate industrial pollution (BOD>150 mg/l and COD>450 mg/l in drain & BOD>10 mg/l in river. Compliance of industrial units should be checked in terms of drain wastewater characteristics. [Action: UPPCB, CPCB, CWC & Irrigation Dept.]

Sugar Mills

(Action: Sugar Units & SPCB; Timeline for proposed action plan: 3 months):

1. Total Sugar Mills: 15 (6- standalone, 3- sugar with cogen, 5- Sugar refinery)
2. Augmentation of effluent treatment plants up to tertiary level.
3. Installation of CPU for treatment of weak strength effluent wherever high pressure boilers (above 45 kg/cm² g) are installed.
4. Installation of sulphur removal system in case of double sulphitation process.
5. Installation of flowmeters with totalizers at:
    a. All fresh water abstraction points
    b. Hot & cold water usage/recycling points
    c. All effluent generation sources
    d. Inlet & outlet of effluent treatment plant.
    e. Treated effluent re-circulation line i.e. in-process or for irrigation purpose.
6. Preparation of Irrigation management plan duly vetted by reputed Agriculture University including total command area, type of soil and loading rate of water.
7. Provision of networking to supply the treated wastewater to farmers.
8. Limiting specific fresh water consumption-
    a. Standalone & Sugar with co-gen: <55 Lit/tonne of cane crushed
    b. Refinery & Refinery with co-gen: <80 Lit/tonne of cane crushed
9. Specific effluent discharge not to exceed:
    a. Standalone & Sugar with co-gen: <135 Lit/tonne of cane crushed

b. Refinery & Refinery with co-gen: <150 Lit/tonne of cane crushed

10. Action plan for proper handling, management and disposal of fly ash/ boiler including record keeping.
11. Identification of recipient drain and monthly monitoring by SPCB.
12. No dumping of fly ash near the banks of drains/rivers.
13. For sugarcane-growing farmers under their command area emphasis to adopt drip irrigation instead of flood irrigation method by setting annual target of covering 20% land for groundwater conservation.
14. Irrigation of all the command area by using drip irrigation method within five years.

Distillery

(Action: Distillery Units & SPCB; Timeline for proposed action plan: 3 months):

1. Total Distilleries in Hindon Basin- 10 (2 reported non-operational)
   ZLD route: Incineration-7, Biocompositing-1
   CPU installed: 8
   MEE installed: 8
2. CPU for treatment of weak strength effluent to be installed
3. Limiting specific fresh water consumption- B & C Heavy: 8 to10KL/KL of product, for cane syrup & sugarcane juice: 6 to 8 KL/KL of product
4. Specific spent wash generation rate not to exceed- 6 to 8 KL/KL of product, for cane syrup & sugarcane juice: 4 to 6 KL/KL of product
5. Mass flow meters with totalizers to be installed at inlet & outlet of MEE with connectivity with CPCB/SPCB server.
6. Identification of the recipient drain near the unit and monitoring on monthly basis by concerned SPCB.
7. Action plan for fly ash & boiler ash disposal.
8. In case of using incineration boiler ash for potash recovery proper record keeping of ash generation, management and handling to be maintained.
9. Installation of web camera at bio-compost yard & lagoon with connectivity with CPCB & SPCB server.
10. Restriction on lagoon capacity: not to exceed quantity of Concentrated Spentwash for 30 days in case of bio-compositing & 7 days in case of incineration.
11. Concentrated spent wash to maintain total solids as;
    In case of Bio-composting: 30%

In case of Incineration: 45-55%

12. Proper record keeping of operation and maintenance of ZLD systems including:
    i. MEE
    ii. CPU
    iii. Incineration /Bio-composting
13. Installation of piezometers at bio-compost yards to monitor ground water quality.
14. Fly ash & boiler ash disposal near water bodies should be restricted.
15. Distillery attached with Sugar mill to reuse treated water from Sugar mill.

Pulp & Paper Mills

(Action: Pulp & Paper Units & SPCB; Timeline for proposed action plan: 3 months):

- Total no. of Pulp & Paper industries located in river Hindon basin: 51 (Operational- 47, non-operational- 4)
    - Wood based: 01
    - Agro based: 03
    - Waste paper based: 42
    - Market based pulp: 01
- Paper board making industries to be covered under the list of GPIs.
- No chemical pulping or wet strength pulping without chemical recovery plants (CRPs).
- Installation of flow meter at water intake / borewell, wastewater generation, treated effluent discharge and recycle line.
- Maintenance of record for water use, wastewater generation, water recycled and wastewater discharge.
- Upgradation of existing effluent treatment system up to tertiary level including installation. of aerators (diffused/surface) and development of required MLSS level.
- Provision of Closed loop fibre recovery and backwater system.
- Replacement of paper machine shower nozzles with nozzles of specified diameter (0.6-0.8 mm).
- To achieve the treated effluent quality as per Charter norms:
    - Paper mills manufacturing chemical pulping:

      pH -6.5-8.5; TSS- 30 mg/L; BOD- 20 mg/L; COD- 200 mg/L, TDS- 1800 mg/L, Colour- 250 PCU, AOX- 8 mg/L and SAR-10
    - RCF and Market Pulp based Paper mills:

pH -6.5-8.5; TSS- 30 mg/L; BOD- 20 mg/L; COD- 150 mg/L, TDS- 1600 mg/L, Colour- 150 PCU and SAR-8

- Achieve the specific fresh water consumption as given below:
    - Wood/Agro Based (bleached grades papers, paperboards & newsprint): 40 KL/MT
    - Agro Based (unbleached grades papers, paperboards & newsprint): 20 KL/MT
    - RCF and Market Pulp Based (bleached grades paper, paperboards & newsprint): 12 KL/MT
    - RCF and Market Pulp Based (unbleached grades of papers and paperboards): 8 KL/MT
    - Paper mills achieving ZLD: 2.5 KL/MT
- Achieve the specific effluent discharge as given below:
    - Wood/Agro Based (bleached grades papers, paperboards & newsprint): 30 KL/MT
    - Agro Based (unbleached grades papers, paperboards & newsprint): 15 KL/MT
    - RCF and Market Pulp Based (bleached grades paper, paperboards & newsprint): 8 KL/MT
    - RCF and Market Pulp Based (unbleached grades of papers and paperboards): 5 KL/MT
- Proper handling, management and disposal of plastic waste, solid waste including record keeping.
- Setting up of Environmental Management Cell (EMC) by individual units.

Textile Mills

(Action: Textile Units & SPCB; Timeline for proposed action plan: 3 months):

- Textile wet processing steps generate effluent having high BOD (550-800 mg/l) and COD (1000-1500 mg/l). For treatment of effluent having such high organic load, biological treatment system of adequate capacity along with tertiary filtration system and capable of running round the clock is mandatory.
- Textile units performing wet processing like pre-treatment (desizing, scouring, mercerization and bleaching), dyeing & printing and finishing (including washing) of cotton and other fabric should have complete ETP comprising of secondary biological treatment units of adequate capacity operating on continuous basis or they should become member of CETP.

- In case, unit is a member of CETP, they should have Primary Effluent Treatment Plant (PETP) of adequate capacity to meet the inlet norms of concerned CETP.
- For standalone units operate in batches and effluent generation is not enough to run the ETP on continuous basis round the clock, in that cases unit has to stop the wet processing steps (pre-treatment, dyeing & printing and finishing) and may be shifted to the dry processes (knitting, weaving, spinning, finishing, stitching, etc.) and machinery used in wet processing like kier, jigger, winch and soft flow shall be dismantled.
    - SPCB shall ensure the dismantling of wet processing machinery and geotagged photographs shall be provided as an evidence. Consent of such units for wet processing shall be revised to dry process.
- Textile units should adopt the Charter for water recycling and pollution prevention in all aspects.

Metal/Battery including Lead-acid/E-waste/Other Hazardous Waste Recycling/Processing Units [Action: Industrial Units, ULBs & SPCB; Timeline for proposed action plan: 3 months):

- Inventory of unauthorized battery including lead-acid, metal (including surface treatment, anodizing, galvanizing & electroplaating), e-waste and other hazardous waste recycling/processing units. Closure/sealing of such units till they obtain CTO & have adequate functional effluent treatment system or become the member of common treatment facility.
- The district-wise status of Authorized Recyclers/ Utilizers /Pre-processors/ Co-processors of Hazardous Waste available with CPCB:
    - Saharanpur – 08
    - Ghaziabad – 36 + 1 (TSDF)
    - Gautam Buddha Nagar - 9
- Development of common treatment facility for disposal of waste generated from above-referred units existing in cluster.
- Recycling and processing units (battery including lead-acid, metal-processing, e-waste and other hazardous waste) should be brought under the ambit of GPIs and subjected to annual inspections under the Namami Gange Programme and quarterly by SPCB.

Dairy/Cattle Farming

(Action: Dairy/Cattle farming Operator, ULBs & SPCB; Timeline for proposed action plan: 6-12 months):

Cattle dung deposition observed in many drains namely Sardhana & Hindon Vihar drains contributing high BOD/COD.

1. Restriction of Dairy/Cattle farming operation along the bank of rivers/water bodies/drains.
2. Dairy cattle farms should not be located in flood prone areas, subject to flooding at 1-in-25-years or more frequent levels in order to avoid contamination of rivers/water bodies/drains.
3. Dairy cattle farms or Gaushalas shall follow the "Guidelines for Environmental Management of Dairy Farms and Gaushalas" issued by CPCB.
4. Dairy cattle farms should have adequate infrastructure by their own to ensure proper handling, treatment and disposal of solid wastes and wastewater or become the member of a common facility.
5. Concerned ULBs shall develop management plan for transportation and disposal of cattle dung/waste and shall impose user charges accordingly.
6. Frequent vigilance of dairy farms by ULBs to ensure no cattle dung/waste disposed into any nearby drain/river/water body.
7. Operation of the dairy without confined place for dumping of cattle dung/waste shall be restrictedSuggested methods to be adopted for disposal/utilisation of solid wastes (dung):
    - Composting/Vermicomposting
    - Biogas/Compressed biogas (CBG) production (anaerobic digestion)
    - Manufacturing of dung wood can be used as fuel
8. Hands on practical trainings on environment/waste management & treatment technologies, scientific feeding for enteric methane reduction, waste to wealth management programme, etc. should be provided to dairy workers/entrepreneurs by the local bodies/SPCB at regular intervals.

Sewage and Solid Waste Management:

Sewage

1. Sewage Treatment Plants (STPs) employing advanced treatment facilities such as Sequencing Batch Reactor (SBR), Extended ASP, and Moving Bed Biofilm Reactor (MBBR) should achieve a BOD removal efficiency of over 90%. Strict action should be taken against the STPs operating agency & disbursement of payment to the operating agency shall be lined with performance in terms of BOD removal efficiency as well as comply with NGT norms. [Action: Jal Nigam, SMCG & NMCG]
2. STPs shall be operated with utilized capacity > 70%. The disinfection units installed at STPs should be operated properly and follow proper protocols and procedures to effectively disinfect the wastewater and meet the discharge standards for fecal coliform levels. Action plan for existing STPs installed in Saharanpur, Muzaffarnagar and Ghaziabad is enclosed as **Annexure-IV** [Action: UPPCB, Jal Nigam, SMCG & NMCG]
3. SMCG with UPJN shall develop a sewage management plan for each city/town/district addressing both present and projected requirements for the next 20 years. It should be periodically reviewed, updated, and adapted to address changing circumstances, technological advancements, and evolving environmental standards. Regular monitoring and evaluation of the plan's effectiveness will help identify any necessary modifications or improvements. [Action: Jal Nigam, SMCG & NMCG]
4. In case of small town, village or isolated drain, low cost decentralized treatment option such as waste stabilization pond (WSP) or constructed wetland may be considered to treat domestic wastewater. [Action: Jal Nigam, SMCG & NMCG]

Solid Waste

1. Prohibition on dumping of municipal/industrial solid wastes and sludge on the active flood plain of river as well as into the river/drain itself. All the dumped waste along the river/drain should be removed immediately and disposed off safely.
2. Installation of wire-net/geo-net at confluence point of drains with river.

[Action: Municipal corporation/Nagar Nigam/Nagar Palika]

River Restoration:

1. Improvement in stream flow in origin/dry stretches of rivers through vegetation development in catchment. Demarcation of flood plain of river and desilting of river bed. The desilted material should be used for strentheging the enbankments and the embankments should be vegetated. [Action: District Administration, Forest Department and Irrigation Department]

2. A minimum water flow ~100-200 cusecs in river Hindon and ~50-100 cusecs in its tributaries such as Kali-West & Krishni including upper stretches of the rivers should be maintained to sustain river ecosystem and prevent significant ecological damage. The determination of minimum flow is a complex process that requires hydrological, ecological assessments, and stakeholder consultation. Therefore, a detailed study may be conducted in consultation with the relevant experts and stakeholders to establish appropriate minimum flow levels in river Hindon and its tributaries. [Action: UP Irrigation Department & CWC]

3. To maintain minimum flow, provision of freshwater intrusion from Ganga/Yamuna canal into Hindon River and its tributaries (Kali-West & Krishni) can be made. The suggested locations from where freshwater may be discharged into river are [Action: Irrigation Dept. & CWC]:

S. No.	District	Location
1.	Saharanpur	Ganga Canal into: • River Kali-West near Rastam village • River Hindon near Maheshpur village • River Krishni near Bhanera Khemchand village
2.	Saharanpur (U.P.) & Hardwar (Uttarakhand)	• Ganga Canal into Sheela drain of River Kali-West near Rasoolpur Fakerhery village near Uttarakhand-Uttar Pradesh border
3.	Muzaffarnagar	• Upper Ganga Canal into river Kali-West near Khatauli town
4.	Shamli	• Eastern Yamuna Canal into river Krishni near Salfa village
5.	Baghpat	• Upper Ganga Canal into river Hindon near Pura village via Jani Escape

4. Freshwater (1500 cusecs) is released in to river Hindon from Upper Ganga Canal near D/s of Meerut where river Hindon act as a channel to transfer freshwater from Upper

Ganga Canal to Agra Canal. Freshwater from Upper Ganga Canal is discharged into river Yamuna from barrage on river Hindon at Ghaziabad which is further released into Agra Canal from Okhla Barrage on river Yamuna. A minimum of 200 cusecs of water should be retained in river Hindon in d/s of barrage at Ghaziabad. [Action: Irrigation Dept. & CWC]

5. State Pollution Control Boards (SPCBs) along with other concerned state agencies shall carry out inventory of existing wetlands and ponds along the rivers and at their origin and prepare action plan for their restoration and revival. Desilting/dredging of wetlands/ponds/drains shall also be carried out. The desilted material should be used for strentheging the enbankments and the embankments should be vegetated. [Action: SPCB, District Administration, Forest Department and Irrigation Department]

6. Rejuvenation and restoration of river stretches by constructing a series of Constructed Wetlands along the river bed and adjoining drains. Integration of drains carrying treated/untreated industrial and domestic wastewater with constructed wetlands will contribute to improving the quality of wastewater discharge into the river through drains. The suggested locations on rivers Hindon, its tributaries and adjoining drains for constructed wetlands/biodiversity park are attached as **Annexure-VIII**. [Action: SPCB, Jal Nigam, Irrigation Dept., Forest Dept. & Technical Experts]

7. Encroachment along wetlands and river stretches has been reported through complaints and in NGT case (OA No. 859/2022 in the matter of Abhisht Kumar Gupta Vs State of Uttar Pradesh & Ors). The concerned District Administration may undertake a survey along with concerned state agencies and take necessary action for encroached wetlands/ponds/river stretches and develop an action plan. [Action: UPPCB, District Administration and UP Irrigation Dept.]

8. The jurisdiction of drains/rivers lies with the state flood control and irrigation department while certain areas fall under the jurisdiction of the Forest Department and Jal Nigam/Sansthan. Such agencies should undergo capacity building to ensure that river should not be polluted and should be trained for rivers/drains restoration plan. [Action: Forest Department, Irrigation Department, CWC, Jal Nigam and Jal Sansthan]

9. Check dams should be constructed in the upper stretch of the Hindon River (from its origin to Saharanpur u/s) to enhance the source of fresh water in river during non-monsoon periods. [Action: Minor Irrigation Department]

10. Construction and maintenance of recharge trenches with recharge shafts in downstream areas. Feasible structures for areas where groundwater levels are deeper than 20 mbgl (meters below ground level) or more. Successful implementation will result in recouping of groundwater level over time and will contribute to river flow. [Action: Irrigation Department & Ground Water Department]

11. Ensuring hydraulic and hydrological connectivity of the river with other water bodies (including groundwater) is important. Influent zones (where groundwater recharges the river) and effluent zones (where the river recharges groundwater) should be identified throughout the entire stretch of the river, for implementation of reach-wise recharge augmentation plan for continuous flow in the river. [Action: Central Water Commission, Ground Water Department and National Institute of Hydrology (NIH)]

12. Illegal abstraction of groundwater at domestic level for commercial purpose has been observed. Metering of household borewell in Class I cities and Class II towns & limitation on use. [Action: U.P. Ground Water Dept.]

Constitution of Committees:

A Task Force/Executive Committee led by the District Magistrate at each district level, and comprising members from the UPPCB, Irrigation Department, Ground Water Department, Forest Department, Jal Nigam/Jal Sansthan and Municipal Corporations/Nagar Palikas etc., should be formed at each district level in catchment of river Hindon to carry out ground verification, inventory of polluting sources, formulation and implementation of action plan at district level.

A Supervisory Committee headed by the Additional Chief Secretary/Principal Secretary of the Department of Environment, Government of Uttar Pradesh, should be constituted having members from UPPCB, CPCB, NMCG, SMCG, Irrigation Department, Forest Department, CWC, Urban Development Department, Technical Expert (2 Nos.) etc. to review the progress made by district committees and to provide guidance to Executive committee. Executive Committee should meet on monthly basis and Supervisory Committee should meet on quarterly basis. [Action: UPPCB, Department of Environment, District Administration and concerned and concerned state stakeholder]

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Analysis of the Seasonal Variation of Groundwater Quality in a Highly Cultivated Catchment, Northern Benin

D. Mathieu Maurice Ahouansou[1,3,*], Sampson K. Agodzo[2], O. Hervé Rodrigue AWOYE[3], Romaine G. ASSOGBA BALLE[3], Luc. O. C Sintondji[3]

[1]Department of Natural Resources Management, Faculty of Agronomic Sciences, University of Abomey-Calavi, Cotonou, Benin
[2]Department of Agricultural Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[3]Department of Water for Agriculture and Society, National Water Institute, University of Abomey-Calavi, Cotonou, Benin
*Corresponding author: maurice.ahouansou@fsa.uac.bj, mauriceahouansou@gmail.com

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Abstract This study assesses groundwater quality in the Dassari watershed, a highly cultivated catchment area in Northern Benin, West Africa. Four sampling campaigns were conducted and the groundwater samples were analyzed using the standardized methods of the American Public Health Association. Descriptive and multivariate statistics were applied to describe and group the water samples into categories. The water samples were also compared to the World Health Organization (WHO) norms and those of the Republic of Benin. Boxplot comparison method and variance analysis were used to analyze the seasonal variation of groundwater parameters in both rainy and dry seasons. The hydro-chemical facies of the sampled groundwater were investigated through Piper and Chadha diagrams, and the general type of groundwater in the catchment was found to be as calcium-rich and magnesium-rich water based on the identification of the dominant cations. The major anion in the samples was Hydro-carbonate HCO_3^-, thus the groundwater in the study catchment can be considered as carbonate-rich water. Comparing the concentrations of analyzed parameters to WHO and the Republic of Benin guidelines for drinking water, the whole catchment was found to have potable groundwater. Comparing the nitrate concentration in the samples to a natural limit of 10 mg/L, we show that all samples had a nitrate concentration above that limit, thus indicating an anthropogenic pollution due to high fertilizer use. However, these concentrations are still under the permissible limit of WHO (50 mg/L). The analysis of the seasonal change in hydro-chemical parameters revealed no significant change at 5% level of these parameters from rainy season to dry season. In the Dassari catchment, groundwater is still potable although we found a slight sign of pollution due to high fertilizer use.

Keywords: *groundwater quality, hydro-chemical Facies, Dassari catchment, Republic of Benin, seasonal variation*

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1. Introduction

Groundwater is a key resource which is very solicited to solve water scarcity problems worldwide in semi-arid and arid regions in particular. Groundwater is an important source of water supply because of its abundance and stable quality [1]. It is a renewable natural resource and a valuable freshwater source provided by hydroecosystem [2]. In comparison to surface water, groundwater is more solicited for drinking water supply because it is in general less susceptible to contamination and pollution [3]. Despite its deep location in the substratum, it is also exposed to natural and human impacts [2].

The groundwater chemical composition is influenced by the geochemistry of aquifers and the leaching of soils, the dissolution of aerosol particles and other human activities such as mining and conventional agriculture [4,5].

In Sub-Saharan Africa, agriculture is the backbone of economy. Due to the decreasing soil fertility, the use of fertilizer became a solution for securing crop productivity. The intensive use of fertilizer occurs in this region where policies are put in place by governments for cash crop production like fibre crop or cotton. By the way a strong interest is given to fertilizer use in sub-Saharan African countries it is observed an intensive use of fertilizers, which might be a source of groundwater pollution because of soil leaching processes that are inevitable. Thus, it is necessary to investigate the variation of groundwater quality as cultivated lands are increasing over the years and more attention is given to the use of chemical fertilizers.

Groundwater contamination from nitrate in particular is the most frequent emerging issue in many countries with both human and ecosystem health consequences. Agriculture stands as the primary source of nitrogen contamination in groundwater. Due to its high water solubility, nitrate has a high leaching potential [6]. The use of groundwater sources for drinking and other domestic purposes is a common feature of many low-income communities. Therefore, groundwater quality is very important to human health. Investigations to understand the hydrochemical characteristics of groundwater and its quality change under natural water circulation processes in a dominant agricultural area not only help in envisaging the alteration of this valuable resource [5], but also aid to offset the impact of the intensive use of fertilizers on groundwater.

Studies on groundwater quality in the Republic of Benin are very few and have been highly localised [7]. Groundwater quality has not been investigated yet regarding the probable consequence of fertilizer use. Geochemical composition of an aquifer is not the only factor determining groundwater quality as human factors also play an important role [8]. The general chemical nature of groundwater and variation in hydrochemical facies can be understood by analysing major cation and anion concentrations at different time periods.

The main objective of this study was to determine the degree of change in the chemical parameters of groundwater in a small highly cultivated catchment in northern Benin. A groundwater quality survey on a small catchment where more and more attention is given for cotton production with an intensive use of fertilizer, is important as a first step in the development of a groundwater management strategy for similar catchments in the Republic Benin.

2. Description of the Study Site

2.1. Geographic Location and Climate

The study site 'Dassari catchment' is a nested catchment of the Pendjari River basin or Volta basin in the Republic of Benin. It is located in North-West Benin and stretches over the coordinates 10°40’ N and 11° N and 1° E and 1°15’ E. It covers an area of approximately 192 km^2. The study site is fully located in the Sudanian zone characterized by a semi-arid climate with a dry season from November to April and a rainy season from Mai to October. The mean annual rainfall amounts to 919.77 mm and the mean near-surface air temperature is about 34°C [9].

The people living in this catchment area are predominantly farmers and use various water sources for drinking and other domestic proposes.

2.2. Geology and Hydrogeology

The Dassari catchment area is composed of one drainage system. Groundwater is one of the major water resources in Dassari catchment and is most used during the dry season. This catchment is characterized by a relatively flat topography. Elevation in the area is varying from 153 m to 234 m above sea level. The entire catchment lays on the low metamorphic sedimentary rocks of Proterozoic (Cambrian) belonging to the Pendjari series [10] which are made up of silts, argillites and fine green sandstones [11].

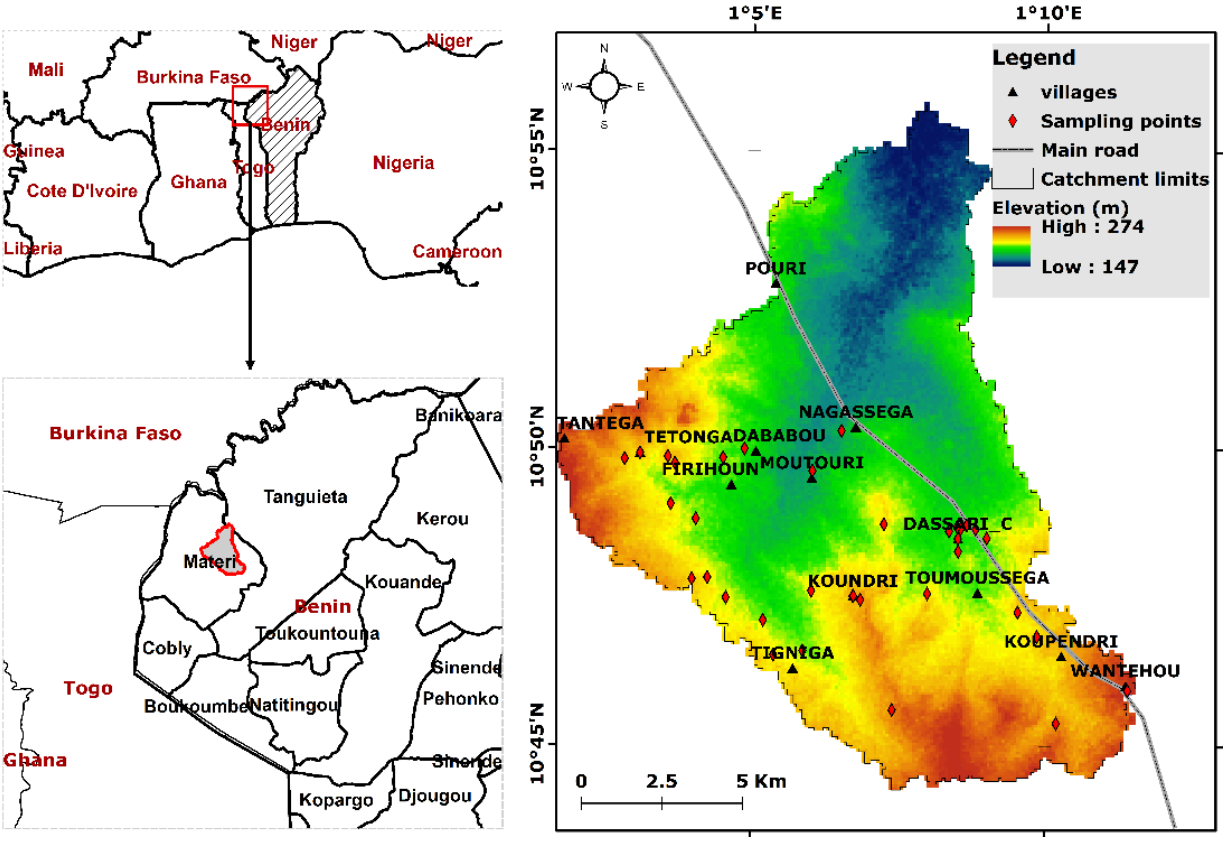

Figure 1. Map the Dassari catchment area

Groundwater flowing through the Pendjari series is hydrocarbonate-sodic or hydrocarbonate-sodium-chloride, hydrocarbonate-sulphated, calcium-magnesium rich. The predominant cations are those of alkaline metals (60.6 mg/L). In general, the calcium and magnesium ion content in groundwater in this region does not exceed 82.3 and 30.3 mg/L, respectively. The pH is close to neutral (6.1 to 7.3) and the hardness is 0.14 to 5.26 mg equivalent/L. The dominant ions are those of calcium and magnesium with a concentration of 46 and 10.6 mg/L respectively, followed by those of sodium and potassium with a concentration of 26.9 mg/L for both [11].

The hydrogeology within the study catchment is based on geological materials and the groundwater is derived primarily from crust alteration or fractures [11,12].

Groundwater associated with alluvium and weathering crusts is the most commonly used by the population. It is generally captured by large hand-dug wells that may dry up during the dry season depending on their position and rainfall.

As for the water of the fractures, it is confined in the tectonized zones and accumulates mainly in the faults. It is perennial for the most part and captured by boreholes or hydraulic boreholes [11].

2.3. Soil and Land Use

Soils in the Dassari catchment are mainly ferruginous soils with crust. Some Gleysoils are found in lowlands and river channels around the catchment, indicating the hydromorphic conditions. The catchment is characterized by temporary river streams [9].

The natural vegetation of the catchment is dominated by a mosaic of savannas with degraded gallery forests along rivers. In terms of land use, the area is dominated by agricultural lands (food crop and cotton production). The rural residential areas occupy the lowest percentage of the whole catchment area.

3. Material and Methods

3.1. Groundwater Sampling and Analysis

To reach the goal of this study, boreholes inside the Dassari catchment were first selected by overlapping the geographical coordinates of the existing boreholes with the catchment shapefile. Thus, a total of thirty-five (35) groundwater sources points or boreholes were identified. These coordinates were obtained from The Benin General Directorate of Water (Direction Génerale de l'Eau) that is in charge of water supply in rural area.

Four sampling campaigns (March and September 2015; March and September 2016) were conducted in both dry and rainy seasons. March represents the dry season while September represents the rainy season. Groundwater samples were collected in polyethylene bottles (1.5 L) for the physico-chemical analysis in laboratory. A total of 140 samples were collected during the four sampling campaigns.

In situ, water temperature, pH, conductivity and dissolved oxygen were measured using a compact precision handheld meter Multi 340i. Alkalinity, calcium, hydrocarbonate, sulphate, magnesium, chloride ion, total iron, nitrite, nitrate, ammonium, phosphate, fluorides and sulphate were analysed in the laboratory within 24 hours of sampling using the standard recommended analytical methods of the American Public Health Association [13]. The volumetric method was applied for the quantitative analysis of calcium, magnesium, chloride and hydrocarbonate. The calcium and magnesium in the samples were determined using the Complexometric titration with EDTA (Ethylene-Diamine Tetra Acetic acid). The chlorides were determined by titration with silver nitrate (Mohr's method). The spectrophotometry method was used to estimate the concentrations of nitrate, nitrite, ammonium, sodium, potassium, phosphate, total iron and fluorides. Sulphate concentration was determined using the colorimetric method. The spectrophotometer used is DR/2400 HACH with operating wavelengths ranging between 400 and 800 nm.

The suitability of groundwater for domestic purposes was evaluated by comparing the values of various water quality parameters with those of the World Health Organisation (WHO 2017) and Benin standard specification guidelines values for drinking water.

3.2. Statistical Analysis

With the goal of evaluating significant changes in groundwater quality used for drinking in a highly cultivated area, the data obtained from the water samples were statistically analysed. Descriptive statistics were used to retrieve information on the major ion concentrations in groundwater per season. Pearson correlation and Student *t*-test were used for describing the significance of the relationship that might exist or not among water quality parameters.

Piper diagrams were plotted using GW_Chart 1.29.0.0 software while Microsoft Excel 2013 was used to build the Chadha's diagram. Moreover, the data used to generate the analytical results shown in Table 1 were submitted to principal component analysis. Cluster analysis (CA) was used to group the water samples based on their similarity.

To analyse the significance of changes in water quality parameters between rainy season and dry season, the boxplot comparison method was used. A one-way analysis of variance (ANOVA) was further used at 5% level of significance to test the significance level of the seasonal change of the parameters.

4. Results and Discussion

4.1. Electrical conductivity (EC), Total Dissolved Solids (TDS) and Hardness (Hd) Values

The physical and chemical parameters of groundwater in the studied catchment are summarized in Table 1. In Dassari catchment, average pH was 7.66 with a minimum and maximum between 6.98 and 8.87, thus indicating the neutral to slightly alkaline nature of the water samples. Only two samples among 140 samples have a pH value slightly exceeding the World Health Organization permissible upper limit of 8.85.

Table 1. Descriptive statistics of chemical parameters in borehole water

Descriptive Statistics									
Parameters	Seasons	Number of samples	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
pH	Rainy season	70	7.76	0.48	0.08	7.59	7.92	7.02	8.87
	Dry season	70	7.57	0.44	0.07	7.41	7.72	6.98	8.50
	Total	140	7.66	0.47	0.06	7.55	7.77	6.98	8.87
EC [µS/cm]	Rainy season	70	594.16	363.80	61.49	469.19	719.12	56.65	1520.80
	Dry season	70	612.58	373.51	63.14	484.27	740.89	55.93	1599.00
	Total	140	603.37	366.12	43.76	516.07	690.67	55.93	1599.00
Hd [mg/l]	Rainy season	70	168.29	69.59	11.76	144.39	192.20	58.54	359.87
	Dry season	70	178.32	71.51	12.09	153.75	202.88	60.03	380.02
	Total	140	173.31	70.23	8.39	156.56	190.05	58.54	380.02
TDS [mg/l]	Rainy season	70	401.06	245.56	41.51	316.70	485.41	38.24	1026.54
	Dry season	70	413.49	252.12	42.62	326.89	500.10	37.75	1079.33
	Total	140	407.27	247.13	29.54	348.35	466.20	37.75	1079.33
Ca^{2+} [mg/l]	Rainy season	70	39.64	15.65	2.64	34.27	45.02	8.76	89.49
	Dry season	70	41.67	16.39	2.77	36.04	47.29	9.53	93.51
	Total	140	40.65	15.94	1.90	36.85	44.45	8.76	93.51
Mg^{2+} [mg/l]	Rainy season	70	16.83	10.51	1.78	13.22	20.45	0.99	41.99
	Dry season	70	18.04	10.69	1.81	14.37	21.71	1.54	44.00
	Total	140	17.44	10.55	1.26	14.92	19.95	0.99	44.00
Na^{+} [mg/l]	Rainy season	70	8.00	2.46	0.42	7.15	8.85	4.57	13.16
	Dry season	70	8.53	2.48	0.42	7.68	9.38	4.81	13.73
	Total	140	8.27	2.47	0.30	7.68	8.85	4.57	13.73
K^{+} [mg/l]	Rainy season	70	1.20	1.88	0.32	0.56	1.85	0.09	8.37
	Dry season	70	1.24	1.87	0.32	0.59	1.88	0.04	8.54
	Total	140	1.22	1.86	0.22	0.78	1.66	0.04	8.54
CO_3^{2-} [mg/l]	Rainy season	70	53.96	73.57	12.44	28.69	79.23	0.64	355.92
	Dry season	70	29.32	31.00	5.24	18.67	39.97	0.63	117.84
	Total	140	41.64	57.40	6.86	27.95	55.33	0.63	355.92
HCO_3^{-} [mg/l]	Rainy season	70	171.21	83.02	14.03	142.69	199.73	21.28	349.05
	Dry season	70	174.45	83.94	14.19	145.62	203.29	21.94	347.55
	Total	140	172.83	82.89	9.91	153.07	192.60	21.28	349.05
Cl^{-} [mg/l]	Rainy season	70	12.34	3.80	0.64	11.03	13.64	7.05	20.30
	Dry season	70	13.16	3.82	0.65	11.84	14.47	7.41	21.17
	Total	140	12.75	3.81	0.46	11.84	13.65	7.05	21.17
SO_4^{2-} [mg/l]	Rainy season	70	31.01	79.67	13.47	3.64	58.37	0.01	409.50
	Dry season	70	30.79	80.39	13.59	3.17	58.40	0.01	414.50
	Total	140	30.90	79.45	9.50	11.95	49.84	0.01	414.50
PO_4^{2-} [mg/l]	Rainy season	70	0.98	1.52	0.26	0.46	1.50	0.08	6.78
	Dry season	70	1.00	1.51	0.26	0.48	1.52	0.04	6.91
	Total	140	0.99	1.50	0.18	0.63	1.35	0.04	6.91
NO_3^{-} [mg/l]	Rainy season	70	22.50	13.70	2.31	17.79	27.20	0.01	55.47
	Dry season	70	23.63	14.12	2.39	18.78	28.48	0.02	59.70
	Total	140	23.07	13.82	1.65	19.77	26.36	0.01	59.70
NO_2^{-} [mg/l]	Rainy season	70	0.13	0.21	0.03	0.06	0.21	0.01	0.80
	Dry season	70	0.17	0.25	0.04	0.08	0.26	0.02	1.04
	Total	140	0.15	0.23	0.03	0.10	0.21	0.01	1.04
NH_4^{+} [mg/l]	Rainy season	70	0.18	0.28	0.05	0.08	0.28	0.01	1.54
	Dry season	70	0.21	0.31	0.05	0.10	0.31	0.01	1.69
	Total	140	0.19	0.30	0.04	0.12	0.26	0.01	1.69
Fluoride [mg/l]	Rainy season	70	0.62	0.65	0.11	0.40	0.84	0.00	3.24
	Dry season	70	0.86	1.43	0.24	0.37	1.35	0.01	8.20
	Total	140	0.74	1.11	0.13	0.47	1.00	0.00	8.20
Fe^{2+}	Rainy season	70	0.82	1.96	0.33	0.14	1.49	0.00	10.20
	Dry season	70	0.89	2.16	0.37	0.15	1.64	0.01	11.27
	Total	140	0.86	2.05	0.25	0.37	1.34	0.00	11.27

[14] which is the same with the standard in the Republic of Benin. This difference of 0.02 is not significant to need a focus of attention.

Water ability of to conduct electricity is measured by the electrical conductivity (EC). Water with a high value of EC indicates its enrichment in salts/dissolved matter.

According to WHO guidelines reported by Ebrahime et al. [15] EC up to 1500 µS/cm is the maximum permissible for drinking water. The EC values recorded in Dassari catchment ranged from 55.93 to 1599 µS/cm, with a mean of 603.37 µS/cm. This indicates that most of the groundwater samples collected between 2015 and 2016 were in the permissible limit. Only about 5.7% of the samples (8 samples) have EC values slightly greater than the permissible upper limit (1516 to 1599 µS/cm). This means that these eight samples have medium enrichment of salts.

Total dissolved solids (TDS) content represents the total amount of inorganic substances, mainly salt, in the water [15]. In the study area, TDS values ranged from 18.17 to 1100.5 mg/L with an average value of 101.45 mg/L. According to WHO [16] the classification of drinking water based on TDS level is as follows: excellent, less than 300 mg/L; good, between 300 and 600 mg/L; fair, between 600 and 900 mg/L; poor, between 900 and 1200 mg/L; and unacceptable, greater than 1200 mg/L. Water with extremely low concentrations of TDS may also be unacceptable because of its flat, insipid taste. Based on this classification, 37.1% of the samples are excellent while 51.4% of the samples are good, 2.9% are fair and 8.6% are poor. None of the samples is classified as unacceptable water. The samples with the highest value of EC also have the highest value of TDS but they do not exceed the limits of 3000 µS/cm and 1200 mg/L.

Water hardness is the traditional measure of the capacity of water to react with soap [16]. Groundwater Hardness (Hd) is mainly controlled by calcium and magnesium ions which are in general produced by the dissolution of carbonated rock. According to WHO, there is no health- based limits for hardness of drinking water. The sampled boreholes hardness values ranging from 58.5 to 380 mg/L with a mean value of 173.3 mg/L in Dassari catchment. Based on the WHO classification about 77.2% of the samples were found to be hard and very hard (see Table 2).

Table 2. Groundwater classification based on Electrical Conductivity, Total Dissolved Solids and Total Hardness

Parameters	Classification	Sample percentage
EC (µS/cm)		
0 - 800	Good	78.6
800 - 3000	Acceptable	21.4
3000 -10,000	Not recommended	0.0
>10,000	Not suitable	0.0
TDS (mg/L)		
< 300	Excellent	37.1
300 - 600	Good	51.4
600 - 900	Fair	2.9
900 -1200	Poor	8.6
>1200	unacceptable	0.0
Hardness (mg/L)		
<60	Soft	1.4
60 - 120	Moderately hard	21.4
120 - 180	Hard	38.6
>180	Very hard	38.6

4.2. Calcium (Ca^{2+}) and Magnesium (Mg^{2+}) Values

Naturally, calcium and magnesium are the most abundant elements in surface and ground water. In Dassari catchment Ca^{2+} concentrations vary from 8.76 to 93.51 mg/L with a mean of 40.65 mg/L (Table 1). The highest concentration of Ca^{2+} (93.51 mg/L) is observed in the dry season while in the rainy season the highest concentration of Ca^{2+} observed is 89.49 mg/L. Though there are a little bit high these concentrations of Ca^{2+} did not exceed the maximum allowable concentration of 200 mg/L recommended by WHO. But 2.9% (4 samples) of the samples had Ca^{2+} concentrations exceeding the maximum acceptable limit of 75 mg/L [16]. Regarding Benin standard specification guidelines values for drinking water, the permissible concentration of Ca^{2+} is 100 mg/L. This means that 100% of the groundwater samples collected for this were good for consumption regarding calcium concentration.

In both rainy and dry seasons, magnesium content in the sampled groundwater ranged from 0.99 to 44 mg/L with a mean of 17.44 mg/L. The acceptable limit of Mg^{2+} concentration in drinking water is specified as 50 mg/L according to Benin and WHO standards and the maximum allowable concentration of Mg^{2+} is 150 mg/l (WHO 2004).

Regarding these standards on Mg^{2+} concentration, all samples were suitable for consumption.

4.3. Sodium (Na^{+}) and Potassium and (K^{+}) Values

In most natural water sources sodium is in general found in lower concentration than calcium and magnesium [2]. During the rainy and dry seasons in Dassari catchment, the concentration of Na^{+} ranged from 4.57 to 13.73 mg/L with a mean of 8,27 mg/L. The permissible limit of sodium is 200 mg/L according to WHO standards [14]. Regarding this value, none of the samples did not exceed the permissible limit of Na+ concentration. Thus, the groundwater in the study site is suitable for domestic purposes.

Naturally, potassium (K^{+}) concentration is quite lower compared with Ca^{2+}, Mg^{2+} and Na^{+} despite its natural availability. Its concentration in drinking water seldom reaches 20 mg/L [2]. The concentration of K^{+} during the rainy and dry seasons in Dassari catchment ranged between 0.04 and 8.54 mg/L with a mean of 1.22 mg/L. The maximum permissible limit of potassium in the drinking water is 12 mg/l and it was found that all samples are below the permissible limit of WHO reported by Sarath Prasanth et al.[2].

4.4. Ammonia (NH_4^{+}) and iron (Fe^{2+}) values

Ammonia in the environment originates from metabolic, agricultural and industrial processes. Natural levels in groundwater are usually below 0.2 mg/L. Anaerobic groundwater may contain up to 3 mg/L [14]. In the study area the concentrations of ammonia ranged from 0.01 mg/L to 1.69mg/L with a mean of 0.19 mg/L. Considering these values groundwater in Dassari catchment are not ammonia-rich water. Since ammonia in drinking-water is

not immediate health relevant, there is no health-based guideline value recommended.

Iron is the second most abundant metal in the earth's crust, of which it accounts for about 5%. Iron is most commonly found in nature in its oxides' form. According to WHO [14] the taste threshold value is 0.12 mg/L. In the water samples from wells, iron concentrations below 0.3 mg/L were characterized as unnoticeable whereas levels of 0.3-3 mg/L were found acceptable. In the groundwater samples from Dassari catchment Fe^{2+} concentrations vary from 0 mg/L to 11.27 mg/L with a mean of 0.86 mg/L. 12 samples (5.6% of all samples) exceed the maximum acceptable limit of 3 mg/L [14].

4.4. Carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-) values

Carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-) ions are the main form of carbonate compounds in freshwater [17]. They are often derived from the dissolution of carbonate minerals in soil. They also control the alkalinity in most groundwater. In Dassari catchment, the observed values of CO_3^{2-} ranged from 0.63 to 355.92 mg/L and HCO_3^- ranged from 21.28 to 349.05 mg/L, with average values of about 41.64 mg/L and 172.83 mg/L respectively. The carbonate and bicarbonates are probably derived from the weathering of the geological material in the catchment which is mainly composed of rocks of Proterozoic (Cambrian) belonging to the Pendjari series [10] that is a carbonate-rich rock. There is no drinking water standard established for carbonate and bicarbonate.

4.5. Chloride (Cl^-) and Fluoride (F^-) Values

Chlorides are present in water at low concentrations (less than 100 mg/L) unless the water is classified as brackish or saline [15]. In groundwater chloride might come from diverse sources such as weathering, leaching of sedimentary rocks and soils. There is no health-based guideline for chloride in drinking-water issued from WHO. But it was recommended a taste threshold of 200-300 mg/L. During the four campaigns all water samples from the study area under the WHO's taste threshold. Cl^- concentrations ranged from 7.05 to 21.17 mg/L with a mean value of 12.75 mg/L.

In the sampled water, the concentration of F^- varied from 0 to 8.20 mg/L (Table 1) with a mean value of 0.74 mg/L. The highest concentration of F^- is obtained during the dry season. The maximum acceptable concentration of Fluoride in drinking water is 1.5 mg/L according to the Republic of Benin and WHO standards. Concentrations between 0.6 and 1.7 mg/l in drinking water have a beneficial effect on the structure and resistance to decay of children's teeth, but excess levels may cause mottling of teeth [14]. In the study catchment about 7.14% (10 samples) of the samples exceed the acceptable limit. According to Subba Rao et al. [18] the key factors that determine the concentration of F^- in groundwater are the sources of geogenic (apatite, biotite, and clays) and anthropogenic (chemical fertilizers), with a combination of higher rate of evaporation and longer interaction of water with the aquifer materials under alkaline environment.

4.6. Sulphate (SO_4^{2-}) and Phosphate (PO_4^{3-}) Values

According to WHO [14] high concentration of sulfate do not cause health issues for humans. But concentrations exceeding 250 mg/L result in a bitter taste in drinking water and may cause a laxative effect for some consumers. WHO specifies the maximum permissible concentration of sulfate in drinking water as 500 mg/L because of the gastrointestinal effects. The sulfate concentrations of the samples from the study catchment ranged between 0.01 and 414.50 mg/L with a mean value of 30.90 mg/L. None of the samples did exceed the WHO limit, thus indicating that groundwater in the catchment is still good for drinking.

Phosphate concentrations in the samples varied from 0.04 to 6.91 mg/L with a mean value of 0.99 mg/L (Table 1). The highest concentration of phosphate is observed in dry season. Kipngetich et al. [19] reported that the recommended limit of phosphate concentration by WHO is 5 mg/L. Based on this threshold, only 5.7% (8 samples) of the samples had their phosphate values greater than the maximum limit.

4.7. Nitrate (NO_3^-) and Nitrite (NO_2^-) Values

Nitrate (NO_3^-) is found naturally in the environment and is an important plant nutrient. It can reach both surface water and groundwater as a consequence of agricultural activity (including excess application of inorganic nitrogenous fertilizers and manures) [14]. The value of NO_3^- in the groundwater samples ranged from 0.01 to 59.70 mg/L, with a mean value of 13.82 mg/L (Table 1). 94.3% of the samples had their NO_3^- concentration below the recommended value for drinking water by WHO (50 mg/L) while 5.7% of the samples had NO_3^- concentration above the recommended limit. NO_3^- is a of non-lithological source. In natural conditions, the concentration of NO_3^- does not exceed 10 mg/L in water so that a high concentration of NO_3^- above 10 mg/L is an indication of anthropogenic pollution [18]. 84.3% of the samples had NO_3^- concentrations higher than 10 mg/L, indicating the impact of a high fertilizer use on groundwater in the study area.

Nitrite (NO_2^-) is not usually present in significant concentrations except in a reducing environment, because nitrate is the more stable oxidation state. It can be formed by the microbial reduction of nitrate and in vivo by reduction from ingested nitrate. The groundwater shows a very low content of NO_2^- from 0.01 to 1.04 mg/L, with a mean value of 0.15 mg/L. 100% of the water samples had their NO_2^- concentration below the recommended limit for drinking water that is 3 mg/L.

4.8. Hydro-geochemical Facies

Hydro-chemical parameters in groundwater can be understood by plotting the concentration of major cations and anions in a Piper trilinear diagram [15,20]. It is a graphical presentation of the major ions that helps to quickly determine the hydro-chemical facies of groundwater [15]. The major cation and anion concentrations are presented in the bottom triangles on the left and right, respectively. The diamond in the top centre of the diagram

presents the composition of both ions. The Piper trilinear diagram for the groundwater samples in rainy and dry season is shown in Figure 2 which explains clearly the variations of the major cation and anion concentration in Dassari catchment.

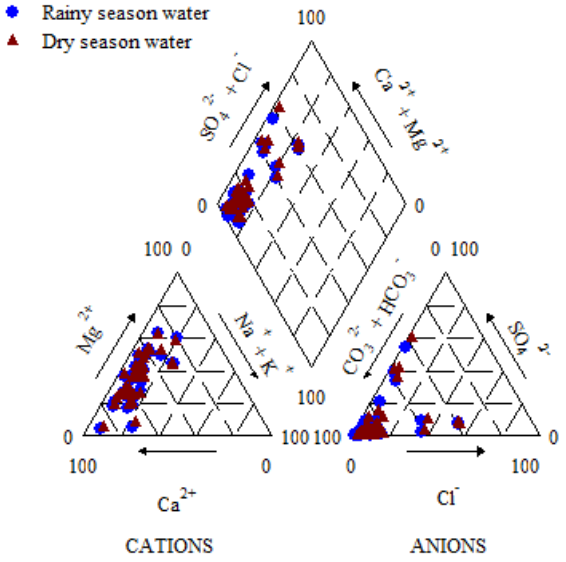

Figure 2. Piper diagram of the groundwater samples

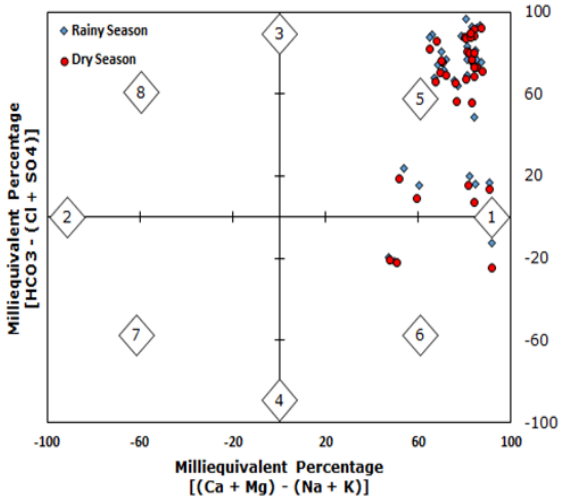

Figure 3. Chadha's plot of the groundwater samples

Looking at the bottom triangles on the left, it clearly comes out that all groundwater samples in the study area were calcium-rich water and 94.3% of the samples were magnesium-rich water. From the bottom triangles on the right, it is shown that 94.3% of the samples were carbonate-rich water while the remaining samples were moderate carbonate water. In the study area the majority of samples belongs to the Ca^{2+} – Mg^{2+} – HCO_3^- type in both rainy and dry seasons. Regarding the diamond in the top centre of the diagram, 11.4% of the samples were moderate strong acid water and cannot be identified as neither anion nor cation dominant.

In brief, groundwater in Dassari catchment is Calcium-Bicarbonate type and this is likely induced by the the rock/water interaction in the area.

The Chadha's plot (Figure 3) is conform with the Piper trilinear diagram (Figure 4). Based on the Chadha's plot, all the samples can be divided into two groups. In the first group, the alkaline earth metal cations exceed the alkali metals cations, viz. Ca2+ – Mg2+ > Na+ – K+ (field 1), 11.4% of the total samples fall into this group. The remain samples (88.6%) fall into the second group alkaline earths and weak acidic anions exceed both alkali metals and strong acidic anions, respectively viz. Ca2+ – Mg2+ – HCO3- > Na+ – K+ – Cl- – SO42- (field 5).

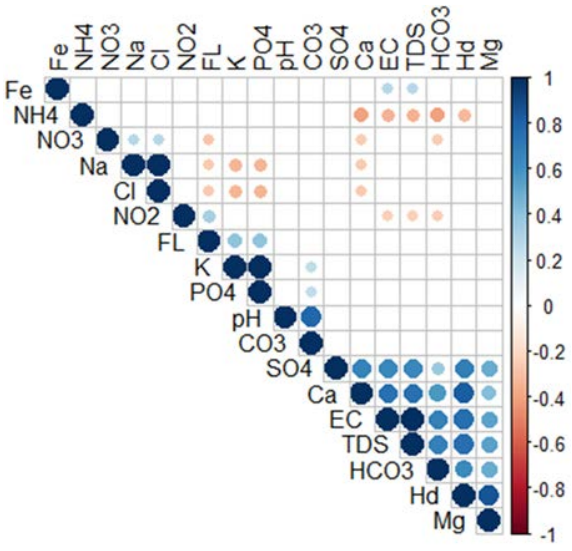

Figure 4. Correlogram of the hydro-chemical parameters

4.9. Interrelations of Chemical Parameters

The interrelations between chemical parameters have been analysed using Pearson's correlation plotted as a correlogram and presented in Figure 4. To examine the significance of a probable relationship between two water quality parameters the Student's *t-test* was used. In this Figure 4, the correlations with a p-value > 0.05 are considered as non significant and their values are not plotted.

This figure displays a strong positive and significant relationship between total hardness (Hd) and HCO_3 (r = 0.70), TDS (r = 0.80), EC (r = 0.8), Ca^{2+} (r = 1), SO_4^{2-} (r = 0.8) and Mg^{2+} (r = 0.8). This indicates that the groundwater quality in the study catchment is characterised by an alkaline environment and the groundwater is mainly controlled by Ca^{2+}, Mg^{2+}, HCO_3^- and SO_4^{2-}which leads to dissolve aquifer minerals. This finding is in good agreement with the Piper diagram and the Chadha's plot.

Significant and negative correlations existing between ammonia ($NH4^+$) and Ca^{2+}, EC, TDS, HCO_3^- , Hd; and between nitrate (NO_3^-) and Ca^{2+}, HCO_3^- and; between nitrite (NO_2^-) and EC, TDS and HCO_3^- indicate anthropogenic factors from agricultural activities in the catchment.

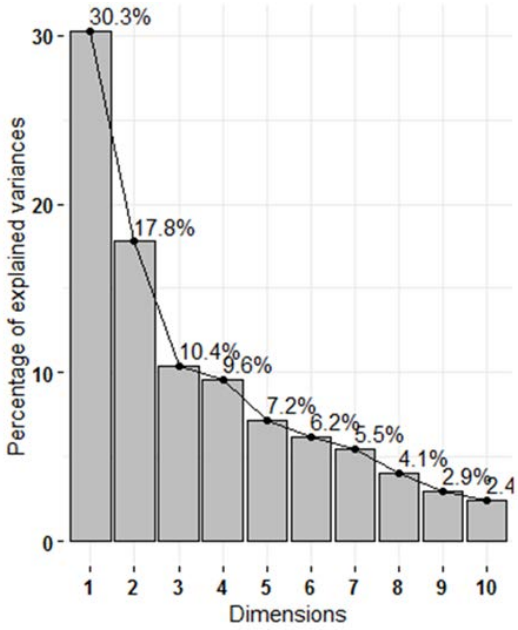

Figure 5. PCA scree plot of the percentage of explained variance

4.10. Principal component analysis

Principal component analysis (PCA) is a multivariate statistical analysis used to reduce the dimensionality of a data set without losing too much information [21,22]. Thus, PCA was applied to reduce the number of chemical parameters of groundwater for further assessment of the relationships between these parameters. In this study, the leading four principal components (PCs) were retained and summarised 68.1 % of the total variance. Figure 5 shows the percentage of the explained variance per component.

Figure 6 displays the correlation level between the leading two principal components and the analysed parameters. The first principal component is highly correlated with the ion concentrations of Ca^{2+}, Mg^{2+}, HCO_3^-, SO_4^{2-}, EC, TDS and Hd while being negatively correlated with ammonia ($NH4^+$).

The second principal component is highly and positively correlated with Na^+ and Cl^-, and weakly correlated with NO^{3-} and Fe^{2+}. This second principal component is also negatively correlated with PO_4^{3-}, K^+, F^-, pH, NO_2^- and CO_3^-.

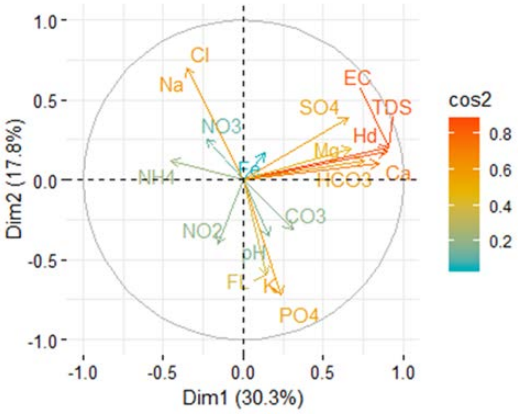

Figure 6. Plot of PCA loading scores for the groundwater chemical parameters

From Figure 5 and Figure 6 it comes out that the most important parameters controlling groundwater quality in rainy and dry seasons in the study catchment are Ca^{2+}, Mg^{2+}, HCO_3^-, SO_4^{2-}, EC, TDS and Hardness(Hd).

4.11. Cluster Analysis

Cluster analysis (CA) is applied in this study to detect similarity and dissimilarity in the groundwater chemical parameters and to group the selected parameters into hydro-chemical groups or clusters. The hierarchical cluster analysis method was used to classify the water samples into clusters where hydro-chemical parameters in the same group or cluster are more similar to each other than to those in other groups or clusters. The application of CA on the water samples shows four groups based on the hydro-chemical composition (Figure 7 and Figure 8) for the rainy and dry seasons. In order to compare the hydrochemistry difference of each group and per season, the average values of the hydro-chemical parameters are shown in Table 3.

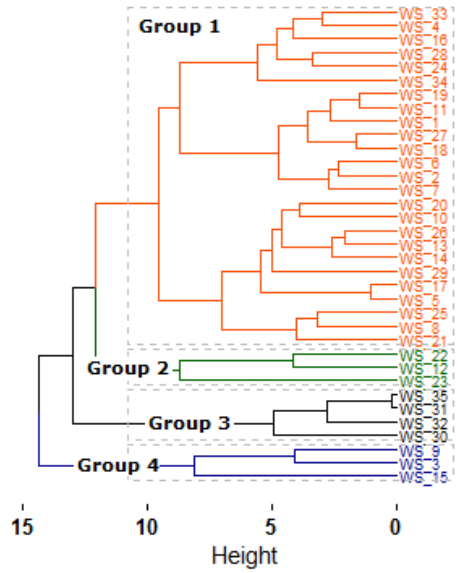

Figure 7. Dendrogram of the water sources in dry season

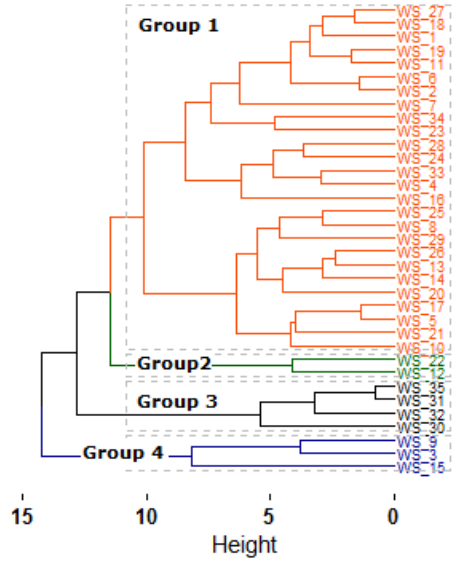

Figure 8. Dendrogram of the water sources in rainy season

Table 3. Average values of the hydro-chemical parameters per water groups

Parameters	Rainy season				Dry season			
	Group 1	Group 2	Group 3	Group 4	Group 1	Group 2	Group 3	Group 4
pH	7.8	8.1	7.3	7.7	7.6	7.6	7.2	7.39
EC [µS/cm]	554.7	805.5	87.7	1470.4	578.5	688.7	87.7	1520.27
Hd [mg/L]	162.8	229.6	72.5	302.6	174.2	211.3	75.4	317.05
TDS [mg/L]	374.4	543.7	59.2	992.5	390.5	464.9	59.2	1026.18
Ca^{2+} [mg/L]	39.7	46.7	13.7	69.2	42.2	44.1	14.2	71.66
Mg^{2+} [mg/L]	15.5	27.4	9.3	31.5	16.7	24.5	9.7	33.54
Na^{+} [mg/L]	7.9	5.9	10.1	7.6	8.5	6.0	10.7	8.17
K^{+} [mg/L]	0.9	7.6	0.2	0.7	0.8	6.4	0.2	0.72
CO_3^{-} [mg/L]	56.8	137.9	2.1	42.2	32.8	45.3	1.4	21.4
HCO_3^{-} [mg/L]	179.5	227.9	27.3	253.1	185.7	192.1	28.0	258.2
Cl^{-} [mg/L]	12.1	9.1	15.6	11.8	13.2	9.3	16.5	12.6
SO_4^{2-} [mg/L]	13.4	10.0	3.2	235.0	12.7	9.6	3.5	239.2
PO_4^{3-} [mg/L]	0.8	6.2	0.2	0.5	0.7	5.2	0.2	0.59
NO_3^{-} [mg/L]	21.5	14.7	29.2	27.4	23.1	13.9	30.4	28.87
NO_2^{-} [mg/L]	0.2	0.0	0.1	0.1	0.2	0.4	0.2	0.09
NH_4^{+} [mg/L]	0.1	0.2	0.7	0.2	0.1	0.2	0.9	0.19
F^{-} [mg/L]	0.7	1.6	0.0	0.4	0.7	3.8	0.0	0.47
Fe^{2+} [mg/L]	0.6	0.7	0.5	3.4	0.65	0.51	0.54	3.76

The analysis of the average values of the hydro-chemical parameters in the four groups reveals that in the rainy and dry seasons the group 4 was characterised by high values of the major cations and anions and high values of EC, Hd and TDS. The group 4 is followed by the group 2, group 1 and group 3 respectively. The group 3 has the lowest concentrations of the major cations and anions and of EC, Hd and TDS. This group 3 also has the highest concentration of Nitrate.

Considering the Hardness level presented in Table 1, groups 2 and 4 had a very hard water while groups 1 and 3 had a moderate hard water. Based on the TDS, group 3 was the group having excellent water, groups 1 and 2 were the groups having good water and group 4 was a poor water group. As well, considering EC groups 1 and 3 can be classified as having good water, while groups 2 and 4 can be classified as having acceptable water.

Regarding the concentration of NO_3^{-} which is an indicator of the impact of human activities (e.g. agriculture) on groundwater resources, all the four groups had their NO_3^{-} concentrations greater than 10 mg/L which is the natural limit of NO_3^{-} concentration in water [18]. But these NO_3^{-} concentrations were still under the permissible limit of 50 mg/L recommended by WHO for water consumption.

4.12. Seasonal Changes in Groundwater Parameters

The seasonal variation in groundwater parameters in Dassari catchment was analysed using the boxplot comparison method and one-way variance analysis (one-way ANOVA). Figure 9 shows boxplots of the analysed parameters for both rainy and dry seasons. It displays a slight variation of the groundwater parameters in dry season and rainy season. In the dry season, the concentrations of the analysed chemical elements seems to be a little bit higher than those obtained in the rainy season. The significance of this variation was tested by a one-way ANOVA considering the seasons as factors. The results of this test are summarised in Table 4.

The analysis of Table 4 reveals that there is no a significant change of the hydro-chemical parameters of groundwater in Dassari catchment from rainy season to dry season at a 5% level of significance. The slight variation that is noted might be due to dissolution and to the high evapotranspiration that characterises the geographical zone of the study area.

Table 4. Summary of one-way ANOVA test

Parameters	Rainy season	Dry season	F-Value	P-Value
pH	7.76	7.57	3.0851	0.083
EC [µS/cm]	594.16	612.58	0.0437	0.835
Hd [mg/L]	168.29	178.32	0.3531	0.554
TDS [mg/L]	401.06	413.49	0.0437	0.835
Ca^{2+} [mg/L]	39.64	41.67	0.2788	0.599
Mg^{2+} [mg/L]	16.83	18.04	0.2268	0.635
Na^{+} [mg/L]	8.00	8.53	0.8080	0.372
K^{+} [mg/L]	1.20	1.24	0.0046	0.946
CO_3^{-} [mg/L]	53.96	29.32	3.3335	0.072
HCO_3^{-} [mg/L]	171.21	174.45	0.0264	0.871
Cl^{-} [mg/L]	12.34	13.16	0.8068	11.80
SO_4^{2-} [mg/L]	31.01	30.79	0.0001	0.990
PO_4^{3-} [mg/L]	0.98	1.00	0.0043	0.948
NO_3^{-} [mg/L]	22.50	23.63	0.1164	0.734
NO_2^{-} [mg/L]	0.13	0.17	0.3941	0.532
NH_4^{+} [mg/L]	0.18	0.21	0.1341	0.715
F^{-} [mg/L]	0.62	0.86	0.7999	0.374
Fe^{2+} [mg/L]	0.82	0.89	0.0251	0.874

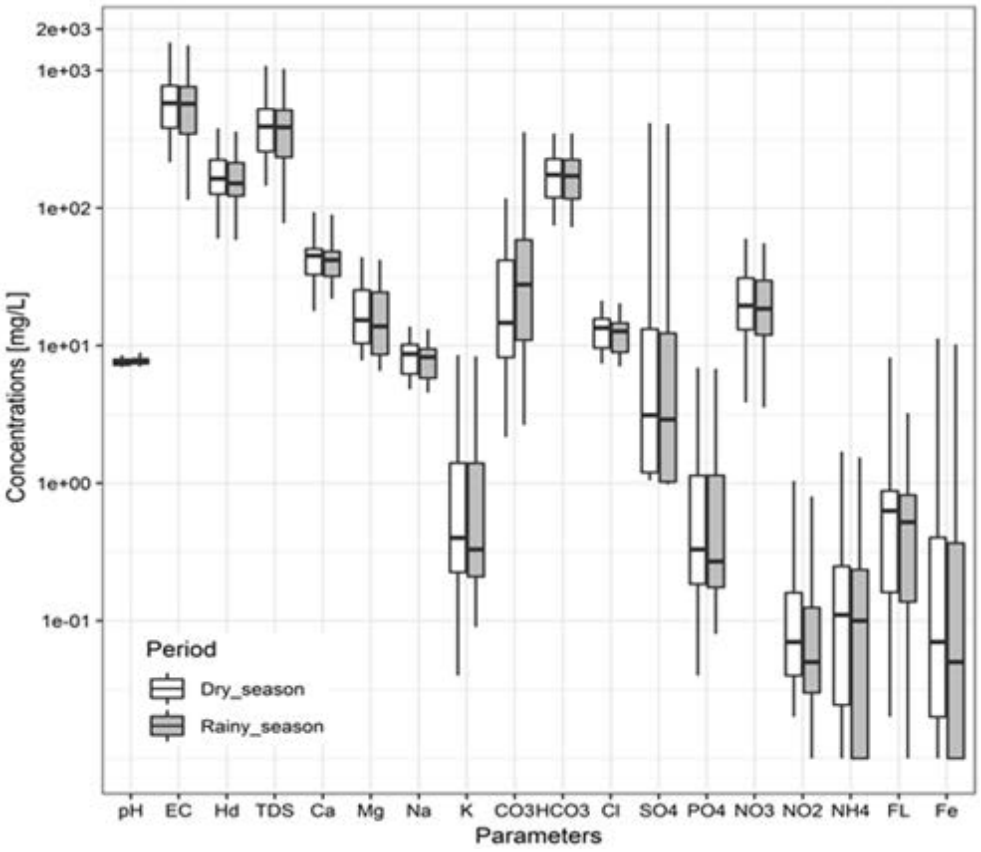

Figure 9. Boxplot of hydro-chemical parameters

5. Conclusion

The study has provided information on the quality of groundwater and its seasonal variation. The effects of anthropogenic activities such as agriculture on groundwater pollution in Dassari catchment in the North-Westof the Republic of Benin are also examined. The analysis of the chemical characteristics the water sampled from boreholes indicated that in the study catchment the groudwater is calcium-rich and magnesium-rich water and the dominant anion is hydro-carbonate (HCO3-). Regarding nitrate concentration in the water samples, groundwater in the study catchment is still good for consumption since the nitrate concentration was found under the permissible limit (50 mg/L) of WHO. But the nitrate concentrations of most samples (84.3%) were above the natural limit of 10 mg/L, thus indicating the impact of high fertilizer use on groundwater in the study area. Looking at the seasonal variation of the hydro-chemical parameters, there was no significant change of the parameters from rainy season to dry season.

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Assessment of Water Quality Index for the Groundwater in Tumkur Taluk, Karnataka State, India

C. R. RAMAKRISHNAIAH[*], C. SADASHIVAIAH[#] and G. RANGANNA[§]

[*]Research Scholar, Department of Civil Engineering, S.I.T, Tumkur-572103.
[#]Karavali Institute of Technology, Neerumarga, Mangalore-575023, India.
[§]Department of Mathematics, UGC-CSA,
Central College Campus, Bangalore University, Bangalore-560 001, India.
rama_bmsce@yahoo.com

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Abstract: The present work is aimed at assessing the water quality index (WQI) for the groundwater of Tumkur taluk. This has been determined by collecting groundwater samples and subjecting the samples to a comprehensive physicochemical analysis. For calculating the WQI, the following 12 parameters have been considered: pH, total hardness, calcium, magnesium, bicarbonate, chloride, nitrate, sulphate, total dissolved solids, iron, manganese and fluorides. The WQI for these samples ranges from 89.21 to 660.56. The high value of WQI has been found to be mainly from the higher values of iron, nitrate, total dissolved solids, hardness, fluorides, bicarbonate and manganese in the groundwater. The results of analyses have been used to suggest models for predicting water quality. The analysis reveals that the groundwater of the area needs some degree of treatment before consumption, and it also needs to be protected from the perils of contamination

Keywords: Groundwater, Water quality standards, Water quality index, India

Introduction

Groundwater is used for domestic and industrial water supply and irrigation all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated pace of industrialization. Human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary conditions. Rapid urbanization, especially in developing countries like India, has affected the availability and quality of

groundwater due to its overexploitation and improper waste disposal, especially in urban areas. According to WHO organization, about 80% of all the diseases in human beings are caused by water. Once the groundwater is contaminated, its quality cannot be restored by stopping the pollutants from the source. It therefore becomes imperative to regularly monitor the quality of groundwater and to device ways and means to protect it. Water quality index is one of the most effective tools[1-4] to communicate information on the quality of water to the concerned citizens and policy makers. It, thus, becomes an important parameter for the assessment and management of groundwater. WQI is defined as a rating reflecting the composite influence of different water quality parameters. WQI is calculated from the point of view of the suitability of groundwater for human consumption.

The objective of the present work is to discuss the suitability of groundwater for human consumption based on computed water quality index values.

Study area

Tumkur taluk is located in the southeastern corner of Karnataka state between 13° 06'30" to 13° 31' North latitude and 76° 59’ to 77° 19’ East longitude and (Figure 1) covers an area of 1043 sq.km with a population[5] of 5,16,661. The major sources of employment are agriculture, horticulture and animal husbandry, which engage almost 80% of the workforce. The major industries are that of chemicals, oil, cotton, soap, tools, food processing, rice mills, stone crushing and mining. Occurrence, movement and storage of groundwater are influenced by lithology, thickness and structure of rock formations. Weathered and fractured granites, granitic gneiss and shale form the main aquifer of Tumkur taluk (Figure 2).

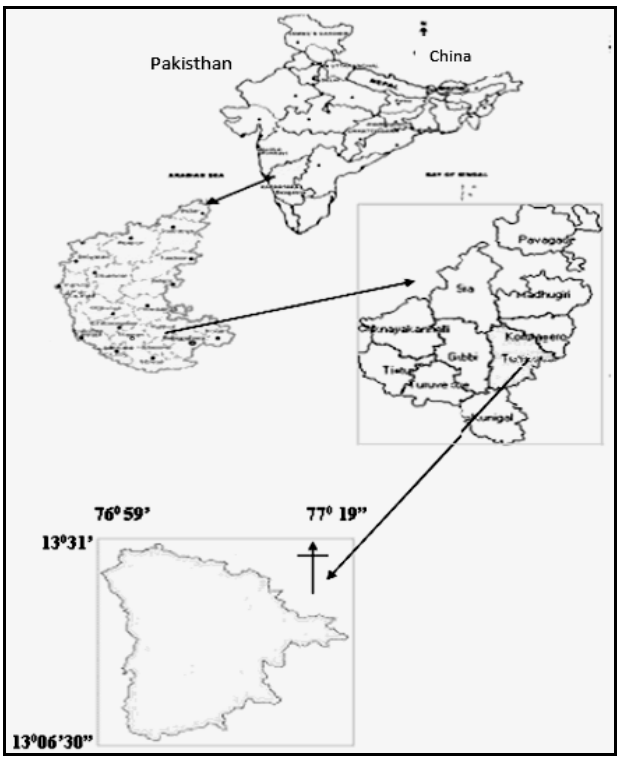

Figure 1. Location map of the study area.

Groundwater in the study area occurs under water table conditions in the weathered and fractured granite, Gneisses. There is no perennial river in the study area. The major ion chemistry of groundwater of Tumkur taluk has not been studied earlier.

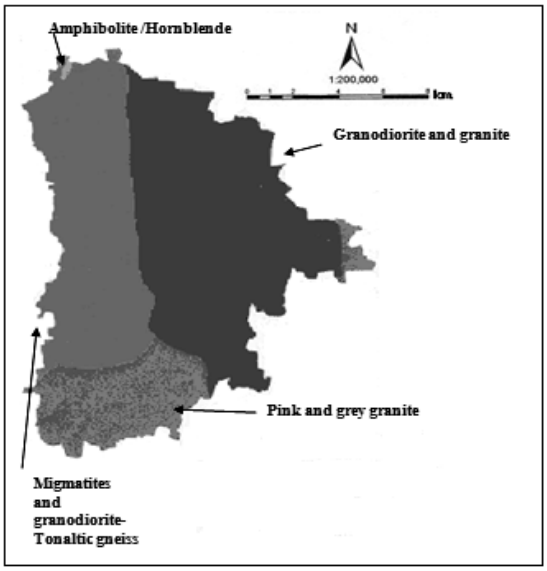

Figure 2. Geological map of study area.

Methodology

Groundwater samples were collected from 269 locations during pre-monsoon period (February 2006) (Figure 3). Each of the groundwater samples was analyzed for 17 parameters such as pH, electrical conductivity, TDS, total hardness, bicarbonate, carbonate, chloride, sulphate, phosphate, nitrate, fluoride, calcium, magnesium, sodium, potassium, iron and manganese using standard procedures recommended by APHA[6].

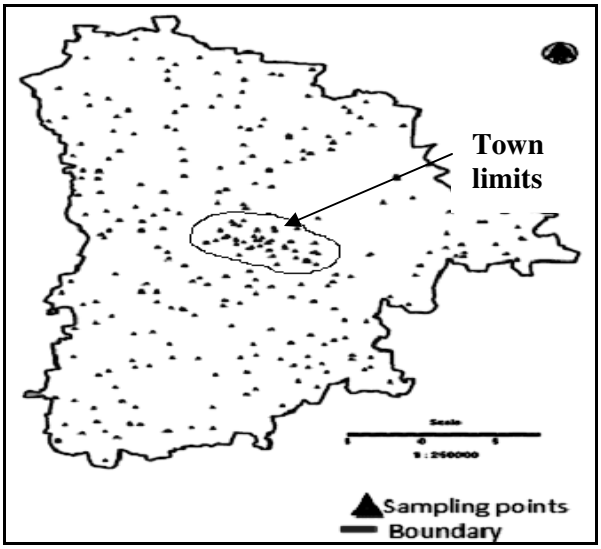

Figure 3. Groundwater sampling locations.

The chemical parameters obtained were used for regression analysis. The regression analysis is carried out by taking TDS as dependent variable and Ca, Mg, Cl, SO_4, NO_3, Na and (HCO_3+CO_3) as independent variables. Trend analysis represents the process of using the analysed data for predictions. This may be used to predict or forecast values of the dependent variable. The regression models can be used to find out the ionic concentration of the groundwater samples, if the dependent variable TDS is measured for different locations, by inverse calculations. Water quality index is calculated from the point of view of suitability of groundwater for human consumption.

Results and Discussion

The chemical analyses of the groundwater and the percent compliance with the Indian Standards[7] and WHO[8] are summarized in Table 1. Normal statistics of water quality parameters of 269 groundwater samples are presented in Table 2.

Table 1. Comparison of groundwater quality with drinking water standards, Indian and WHO.

Parameters	Indian Standard	Percent compliance	WHO Standard	Percent compliance
pH	6.5-8.5	98.5	7.0-8.0	91
Electrical conductivity	-	-	-	-
Total dissolved solids	500	70	1,000	96.5
Total hardness as $CaCO_3$, mg/L	300	70	100	0.5
Carbonate, mg/L	-	-	-	-
Bicarbonate, mg/L	-	-	-	-
Chloride, mg/L	250	97	250	97
Sulphate, mg/L	200	100	250	100
Phosphate, mg/L	-	-	-	-
Nitrate, mg/L	45	51.5	50	56.5
Fluoride, mg/L	1	30	1	30
Calcium, mg/L	75	96	75	96
Magnesium, mg/L	30	26	30	26
Sodium, mg/L	-	-	200	-
Potassium, mg/L	-	-	-	-
Iron, mg/L	0.3	0.5	0.1	0.5
Manganese, mg/L	0.1	17	0.05	17

The following regression models have been obtained from the results of analysis of water samples. Considering a known value of TDS, the percentage contribution of each ion can be obtained by substituting an average ionic value for the entire study area for pre-monsoon season.

$$Ca^{++} = 0.0368\ TDS + 15.435$$
$$Mg^{++} = 0.0594\ TDS + 19.311$$
$$HCO_3^- + CO_3^{--} = 0.1063\ TDS + 157.26$$
$$Cl^- = 0.1914\ TDS + 8.6634$$
$$SO_4^{--} = 0.0383\ TDS + 12.902$$

NO_3^- = 0.0528 TDS + 32.852
Na^+ = 0.0378 TDS + 23.685
Total hardness = 0.9937 (Ca+Mg) Hardness + 1.7501
Conductivity, µmohs/cm = 1.9151 TDS - 2.6814

Table 2. Normal statistics of water quality parameters of groundwater samples.

Parameters	Pre-monsoon samples (2006)							
	Min	Max	AM	SD	CV	Q1	Med	Q3
pH	6.61	8.90	7.5	0.416	5.548	7.42	7.46	7.48
Electrical conductivity µmohs/cm	130	3000	874.3	85.48	81.23	530	760	560
Total dissolved solids	70	1500	453.3	479.5	54.84	280	400	560
Total hardness as $CaCO_3$	70	1060	271.4	129.1	47.55	224	248	272
Bicarbonate	45	550	199.4	47.86	27.77	155	196	226
Chloride	4.9	662.3	105.2	12.68	55.96	49.98	79.98	141.5
Sulphate	1.5	174	29.93	29.65	32.92	12	22.5	35
Phosphate	0.05	5.6	1.49	1.266	85.15	0.6	1.1	1.9
Nitrate	261	0.44	54.3	48.58	144.2	17.72	42.09	69.5
Fluoride	0.02	3.2	1.43	23.26	65.33	1.0	1.5	1.8
Calcium	1.60	174.7	31.21	21.3	68.22	17.64	27.25	38.48
Magnesium	0.24	229.4	47.06	29.2	62.06	29.4	41.8	57.83
Sodium	4	140	29.65	19.95	99.05	27	35	48
Potassium	1	27	3.79	3.229	49.47	2	3	5
Iron	0.1	4.72	1.95	48.58	89.46	1.56	1.9	2.2
Manganese	0.05	5.5	0.76	0.624	43.55	0.2	0.3	0.85

All units except pH and Electrical conductivity are in mg/l, Min-Minimum, Max-Maximum, AM-Arithmetic mean, SD-Standard deviation, CV-Coefficient variation, Q1-Median of the lower half, Q3-Median of the upper half, Med-Median

For computing WQI three steps are followed. In the first step, each of the 19 parameters has been assigned a weight (wi) according to its relative importance in the overall quality of water for drinking purposes (Table 3). The maximum weight of 5 has been assigned to the parameter nitrate due to its major importance in water quality assessment. Magnesium which is given the minimum weight of 1 as magnesium by itself may not be harmful. Other

In the second step, the relative weight (W_i) is computed from t he following equation:

$$W_i = \frac{w_i}{\sum_{i=1}^{n} w_i} \quad (1)$$

Where, W_i is the relative weight, w_i is the weight of each parameter and n is the number ot parameters. Calculated relative weight (W_i) values of each parameter are also given in Table 3.

In the third step, a quality rating scale (q_i) for each parameter is assigned by dividing its concentration in each water sample by its respective standard according to the guidelines laid down in the BIS and the result multiplied by 100:

$$q_i = (C_i / S_i) \times 100 \quad (2)$$

Table 3. Relative weight of chemical parameters.

Chemical parameters	Indian Standards	Weight (w_i)	Relative weight (W_i)
pH	6.5-8.5	4	0.09756
Total hardness (TH)	300-600	2	0.04878
Calcium	75-200	2	0.04878
Magnesium	30-100	2	0.02439
Bicarbonate	244-732	3	0.07317
Chloride	250-1,000	3	0.07317
Total dissolved solids (TDS)	500-2,000	4	0.09756
Fluoride	1-1.5	4	0.09756
Manganese	0.1-0.3	4	0.09756
Nitrate	45-100	5	0.12195
Iron	0.3-1.0	4	0.09756
Sulphate	200-400	4	0.09756
		$\sum w_i = 41$	$\sum W_i = 1.000$

where q_i is the quality rating, C_i is the concentration of each chemical parameter in each water sample in mg/L, and S_i is the Indian drinking water standard for each chemical parameter in mg/L according to the guidelines of the BIS[7] 10500, 1991.

For computing the WQI, the SI is first determined for each chemical parameter, which is then used to determine the WQI as per the following equation

$$SI_i = W_i \cdot q_i \quad (3)$$

$$WQI = \sum SI_i \quad (4)$$

SI_i is the subindex of ith parameter; q_i is the rating based on concentration of ith parameter and n is the number of parameters. The computed WQI values are classified into five types, “excellent water” to “water, unsuitable for drinking”.

Electrical conductivity of water is a direct function of its total dissolved salts[9]. Hence it is an index to represent the total concentration of soluble salts in water[10]. In our study area, the electrical conductivity of the groundwater samples varied between 130- 3000 µS/cm during pre-monsoon.

The permissible total dissolved salts for drinking water is 500 mg/L. In the absence of potable water source the permissible limit is upto 2000 mg/L**.** It is found from the analysis, all the well water samples TDS is within the maximum limit of 2000 mg/L in pre-monsoon period. The range of TDS levels in the study area is 70-1500 mg/L. Total 84 samples in pre-monsoon period show TDS value beyond the desirable limit of 500 mg/L**.** The highest concentration of total dissolved solids was found to be 1500mg/L at Devalapura (N 13.4878^0 E 77.10525^0) due to dense residential area and due to intensive irrigation in that area. High values of TDS in groundwater are generally not harmful to human beings but high concentration of these may affect persons, who are suffering from kidney and heart diseases[11]. Water containing high solids may cause laxative or constipation effects[12]**.**

During pre-monsoon season of the year 2006, based on the comparisons of chemical constituents with WHO (1994) standards, it is found that, for 269 water samples, eleven samples have total hardness value above maximum permissible limit of 500 mg/L. Total hardness varies from 70 to 1060 mg/L**.** The hardness values for the study area are found to be high for almost all locations for pre-monsoon and determined to fall above the desirable limit of WHO specification. According to Sawyer and McCarty’s classification[13] for hardness, 26 samples fall under the

moderately hard class and 242 samples fall under the hard class to very hard class for pre-monsoon water samples.

Chloride is a widely distributed element in all types of rocks in one or the other form. Its affinity towards sodium is high. Therefore, its concentration is high in ground waters, where the temperature is high and rainfall is less. Soil porosity and permeability also has a key role in building up the chlorides concentration[14]. The chloride content in rural part of Tumkur taluk was found to be well within the permissible levels. The chloride content ranges from 5 to 662 mg/L.

In Tumkur taluk, the nitrate value varies from 0.4 to 261 ppm for the pre-monsoon period. For the post-monsoon period, the value varies from 0.39 to 149 ppm. The nitrate value for the study area is found to be more than 45 ppm as per WHO (1994) in 131 locations. More nitrate value is found in the rural part of the study area due to over-application of fertilizer, improper manure management practices, and improper operation and maintenance of septic systems.

In this study, the computed WQI values ranges from 89.21 to 660.56 and therefore, can be categorized into five types "excellent water" to "water unsuitable for drinking". Table 4 shows the percentage of water samples that falls under different quality. The high value of WQI at these stations has been found to be mainly from the higher values of iron, nitrate, total dissolved solids, hardness, fluorides, bicarbonate and manganese in the groundwater.

Table 4. Water quality classification based on WQI value

WQI value	Water quality	Percentage of water samples (Pre-monsoon)
<50	excellent	00
50-100	good water	1.5
100-200	poor water	63.5
200-300	very poor water	22
>300	Water unsuitable for drinking	13.0

The degree of a linear association between any two of the water quality parameters, as measured by the simple correlation coefficient (r), is presented in Table 5. Magnesium and chloride are highly interrelated among themselves. This interrelationship indicates that the hardness of the water is permanent in nature.

Table 5. Correlation coefficient matrix of water quality parameters.

Para-meter	pH	TH	Ca	Mg	HCO_3	Cl	TDS	FL	Mn	NO_3	Fe	SO_4
pH	1											
TH	-0.28	1										
Ca	-0.22	0.356	1									
Mg	-0.21	0.912	-0.06	1								
HCO_3	-0.14	0.479	0.104	0.469	1							
Cl	-0.21	0.767	0.287	0.698	0.015	1						
TDS	-0.23	0.709	0.342	0.61	0.208	0.746	1					
FL	0.111	-0.04	-0.14	0.015	0.085	-0.14	-0.16	1				
Mn	-0.03	-0.08	-0.12	-0.04	0.097	-0.16	-0.07	0.057	1			
NO_3	-0.24	0.181	0.329	0.047	0.096	-0.12	0.144	0.007	0.113	1		
Fe	-0	0.009	-0	0.007	0.043	0.024	-0.01	0.048	0.087	-0.13	1	
SO_4	-0.24	0.364	0.249	0.282	0.269	0.014	0.225	0.059	0.038	0.417	-0.1	1

Conclusions

The WQI for 269 samples ranges from 89.21 to 660.56. Almost ninety nine percent of the samples exceeded 100, the upper limit for drinking water. The high value of WQI at these stations has been found to be mainly from the higher values of iron, nitrate, total dissolved solids, hardness, fluorides, bicarbonate, chloride and manganese in the groundwater. About 63.5% of water samples are poor in quality. In this part, the groundwater quality may improve due to inflow of freshwater of good quality during rainy season. Magnesium and chloride are significantly interrelated and indicates that the hardness of the water is permanent in nature. The analysis reveals that the groundwater of the area needs some degree of treatment before consumption, and it also needs to be protected from the perils of contamination

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Annexure-III: Monitoring data of Sewage Treatment Plants

S. No.	Name of STPs	Name of Town	Treatment Technology	Designed Capacity (MLD)	Utilized capacity (MLD)	Operational/Non-Operational Status	Responsible Agency	Final Discharge to river/drain
1	Saharanpur STP , Mahilpur	Saharanpur	UASB	38	38	Operational	UP Jal Nigam	River Dhamola
2	Muzaffarnagar STP, Nagarpalika	Muzaffarnagar	Oxidation Pond	32.5	17	Operational	UP Jal Nigam	Suzroo drain to River Kali West
3	Indirapuram STP 74 MLD	Ghaziabad	SBR	74	74	Operational	UP Jal Nigam	Government Drain to river Hindon
4	Indirapuram STP 56 MLD	Ghaziabad	SBR	56	50	Operational	GDA	Reuse and extra to Government Drain to river Hindon
5	Indirapuram STP 56 MLD	Ghaziabad	UASB	56	56	Operational	UP Jal Nigam	Government Drain to river Hindon
6	Dudahaida-3 STP 70 MLD, Vijay Nagar	Ghaziabad	UASB	70	70	Operational	UP Jal Nigam	Dasna drain to Hindon
7	Dudahaida STP 56 MLD, Vijay Nagar	Ghaziabad	SBR	56	56	Operational	UP Jal Nigam	Dasna drain to Hindon
8	Morty STP Rajnagar Extension 56 MLD	Ghaziabad	SBR	56	22.5	Operational	GDA	Local drain to Hindon river
9	Govindpuram STP 56 MLD	Ghaziabad	SBR	56	12.38	Operational	GDA	Local drain to Dasna Drain to Hindon river
10	Bapudham-Madhuban STP 56 MLD	Ghaziabad	SBR	56	1.5	Operational	GDA	Local drain to Dasna Drain to Hindon river

Sl. No.	Name of STPs	Name of Town	Treatment Technology	Designed Capacity (MLD)	Utilized capacity (MLD	Influent Characteristics (Inlet of STP)						Effluent Characteristics (Outlet of STP)						
						Physico-chemical parameters (all in mg/L, except pH)						Physico-chemical parameters						
						pH	TSS	COD	BOD	TN	TP	pH	TSS	COD	BOD	TN	TP	FC
1	Saharanpur STP , Mahilpur	Saharanpur	UASB	38	38	7.1	85	200	57	-	-	7.4	22	72	8	2.46	-	**54 x 10^5**
2	Muzaffarnagar STP, Nagarpalika	Muzaffarnagar	Oxidation Pond	32.5	17	6.6	184	198	57	-	-	6.6	53	100	41	-	-	**1100**
3	Indirapuram STP 74 MLD	Ghaziabad	SBR	74	74	7.0	133	333	95	-	-	7.1	**49**	**266**	**58**	**25.58**	0.96	**3300**
4	Indirapuram STP 56 MLD	Ghaziabad	SBR	56	50	7.1	380	467	157	-	-	7.3	14	**77**	**13**	4.61	0.25	**17000**
5	Indirapuram STP 56 MLD	Ghaziabad	UASB	56	56	7.1	274	454	143	-	-	7.1	74	**224**	**71**	**25.82**	3.26	**3.3E+08**
6	Dudahaida-3 STP 70 MLD, Vijay Nagar	Ghaziabad	UASB	70	70	7.4	289	423	157	ND	ND	7.4	**54**	**182**	**39**	**20.02**	3.45	**3400000**
7	Dudahaida STP 56 MLD, Vijay Nagar	Ghaziabad	SBR	56	56	7.4	210	334	99	ND	ND	7.6	15	**63**	7	6.523	1.71	**120000**
8	Morty STP Rajnagar Extension 56 MLD	Ghaziabad	SBR	56	22.5	7.1	179	336	108		5.78	7.3	20	48	5	RA	0.51	79 x 10^5
9	Govindpuram STP 56 MLD	Ghaziabad	SBR	56	12.38	7.3	132	281	96	-	-	7.4	10	12	2	3.62	3.42	110
10	Bapudham-Madhuban STP 56 MLD	Ghaziabad	SBR	56	1.5	7.6	94	95	15	-	-	7.6	15	44	6	5.68	2.94	2

Removal efficiency with respect to BOD, COD and TSS

Sl. No.	Name of STPs	Name of Town	Treatment Technology	Designed Capacity (MLD)	Utilized Capacity (MLD)	TSS			COD			BOD		
						Inlet	Outlet	Removal efficiency (%)	Inlet	Outlet	Removal efficiency (%)	Inlet	Outlet	Removal efficiency (%)
1	Saharanpur STP , Mahilpur	Saharanpur	UASB	38	38	85	22	74.12	200	72	64.00	57	8	85.96
2	Muzaffarnagar STP, Nagarpalika	Muzaffarnagar	Oxidation Pond	32.5	17	184	53	71.20	198	100	49.49	57	41	28.07
3	Indirapuram STP 74 MLD	Ghaziabad	SBR	74	74	133	49	63.16	333	266	20.12	95	58	38.95
4	Indirapuram STP 56 MLD	Ghaziabad	SBR	56	50	380	14	96.32	467	77	83.51	157	13	91.72
5	Indirapuram STP 56 MLD	Ghaziabad	UASB	56	56	274	74	72.99	454	224	50.66	143	71	50.35
6	Dudahaida-3 STP 70 MLD, Vijay Nagar	Ghaziabad	UASB	70	70	289	54	81.31	423	182	56.97	157	39	75.16
7	Dudahaida STP 56 MLD, Vijay Nagar	Ghaziabad	SBR	56	56	210	15	92.86	334	63	81.14	99	7	92.93
8	Morty STP Raj Nagar Extension 56 MLD	Ghaziabad	SBR	56	22.5	179	20	88.83	336	48	85.71	108	5	95.37
9	Govindpuram STP 56 MLD	Ghaziabad	SBR	56	12.38	132	10	92.42	281	12	95.73	96	2	97.92
10	Bapudham-Madhuban STP 56 MLD	Ghaziabad	SBR	56	1.5	94	15	84.04	95	44	53.68	15	6	60.00

Annexure-IV: Action plan for STPs in Saharanpur, Muzaffarnagar and Ghaziabad

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
1	38 MLD STP Saharanpur	UASB	UP Jal Nigam	85.96	Yes	Non-complying w.r.t. COD, TSS, FC	• Inadequate disinfection system • Improper CCT configuration • Weak strength sewage (BOD 57 mg/l) • Low pollutant removal efficiency (74% COD removal) • No OCEMS, • No Inlet & outlet Flow meter for metering	• Disinfection system of adequate design capacity with proper tank configuration shall be installed • Augmentation of sewage network • FM to be installed at inlet & outlet • OCEMS to be installed at outlet for continuous performance monitoring • O&M shall be improved
2	32.5 MLD STP, Muzaffarnagar	Oxidation Pond	UP Jal Nigam	28.07	No	Non-complying w.r.t. BOD, COD, TSS & FC	• Poor O&M • Under capacity utilization (52 %) • No OCEMS • No disinfection system • Weak strength sewage (BOD 57 mg/l) • Obsolete treatment technology	• O&M shall be improved • Augmentation of sewage network • OCEMS to be installed at outlet for continuous performance monitoring • New STP based on advance technology and as per new standard with

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
							• No metering facility at outlet, • No OCEMS • Low pollutant removal efficiency (50% COD removal, 28% BOD)	future projections to be installed • Duck weed observed shall be removed to improve DO level • FM to be installed at inlet & outlet • Desludging of oxidation pond shall be done periodically
3	74 MLD STP Indirapuram Ghaziabad	SBR	UP Jal Nigam	38.95	Yes	Non-Complying w.r.t. BOD, COD, TSS, TN, FC	• No functional flow meter at inlet & outlet for flow measurement • Non-functional OCEMS • Low pollutant removal efficiency (31% COD removal, 39 % BOD), High TN at outlet 26.6 mg/l against norms of 10 mg/l • Poor O&M (MLVSS/MLSS ratio - 0.5) • Improper dosing of disinfection chemical	• FM to be installed at inlet & outlet • OCEMS to be installed at outlet • Periodic desludging of SBR basin to remove dead microbes • Proper internal recirculation to improve nitrogen removal efficiency • Optimization of disinfection system as per feed flow condition • Tertiary system shall be installed to improve TSS

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
							• No Tertiary treatment	removal (outlet TSS-49 mg/) • OCEMS shall be made function for continuous performance monitoring
4	56 MLD STP Indirapuram Ghaziabad	SBR	GDA	91.72	Yes	Non-Complying w.r.t. BOD, COD, FC	• No flow meter at outlet for flow measurement • No OCEMS • Poor O&M • Improper dosing of disinfection chemical • No Tertiary treatment	• FM to be installed at inlet & outlet • OCEMS to be installed at outlet for continuous performance monitoring • Disinfection system shall be optimized as per feed flow condition • Tertiary system shall be installed to improve overall efficiency
5	56 MLD STP Indirapuram Ghaziabad	UASB	UP Jal Nigam	50.35	No	Non-Complying w.r.t. BOD, COD, TSS, TN, FC	• Nonfunctional mechanical screen • No flow meter at inlet & outlet • No OCEMS • Low pollutant removal efficiency (50% for BOD & COD) • Poor O&M	• FM to be installed at inlet & outlet • OCEMS to be installed at outlet for continuous performance monitoring • Disinfection system of adequate design capacity with proper tank configuration shall be installed

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
							• No disinfection system • No Tertiary treatment • Obsolete design technology	• Tertiary system of adequate design capacity shall be installed to improve overall efficiency • O&M shall be improved through frequent monitoring of operational parameters like pH, alkalinity, SRT, sludge granule size etc.
6	70 MLD STP, Vijay Nagar Ghaziabad	UASB	UP Jal Nigam	75.16	No	NC w.r.t. COD, BOD, TSS, total nitrogen, FC	• No flow meter (FM) at inlet & outlet metering • No OCEMS • Low pollutant removal efficiency (75% for BOD & 53% COD) • Poor O&M • No disinfection system • No Tertiary treatment • Obsolete design technology	• FM to be installed at inlet & outlet • OCEMS to be installed at outlet for continuous performance monitoring • Disinfection system of adequate design capacity with proper tank configuration shall be installed • Tertiary system of adequate design capacity shall be installed to

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
								improve overall efficiency • O&M shall be improved through frequent monitoring of operational parameters like pH, alkalinity, SRT, sludge granule size etc.
7	56 MLD STP, Vijay Nagar Ghaziabad	SBR	UP Jal Nigam	92.93	Yes	NC w.r.t. COD & FC	• No functional flow meter at inlet & outlet • Low pollutant removal efficiency (81% COD removal) • Poor O&M (MLVSS/MLSS ratio - 0.4) • Improper dosing of disinfection chemical • No Tertiary treatment	• FM to be installed at inlet & outlet • Periodic desludging of SBR basin to remove dead microbes & improving MLVSS/MLSS ratio by controlled recirculation rate • Proper internal recirculation to improve nitrogen removal efficiency • Optimization of disinfection system as per feed flow condition

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
								• Tertiary system shall be installed to improve overall efficiency • OCEMS shall be made function for continuous performance monitoring
8	56 MLD STP Morty STP Rajnagar Extension Ghaziabad	SBR	GDA	95.37	Yes	Non-Complying w.r.t. FC	• Under capacity utilization (40 %) • No OCEMS • No tertiary Filtration • Poor O&M (MLVSS/MLSS ratio-0.4) • Improper dosing of disinfection chemical	• Augmentation of sewage network • OCEMS to be installed • Periodic desludging of SBR basin to remove dead microbes & improving MLVSS/MLSS ratio by controlled recirculation rate • Proper internal recirculation to improve nitrogen removal efficiency • Optimization of disinfection system as per feed flow condition • Tertiary system shall be installed to improve overall efficiency

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
9	56 MLD STP Govindpuram, Ghaziabad	SBR	GDA	97.92	Yes	Complying	• Under capacity utilizations (22 %) • No OCEMS • No functional FM at inlet & outlet • No tertiary Filtration	• Augmentation of sewage network in STP catchment area shall be done to improve utilization capacity • OCEMS to be installed • FM to be installed at inlet & outlet • Tertiary system shall be installed to improve overall efficiency • MLVSS/MLSS shall be improved by controlled recirculation rate
10	56 MLD STP Madhuban-Bapudham Ghaziabad	SBR	GDA	60.00	Yes	Complying	• Under capacity utilizations (3 %) • No OCEMS • No FM at inlet & outlet • No tertiary Filtration • Weak strength sewage at inlet (BOD 15 mg/l)	• Augmentation of sewage network in STP catchment area shall be done to improve utilization capacity • OCEMS at STP outlet to be installed for continuous performance monitoring • FM to be installed at inlet & outlet

Sl. No.	Name of STPs	Treatment Technology	Responsible Agency	BOD reduction (%)	Availability of Disinfection System (Yes/No)	Compliance Status w.r.t Hon'ble NGT norms dated 30.04.2019	Key Issues	Action points
								• Tertiary system shall be installed to improve overall efficiency • MLVSS/MLSS shall be improved by controlled recirculation rate

Annexure-V: Sector-wise GPIs in river Hindon basin (Year 2022-23)

Table 1 List of Textiles units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
1	ANMOL TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
2	ARORA HOIESERY, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
3	ATUL TEXTILE, BEHAT ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
4	BOMBAY HOSEIRY, CHAJJPURA, DEHRADUN ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
5	DURGA TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
6	EKTA TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
7	GANPATI TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
8	GARG DYEING, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
9	GENERAL TEXTILES , VILLAGE DHAMOLA, JANTA ROAD, SAHARAAPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
10	J.J. TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
11	KAMAL ENTERPRISES, VILLAGE DHAMOLA, JANTA ROAD, SAHARAAPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
12	MAK HOUSARY, TIPERPUR JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
13	R.K. TEXTILES , GAGALHERI, DEHRADUN ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
14	SAHARANPUR TEXTILE, JANTA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
15	SAHARANPUR WOOLS LTD. DEHLI ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
16	SHAH INDUSTRIES, 18 MEDANTA COMPLEX, JANTA ROAD, SAHARNAPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
17	SIDDHARTH TEXTILE, CHILKANA ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
18	STANDARD ENGINEERING WORKS, INDUSTRIAL ESTATE, DELHI ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
19	SUPER TEXTILE, VILLAGE TIPARPUR, JANTA ROAD, SAHARNAPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
20	BAHUBALI TRADERS, SARDHANA,MEERUT	Uttar Pradesh	Meerut	Meerut	Hindon / Yamuna
21	KRISHNA INDUSTRIES KHASRA NO 619 BHALSAUNA SARDHANA MEERUT	Uttar Pradesh	Meerut	Meerut	Hindon / Yamuna
22	CONTINENTAL HOME FURNISHING, DUNDAHERA, KHEKRA, BAGPAT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
23	PRAGATI ENTERPRISES,VILLAGE HASANPUR , MASSOORIE, KHEKRA,BAGHPAT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna
24	ROJ ENTERPRISES KHASRA NO 19 , 20 VILL DUNDAHERA TEHSIL KHEKRA BAGPAT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna
25	KARTIKEY PROCESSORS, B-8,9, M.G. ROAD IND. AREA, HAPUR	Uttar Pradesh	Hapur	Ghaziabad	Hindon / Yamuna
26	MATESHWARI INDUSTRIES, G-30, M.G. ROAD IND. AREA, HAPUR	Uttar Pradesh	Hapur	Ghaziabad	Hindon / Yamuna
27	GIRDHAR PROCESSOR, G-111, PHASE-1, M.G. ROAD INDUSTRIAL AREA, HAPUR.,HAPUR,245101	Uttar Pradesh	Hapur	Ghaziabad	Hindon / Yamuna
28	SCARED KNIT PROCESSORS, C-75, M.G.ROAD IND.AREA, HAPUR.	Uttar Pradesh	Hapur	Ghaziabad	Hindon / Yamuna
29	A & A, S-50, SITE-2, LONI ROAD IND.AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
30	A.N. FABRIC DYERS, 5/6, SITE-2, LONI ROAD MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
31	A.R. SUPREME, 26-27, RURAL IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
32	A.S. ENTERPRISES, ARYA NAGAR INDUSTRIAL AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
33	AIDEN JEANS, B-49/5, SITE-4 IND. AREA, SAHIBABAD, , GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
34	AJAY VEER SIROHA, K-23, APPAREL PARK, SECTOR D-1 (P3), TRONICA CITY, LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
35	ALEENA WASHING, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
36	AMKO EXPORT, A-1, B.S.ROAD IND. AREA GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
37	ANISH WASING WORKS, 96/3, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
38	ANITA DYEING PROCESSING, 12/21, ARYA NAGAR LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
39	ANJALI CREATION (SHANKER PRINT), S-49, LONI ROAD SITE-2 MOHAN NAGAR, GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
40	APEX UDYOG, J-4, SEC D-1, APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
41	ARIHANT TEXTILE, 53-54, RURAL IND.AREA LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
42	AROMA FREGANCE P LTD., 5/3, SITE-2, LONI ROAD, MOHAN NGR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
43	ARVIND DYEING, PLOT NO.-14, ARYA NAGAR, NAIPURA ROAD, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
44	ASHA PRINTS, A-5/4, , LONI ROAD MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
45	ASR ENTERPRISES, S-124, SITE-2, LONI ROAD MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
46	BALAJI INDUSTRY, 37, RURAL IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
47	BALAJI INDUSTRY, PLOT NO. 7, GALI NO. 1, RAJINDER NAGAR IND. AREA, MOHAN NGR., GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
48	BALAJI UDYOG, B-80, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
49	BATIK INDIA, D-13, UDYOG KUNJ. DASNA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
50	BEAUTY ART PRINTS INDIA PVT.LTD.,54/4, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
51	BHAGWATI COLOUR IMPAX, A-36, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
52	BHAGWATI DYEING, 84, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
53	BRIGHT WASH DYEING, C- 21, ROOP NAGAR I.A, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
54	CHACHA ENTERPRISES, J-4, APPRAL PARK, TRONCA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
55	CHARBI APPARELS, 101/2, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
56	COLORISE (OLD NAME DEEPAK GAMBHIR), E-12 APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
57	COLOUR TUCH, 56/28, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
58	D.K. JAIN, G-262, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
59	DENIM MATCHING, G-141, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
60	DEV TARA INDUSTRIES LTD., MEERUT ROAD DUHAI, MURADNAGR	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
61	DHRUBE ENTERPRISES OLD NAME RUPAL WASHING, A-36/2, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
62	DILIP DYEING & WASHING, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
63	DURGESHWARI GARMENTS PVT.LTD., E-13, SECT-13-1, APPRAL PARK, TRONCA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
64	EKANSH TEXTILE, K-36, SEC D-1, APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
65	EKTA WASHING, A-40, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
66	EXCELLENTS APPARELS PVT. LTD., K-52, SEC D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
67	FAB CARE, 79/1, RAJINDER NAGAR IND.AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
68	FANCY DYEING & WASHING, 83-B, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
69	FINE WASH, PLOT NO. 40, RURAL IND. STATE LONI, LONI, GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
70	FUSION FASHION, B-61, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
71	G.S.DAS APPRARALS PVT.LTD., 4/44, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
72	GANGA PROCESSORS, 18/11, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
73	GANPATI CREATION, C-19/1, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
74	GAZI DYEING (OLD NAME AJAY AUTO BULB CORPN.), 45, RURAL IND. AREA, NGR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
75	GHAN SHYAM TEXTILES, K-19, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
76	GLAXI GARMENTS, K-22, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
77	GOYAL CANVAS PVT.LTD., 18/43, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
78	GULSHAN RAI JAIN, G-82, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
79	GUNGUN ENTERPRISES, 38/2/24, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
80	GYAN CHAND & SONS, G-87, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
81	H.B. DYEING, A-35, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
82	HARD MAN JEANS, B-32, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
83	HASAN TEXTILE, 84, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
84	HIMAX WASH (OLD NAME TAJJUMAL JEANS DYEING), ARYA NAGAR, NAIPURA ROAD LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
85	INDIAN TEXTILES COMPANY, E-49, B.S.ROAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
86	J.B.S. PROCESSORS, G-104, APPAREL PARK, SECTOR D-1 (P3), TRONICA CITY, LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
87	JAI AMBEY DYEING, 58,59, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
88	JAI MATA DI DYERS, I-9, SEC D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
89	JAI SANTOSHI ENTERPRISES, 50, SHYAM IND. AREA LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
90	JAI SHRI DYING, I-21, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
91	JYOTI DYEING, 18/8, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
92	K.K. INDUSTRIES, 7/5, SITE-4, IND AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
93	K.R. WASHING, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
94	KANHIYA ENTERPRISES, A-48/11, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
95	KRISH GARMENTS (OLD NAME SANJEEV KUMAR), G-109, SEC D-1(P3), APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
96	KRISHANA WASHING SERVICE), 72/14, RAJINDER NAGAR IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
97	KRISHNA KUMAR AGARWAL, G-129, APPAREL PARK, SECTOR D-1 (P3), TRONICA CITY, LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
98	KRISHNA PRINT PVT. LTD., A-47, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
99	L.K. INDUSTRY (WASHING), 10/2, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
100	LATEX WASH, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
101	LAXMI BLEACH (NEW NAME MANI BHADRA PROCESSORS), G-102, SEC D-1(P3), APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
102	LAXMI DYEING & PRINTING WORKS PVT.LTD., S-81, LONI ROAD I.A., MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
103	LAXMI DYEING, A-13, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
104	LAXMI PROCESSORS, K-16, SECT-D-1, POCKET-3, APPRAL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
105	M.A. GARMENT, A-9, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
106	M.A. GARMENTS, 20/6/21, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
107	M.J. ALLIED ENTERPRISES, E-4, SITE-4 IND. AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
108	M.K.WASING & DYEING, B-74, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
109	M.R. DYEING, B-80, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
110	M.R. INDUSTRY, B-84/3, ROOP NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
111	M.S. DYEING, A-29, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
112	M.S. TRADING, E-15, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
113	M.Y. GARMENTS, 20/6/14, SITE-4, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
114	MAHA SHAKTI THREADS MILLS, 56/12, SITE-4 SAHIBABAD IND. AREA. GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
115	MAHALAXMI DYERS, 49/24, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
116	MALIK DYEING, GALI NO.-2, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
117	MALIK WASHING, 101/2, ARYA NAGAR IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
118	N.G. TEX PRINTS P.LTD., E-13/2, KAVI NAGAR IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
119	N.G. TEXTILES., 13A/10, SITE-2, LONI ROAD I.A., MOHAN NGR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
120	NAGPAL INDUSTRY, A-23, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
121	NANDI ENTERPRISES, J-15, SEC D-1(P3), APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
122	NANDI ENTERPRISES, K-14, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
123	NANDNI PROCESSORS, 4/27, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
124	NEELAM TEX PRINTS PVT.LTD., 41/1, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
125	NEW AR GARMENT, 81, RURAL IND.AREA, LONI GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
126	NIRDOSH DYEING & WASHING, KHASRA NO. 72/2, GALI NO.7, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
127	NON STOP COLOUR, S-3, SITE-2, LONI ROAD I.A., MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
128	OM PRAKASH SHARMA, J-11, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
129	PAL NIT FAB, 54/14, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
130	PAWAN GARMENT, A-29, ROOP NGR I.A., LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
131	POOJA DYEING, A-41, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
132	POOJA PAHAWA, K-11, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
133	POOJA PROCESSORS UNIT 3 PLOT NO. K-41 AND K-42, D-1, INDUSTRIAL AREA TRONICA CITY GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
134	POOJA PROCESSORS, 62/2/3, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
135	PREM PROCESSORS, 52 RAJINDER NAGAR IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
136	PRERNA THREAD G-274, SEC-D-1 P-3, APPAREL PARK INDUSTRIAL AREA, TRONICA CITY, LONI, GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
137	PRINCE DYEING, ARYA NAGAR INDUSTRIAL AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
138	PURAN MUNJAL,(NEW NAME ADHUNIK DYEING), H-12, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
139	QUADRI PROCESSORS, I-8, SEC D-1(P3),.APPAREL PARK, TRONIKA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
140	R.R. DYEING, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
141	R.R. IMPEX, G-261, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
142	R.V. ENTERPIRSES, 180/2 & 180/4, RAJIENDER NAGAR IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
143	RACHITA PROCESSORS, K-33 & K-34, SEC D-1, APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
144	RADHEY RAMAN DYEING & WASHING, 4, ARYA NAGAR IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
145	RAGGING SONS, I-13, SEC D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
146	RAISH ENTERPRISES, 96/2, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
147	RAJ DYEING COMPANY PLOT NO. G-76, SECTOR D-1, APPAREL PARK, TRONICA CITY,GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
148	RAJEEV KUMAR, G-64, SEC D-1(P3), APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
149	RAMESH DYEING & WASHING, PLOT NO- 17, ARYA NAGAR IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
150	RASTOGI GARMENTS, A-32, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
151	RATAN GARMENTS, 56/29, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
152	RIGHT WASH UDYOG, 72/19, RAJINDER NAGAR IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
153	RITIKA ENTERPRISES, 18/32, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
154	ROBEST INFRA TECH P LTD., J-13, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
155	ROOP TRADING COMPANY, E-14, SECT-D-1, POCKET-3, APPRAL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
156	ROOP TRADING COMPANY, K-9, SECT-D-1, POCKET-3, APPRAL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
157	ROXCY ENTERPRISES, GALI NO. 1, 72/2, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
158	ROYAL TECHNO DYERS, K-47, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
159	S. STAR ENTERPRISES, A-50/2, ROOP NAGAR IND.AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
160	S.A.K. DYEING & PROCESSORS, 76, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
161	S.B. FEB TECH P LTD., 28/1/24, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
162	S.D. GARMENTS, I-2, SECTOR-D-1, POCKET-3, APPRAL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
163	S.G. RUBBER INDUSTRY, A-77, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
164	S.K. INDUSTRIES, B-80, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
165	S.S. CONCEPT (OLD NAME ASHA TANU PRINTS), A-5/3, , LONI ROAD MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
166	S.S. DYEING, GALI NO. 2, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
167	S.S. HOSIERY (OLD NAME IS NATIONAL INDUSTRIES), G-264, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
168	S.S. PRINTS, 56/14-15, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
169	S.T. TRADERS, J-5, APPRAL PARK, TRONCA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
170	S.V.S. FASHION, J-22, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
171	SAHIBABAD PRINTERS, 182/3, G.T.ROAD, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
172	SAI PROCESSING, 7/37, SITE-2, LONI ROAD IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
173	SAI SARAN GARMENT,(NEW NAME LOTUS KNIT PROCESSING HOUSE), G-108, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
174	SANDEEP TYAGI, G-271, SEC D-1(P3), APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
175	SANJAY JAIN JEANS DYEING, S-30, UPSIDC IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
176	SANJEEV KUMAR (SHYAM WASHING), G-81, APPAREL PARK, SECTOR D-1 (P3), TRONICA CITY, LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
177	SANJU PROCESSORS, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
178	SARA INTERNATIONAL, G-265-266, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
179	SHAFALI DYEING, G-84, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
180	SHAHI EXPORTS P LTD., 30-SITE-2, LONI ROAD IND.AREA MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
181	SHAHNAJ WASHING, 87, ARYA NAGAR IND. AREA, NAIPURA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
182	SHARMA WASHING WORKS, KHASRA NO. 92, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
183	SHASHI WASHING WORK, A-60, ROOP NAGAR I.A LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
184	SHEELA ENTERPRISES, 27, SHYAM IND. AREA LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
185	SHIV KUMAR PAWAN KUMAR, 57/1/13, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
186	SHIVA PROCESSORS, 18/6, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
187	SHIVANI DYEING, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
188	SHRI ASHOK KUMAR CHACHRA (SIDHARTH DYEING) PLOT NO G-59,SECTOR D-1, APPAREL PARK, TRONICA CITY, GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
189	SHRI BALA JI PROCESSORS, S-134, SITE-2, LONI ROAD IND.AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
190	SHRI KRISHNA ARTS & DYEING, A-72, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
191	SHRI KRISHNA TEXTILES, 18/19, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
192	SHRI MAHAVEER ENTERPRISES, 28/1/15, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
193	SHRI PARAS COLORATION (U.B. DYEING), G-117, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
194	SIDDHI VINYAK TEXILE P LTD., H-11, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
195	SIDDHI VINYAK, G-103, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
196	SIDHI VINAYAK, 48/1/18, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
197	SIDRA WASHING, ARYA NAGAR INDUSTRIAL AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
198	SIMPLE DYEING & WASHING, 7, KHARA NO. 357, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
199	SOLANKY DYEING, B-9, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
200	SPD RAINBOW(LAVYA UDYOG), 56/17, SITE-4, SAHIBABD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
201	SUDHIR KUMAR JAIN, G-80, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
202	SUMER MAL (R.K. EXPORT & IMPORT), H-13, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
203	SUN DYERS, I-19, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
204	SUN SHINE DYEING & WASHING, 75-76, RURAL IND. AREA, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
205	SUNIL KUMAR, G-85, APPAREL PARK, SECTOR D-1 (P3), TRONICA CITY, LONI	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
206	SUNNY PRINTS, 5/7, SITE-2, LONI ROAD, IND.AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
207	SUPER FINE WASH, 71, ARYA NAGAR IND.AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
208	SUPER HOSIERY, BANTHLA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
209	SUPER INDUSTRY, GALI NO. 2, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
210	SUPREME INDUSTRIES, J-2, APPRAL PARK, TRONCA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
211	SURUCHI DYEING, 37, S.S.OF G.T.ROAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
212	SWASTIK WASHING, A-37, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
213	TINA DYEING, B-53, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
214	TIWARI FEB, G-255, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
215	TUSAR GARMENTS (SPECTRUM DYE STUDIO), J-3, SECTOR D-1(P), APARELS PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
216	UMAR GARMENTS, 83-B, ARYA NAGAR IND. AREA, LONI, GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
217	V.S. DYEING, PLOT NO.-15, ARYA NAGAR, NAIPURA ROAD, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
218	V.S. GARMENTS, 20/6/10, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
219	VAISHALI HOSIERY, I-17, SEC D-1, APPAREL PARK, TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
220	VAISHNO GARMENTS, 20/6/3, SITE-4, IND AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
221	VANISHIKA DYEING, B-68, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
222	VEDANTA ESTATE, (NEW NAME A.N. PROCESSORS), I-12, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
223	VEDANTA ESTATE, I-11, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
224	VEDANTA ESTATE, J-12, APPAREL PARK, SECTOR D-1(P3), TRONICA CITY, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
225	VENTKESH ENTERPRISES, 48/1/7, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
226	VERSHA WASHING, 49/25, SITE-4, IND. AREA, SAHIBABAD, , GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
227	VIDHI VENTUER, RAJINDER NAGAR IND. AREA, MOHAN NAGAR, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
228	VINAY DYEING & WASHING, 3, 96/3, ARYA NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
229	VIVEK DYEING, MAIN ROAD, A-7, MAIN ROAD, ROOP NAGAR IND. AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
230	VOICE INDIA UDYOG, 203, LAXMI IND. ENCLAVE, ARYA NAGAR IND.AREA, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
231	WARSI BROTHERS, (NIKHIL TRADING), B-59, ROOP NAGAR I.A LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
232	Z.A. WASHING, UNIT-II, ARYA NAGAR, LONI, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
233	COSMO INDUSTRIES, C-44, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
234	DALIP ENTERPRISES, D-87, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
235	KARIKA INDIA PVT. LTD B-126, SECTOR-5, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
236	N.K. DYEING C-170, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
237	S.S. PROCESSORS PVT. LTD. A-43, SECTOR-5, NOIDA, GAUTAMBUDDHA NAGA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
238	SANIDHYA ENGINEERS (P) LTD., D-43, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
239	SATGURU PROCESSOR, C-160, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
240	SHAM DYERS B-24, SECTOR-4, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
241	SONI DYEING C-190, HOSIERY COMPLEX, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
242	SUPER FINE PROCESSORS (P) LTD., C-36, SECTOR-8, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
243	THE GANESH HOSIERY INDUSTRIES, F-67, SECTOR-11, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
244	ARICAB FAB (P) LTD, C-4, SITE-4, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
245	BAJAJ CARPET (P) LTD, VILL-HABIBPUR, NOIDA DADRI ROAD, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
246	BIR HORIZONS PVT. LTD., PLOT NO. F-79, SITE-B, SURAJPUR, GR. NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
247	COLOUR & STYLE (P) LTD, A-1/2, 8/9, SITE-B, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
248	GANGA POLYSTER PLOT NO. 37, SITE-C, SURAJPUR, GR. NOIDA.	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
249	INDIA DYEING & TEXTILES PLOT NO., F-75 SITE-B G. NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
250	LAXMI FABDYE PRINTING PVT. LTD., PLOT NO- C-7, INDUSTRIAL AREA, SITE-C, SURAJPUR, GREATER NOIDA.	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
251	PROMOTIONAL CLUB, PLOT NO. C-1, C-2, C-3, EPIP, INDUSTRIAL AREA, SITE-5, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
252	SHREE JAGDAMBA KNITS (P) LTD, P.NO.-95,105, SITE-B, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
253	SKY LARK DYEING (P) LTD., PLOT NO.- B-2/14, SITE-B, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
254	SS TEXTILE, PLOT NO. G-46, SITE-B, INDUSTRIAL AREA SURAJPUR, GR.NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
255	SULTANPUR HOSIERY MILLS PVT LTD, PLOT NO. F-68, SITE-C, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
256	SURYA PROCESSOR PVT. LTD, BISRAKH ROAD, VILL-CHHAPRAULA, GR.NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
257	VIMAL DYEING, PLOT NO.H-41, SITE-C, GR.NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna

Table 2 List of Tannery units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
1	H.J. TANNERY PVT. LTD. JOLLY ROAD MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
2	EXCLUSIVE LEATHER, KHASRA NO.2751, VILL.BHURGARI, DASNA	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
3	KATHURIA BROTHERS, A-12 MEERUT ROAD IND.AREA	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
4	TRIYASH ENTERPRISES, KHASRA NO.2751, VILL.BHOOR GARI, DASNA	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
5	ADARSH THERMOPACK INDUSTRIES (P) LTD, E-106, SITE B, SURAJPUR, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
6	MAHANA LEATHERS, PLOT NO. 101, SITE-B, SURAJPUR, UPSIDC, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna

Table 3 List of Sugar units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
1	UTTAM SUGAR MILL, LIBBERHERI, MANGLORE, ROORKEE, DIST. HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
2	DHANASHREEAGRO PRODUCTS PVT. LTD. (FORMERLY M/S LAKSHMI SUGAR MILL) VILL- IKBALPUR, ROORKEE, DISTT. HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
3	BAJAJ HINDUSTAN LTD. SUGAR UNIT, GAGNOLI, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
4	DAYA SUGAR(A UNIT OF B.K. INVESTMENT) NAYA BANS, GAGALHERI, SAHARNAPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
5	THE KISAN SAHAKARI CHINI MILL, NANOUTA, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Krishni / Hindon / Yamuna
6	TRIVENI ENGG. & INDUSTRIES LTD, DEOBAND, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Kali West / Hindon / Yamuna
7	UPPER DOAB SUGAR MILL, SHAMLI	Uttar Pradesh	Shamli	Muzaffarnagar	Krishni / Hindon / Yamuna
8	BAJAJ HINDUSTHAN LTD. THANA BHAWAN, SHAMLI	Uttar Pradesh	Shamli	Muzaffarnagar	Krishni / Hindon / Yamuna
9	BAJAJ HINDUSTAN LTD. BHAISANA, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
10	D.S.M. SUGAR MANSURPUR, MEERUT ROAD. MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
11	I.P.L. (FORMERLY TITAWI SUGAR COMPLEX), TITAWI, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
12	I.P.L. SUGAR UNIT ROHANA KALAN, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
13	UTTAM SUGAR MILLS, KHAIKHERI, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
14	BAJAJ HINDUSTAN LTD, SUGAR, KINONI, MEERUT	Uttar Pradesh	Meerut	Meerut	Hindon / Yamuna
15	RAMALA SAHKARI CHINI MILLS LTD,RAMALA,BAGHPAT	Uttar Pradesh	Baghpat	Meerut	Krishni / Hindon / Yamuna

Table 4 List of Slaughter House units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
1	A.L.M. INDUSTRIES (SLAGHTER HOUSE UNIT) HARODA, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
2	NAGAR NIGAM, PASHUBADHSHALA, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
3	NAGAR PALIKA PARISHAD, PASHUBADHSHALA, GANGOH, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
4	AL NOOR EXPORT, JANSATH ROAD MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
5	AL NAFEES FROZEN FOODS EXPORTS, HAPUR ROAD DASNA GZB. (INTEGRATED MEAT UNIT)	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
6	AL NASEER EXPORT PVT.LTD., 2761, BHOOR GARI, DASNA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
7	AL-AALI EXPORTS (P) LTD., B-37, SITE-4, IND. AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
8	ANNA ASSOCIATE PVT. LTD., 108, SITE-4 IND. AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
9	ARSHIYA EXPORT PVT. LTD.) B-67, SITE-4, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
10	EAGLE CONTINENTAL FOODS P LTD., KALLUA GARHI ROAD, DASNA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
11	FAIR EXPORT (INDIA) PVT. LTD., 20/1, SITE-4 IND. AREA, SAHIBABAD, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
12	FIRGO RIFFICO ALANA LTD., A-15, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
13	FRIGO RIFICO ALANA LTD., UNIT-2, A-14/1, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
14	HIND INDUSTRIES LTD., PLOT NO. B-42, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
15	INTERNATIONAL AGRO FOOD, VILL. BHOOR GARI, DASNA GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
16	M.K. OVERCEASE PVT. LTD., B-63, 64, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
17	MIRHA EXPORT PVT.LTD., B-36, SITE-4, SAHIBABAD IND. AREA, GHAZIABAD.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

Table 5 List of Pulp & Paper units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
1	AROMA CRAFT & TISSUES PVT. LTD., VILL. LATHERDEVA, JHABRERAROAD, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
2	UTTARANCHAL PULP & PAPER MILLS, MANGLORE DEOBAND ROAD, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
3	AADHARSHREE PAPER MILLS PVT. LTD., KH. NO. 9/4/1/2.5 MANGLORE, DEOBAND ROAD, VILL. MUNDET, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
4	GANGOTRI PAPER MILL, NARSANLAKHNOTA ROAD, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
5	SAGAR PAPER MILLS PVT. LTD., VILL. LATHERDEVA, MANGLOREJHABRERA ROAD, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
6	SAGAR PULP & PAPER MILLS, MANGLORE DEOBAND ROAD, ROORKEE, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
7	HINDON FILTER (P) LTD. UNIT 2 VILLAGE KOLKI KALAN SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
8	STAR PAPER MILL SAHARANPUR.	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
9	MARUTI PAPERS (P) LTD. VILL - SIKKA SHAMLI	Uttar Pradesh	Shamli	Muzaffarnagar	Krishni / Hindon / Yamuna
10	NIKITA PAPERS (P) LTD. IND. ESTATE SHAMLI	Uttar Pradesh	Shamli	Muzaffarnagar	Krishni / Hindon / Yamuna
11	AGGARWAL DUPLEX & BOARD MILLS LTD. BHOPA ROAD MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
12	ARISTO CRAFT PAPER MILLS PVT. LTD. MEERUT ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
13	BINDALAS DUPLEX LTD, BHOPA ROAD (UNIT-1), MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
14	BINDALAS DUPLEX LTD, BHOPA ROAD (UNIT-2) MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
15	BINDALS PAPERS MILLS LTD. BHOPA ROAD, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
16	D.L.S. PAPERS PVT. LTD., 10KM MEERUT ROAD, DHAULAPUL, BEGRAJPUR, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
17	DDLS PAPERS PVT. LTD., 10KM MEERUT ROAD, DHAULAPUL, BEGRAJPUR, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
18	DISHA PAPER INDUSTRIS, JOLLY ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
19	GALAXY PAPERS PVT.LTD. JOLLY ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
20	GARG DUPLEX & PAPER MILLS (P) LTD. BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
21	GENUS PAPER & BOARDS LTD. (UNIT-1), JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
22	GENUS PAPER & BOARDS LTD. (UNIT-2), JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
23	K.K. DUPLEX PVT. LTD., JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
24	KRISHNANCHAL PULP & PAPERS PVT. LTD., (FORMERLY PRIME PAPERS) JOLLY ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
25	MAHALAXMI CRAFT & TISSUES BHOPA ROAD, JANSATH MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
26	MEENU PAPERS (P) LTD. BHOPA ROAD MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
27	ORIENT BOARD & PAPER MILL PVT. LTD., JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
28	PARIJAT PAPER MILLS, LTD., BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
29	RANA PAPERS (NEW NAME N.S. PAPERS LTD.) JANSATH ROAD (UNIT-1) MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
30	S.K. PAPERS (TAKEN OVER M/S. TAJ PAPER MILLS PVT. LTD.), JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
31	SHAKTI CRAFT & TISSUES, JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
32	SHAKUMBARI PULP & PAPER BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
33	SHRI BHAGESHWARI PAPER MILLS (P) LTD., BHOPA ROAD UNIT-1 MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
34	SHRI BHAGESHWARI PAPER MILLS (P) LTD., BHOPA ROAD UNIT-2 MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
35	SHRI VEER BALAJI PAPER MILLS (FORMERLY SITA PAPER MILL) BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
36	SIDDHESHWARY IND. PVT. LTD., JANSATH ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
37	SIDHBALI PAPERS MILLS LTD,) BHOP ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
38	SILVER TON PULP & PAPER, BHOPA ROAD, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
39	SILVER TONE PULP & PAPER (UNIT-2) BHOPA ROAD, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
40	SILVERTOAN PAPER LTD. (UNIT-1) BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
41	SILVERTOAN PAPER LTD. (UNIT-2) 16BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
42	SUYASH CRAFT & PAPERS LTD., VELHANA, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
43	TEHRI PULP & PAPERS LTD. BHOPA ROAD (UNIT-1) MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
44	TEHRI PULP & PAPERS LTD. BHOPA ROAD (UNIT-2) MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
45	TIRUPATI BALAJI FIBRES LTD. BHOPA ROAD, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Hindon / Yamuna
46	GANGESWAR PAPERS PVT LTD.DUNDAHERA, BAGHPAT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna
47	SARDHANA PAPERS PVT LTD., SARDHANA, MEERUT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna
48	ASHOKA PULP & PAPER PVT. LTD., 11, LONI ROAD IND. AREA, MOHAN NAGAR, GZB.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
49	MAGNUM VENTURES LTD, 18/41, SITE-4 SAHIBABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
50	SHRI GANGA PAPER MILLS PVT.LTD., HAPUR ROAD DASNA	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
51	SANDEEP PAPER MILLS (P) LTD, A-20, SECTOR-6, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
52	KAWATRA PAPERS (P) LTD., DHOOM MANIKPUR, G.T. ROAD, DADRI	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna
53	SUCHI PAPER MILLS, BISRAKH ROAD, CHAPRAULLA, G.T. ROAD, GREATER NOIDA, G B NAGAR.	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna

Table 6 List of Food & Beverages units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
1	AVEENA MILK PRODUCT, KHASRA NO. 550, LATIFPUR, KHUBBANPUR, HARIDWAR	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
2	PASHUPATI DAIRY (P) LTD. DEHRADUN ROAD, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
3	S.M.C. FOODS LTD. NANAUTA, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Krishni / Hindon / Yamuna

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
4	GOGA FOODS LTD, KHEKRA,BAGPAT	Uttar Pradesh	Baghpat	Meerut	Hindon / Yamuna
5	MOON BREVRAGES OLD NAME (HINDUSTAN COCO COLA BEVERAGES PVT. LTD.), 5TH KM, MILESTONE, M.G. ROAD IND. AREA, HAPUR.	Uttar Pradesh	Hapur	Ghaziabad	Hindon / Yamuna
6	V.R.S. FOOD LTD. (VEDRAM & SONS), UNIT-2, B-33, SITE-4 , SBD. GZB.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
7	V.R.S. FOOD LTD., (VEDRAM & SONS), UNIT-1, B-56, SITE-4 , SBD.GZB.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
8	HALDIRAM SNACKS (P)LTD., A-11, SECTOR-68, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
9	HALDIRAM SNACKS (P)LTD., A-2-4, SECTOR-65, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
10	HALDIRAM SNACKS (P)LTD., B-1, SECTOR-63, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
11	HALDIRAM SNACKS (P)LTD., C-3, SECTOR-67, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
12	PARAG DAIRY,(PCDF LUCKNOW) B-219, PHASE-II, NOIDA	Uttar Pradesh	Gautam Budh Nagar	Noida	Hindon / Yamuna
13	CONTINENTAL MILKOSE (INDIA) LTD, HABIBPUR, KULESRA, GREATER NOIDA	Uttar Pradesh	Gautam Budh Nagar	Greater Noida	Hindon / Yamuna

Table 7 List of Chemical units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
1	DABUR INDIA LTD, P-22, SITE 4 SAHIBABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

Table 8 List of Distillery units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB/UKPCB	Tributaries
1	UTTAM SUGAR MILLS LIMITED (DISTILLERY DIVISION), LIBBERHERI, ROORKEE, HARIDWAR, UTTARAKHAND	Uttarakhand	Haridwar	Roorkee	Kali West / Hindon / Yamuna
2	BAJAJ HINDUSTAN LTD. DISTILLARY UNIT, GAGNOLI. SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
3	U.P. CO-OPRATIVE CO. LTD. TAPRI, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Hindon / Yamuna
4	U.P. CO-OPRATIVE SUGAR FACTORY NANAUTA, SAHARANPUR	Uttar Pradesh	Saharanpur	Saharanpur	Krishni / Hindon / Yamuna
5	SHAMLI DISTILLERY & CHEM. WORKS. SHAMLI	Uttar Pradesh	Shamli	Muzaffarnagar	Krishni / Hindon / Yamuna
6	INDIAN POTASH LIMITED DISTILLERY DIVISION, ROHANA KALAN, MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
7	SIR SHADI LAL DISTILLERY & CHEMICAL WORKS, MANSOORPUR MUZAFFARNAGAR	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
8	TRIVENI ENGG. INDUSTRIES LTD. BILASPUR, JOLLY ROAD, MUZAFFARNAGAR.	Uttar Pradesh	Muzaffarnagar	Muzaffarnagar	Kali West / Hindon / Yamuna
9	BAJAJ HINDUSTAN LTD, DISTILLERY UNIT, KINONI, MEERUT	Uttar Pradesh	Meerut	Meerut	Hindon / Yamuna
10	MOHAN MEAKIN LTD. MOHAN NAGAR GHAZIABAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

Table 9 List of others sector units in catchment of river Hindon basin

S. No.	Name & Address of Unit	State	District	Regional Office, UPPCB	Tributaries
1	BHUSHAN STEEL LTD., 23, SITE-4, SBD. GZB.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
2	CONTINENTAL CARBON INDIA LTD., A-14, S.S. OF G.T. ROAD	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna
3	SHRI RAM PISTON & RINGS LTD., MEERUT ROAD IND.AREA GZB.	Uttar Pradesh	Ghaziabad	Ghaziabad	Hindon / Yamuna

Annexure-VI: List of industries provided by UPPCB (Year-2023)

District Saharanpur (37 GPIs & 12 Non-GPIs)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
1	Jagdamba Gramodhyog Sansthan, Dehradun Road, Saharanpur	Saharanpur	Not mentioned	Confirming	Non-GPI	Red	Board Mill	Hindon
2	Pashupati Dairy (P) Ltd. Dehradun Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Milk Processing	
3	Bombay Housery, Village Mohmmadpur, Kailashpur, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	
4	Daya Sugar (A unit of B K Investment Services Pvt Ltd.) Naya Bans, Gagalheri, Saharnapur	Saharanpur		Confirming	GPI	Red	Sugar Mill	Hindon
5	Star Paper Mill Saharanpur.	Saharanpur		Confirming	GPI	Orange	Paper Mill	Hindon
6	Shankar Board Mill, Saharanpur	Saharanpur		Confirming	Non-GPI	Orange	Board Mill	Hindon
7	Arora Hoiesery, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
8	Kamal Enterprises, Village Dhamola, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
9	General Textiles, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
10	Mak Hosiery, Tiparpur, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
11	Super Textile, Village Tiparpur, Janta Road, Saharnapur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
12	Shah Industries, 18 Medanta Complex, Janta Road, Saharnapur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
13	Ganpati Textile, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
14	Ekta Textile, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
15	Anmol Textile, Janta Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
16	Shalimar Cotton Dyeing, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
17	Siddharth Textile, Chilkana Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
18	Saharanpur Wools Ltd. Dehli Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon
19	Atul Textile, Behat Road, Saharanpur	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
20	Durga Textile, Janta Road, Saharanpur	Saharanpur	Kamdhenu Complex	Confirming	GPI	Red	Textile Dyeing	Hindon
21	Garg Dyeing, Janta Road, Saharanpur	Saharanpur	Kamdhenu Complex	Confirming	GPI	Red	Textile Dyeing	Hindon
22	J.J. Textile, Janta Road, Saharanpur	Saharanpur	Kamdhenu Complex	Confirming	GPI	Red	Textile Dyeing	Hindon
23	Saharanpur Textiles Pvt. Ltd., Janta Road, Saharanpur	Saharanpur	Not mentioned	Confirming	GPI	Red	Textile Dyeing	Hindon
24	Standard Engineering works, Industrial estate, Delhi road, Saharnapur	Saharanpur	DIC Delhi road, Indust. Area	Confirming	GPI	Red	Textile Dyeing	Hindon
25	Nagar Nigam, Pashubadhshala, Saharanpur	Saharanpur	Not mentioned	Confirming	GPI	Red	Slaughter House	Hindon
26	Deep Industries, I.E. Delhi Road, Saharanpur	Saharanpur	DIC Delhi road, Indust. Area	Confirming	GPI	Red	Textile Dyeing	Hindon
27	Bajaj Hindustan Ltd. Distillery Unit, Gagnoli. Saharanpur	Saharanpur	Not mentioned	Confirming	GPI	Red	Distillery	Hindon
28	Bajaj Hindustan Ltd. Sugar Unit, Gagnoli. Saharanpur	Saharanpur		Confirming	GPI	Red	Sugar	Hindon
29	The Kisan Sahakari Chini Mill, Nanouta, Saharanpur	Saharanpur		Confirming	GPI	Red	Sugar	Krishni
30	S.M.C. Foods Ltd. Nanauta, Saharanpur	Saharanpur		Confirming	GPI	Red	Milk Processing	Krishni
31	U.P. Co-Operative Sugar Factory (Distellry Unit) Nanauta, Saharanpur	Saharanpur		Confirming	GPI	Red	Distillery	Krishni
32	Triveni Engg. & Industries Ltd, Deoband, Saharanpur	Saharanpur		Confirming	GPI	Red	Sugar	Kali West
33	ALM Industries (Meat Procesing)Haroda, Saharanpur	Saharanpur		Confirming	GPI	Red	Slaughter House	
34	ALM Industries (Meat Procesing)Haroda, Saharanpur	Saharanpur		Confirming	GPI	Red	Slaughter House	
35	U.P, Co-operative Co. ltd Tapari	Saharanpur		Confirming	GPI	Red	Distillery	
36	Rainbow Board Mill (Kraft Unit)	Saharanpur		Confirming	GPI	Red	Kraft	
37	Swaroop Paper Pvt ltd, Saharanpur	Saharanpur		Confirming	GPI	Red	Paper Mill	
38	Hindon Filter pvt ltd (Unit -2) Village Kolkikalan,	Saharanpur		Confirming	GPI		Paper Mill	
39	Shri Krishna Board Mill, Gagalheri	Saharanpur		Confirming	Non-GPI		Board Mill	
40	Mahaveer Hand mande Paper & Board Mill	Saharanpur		Confirming	Non-GPI	Red	Board Mill	

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
41	Anant Board Mil (Old Name Parmar Paper Mill ltd)	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
42	Saharanpur Paper Board Mill, Village Majri Dehradun road	Saharanpur		Confirming	Non-GPI	Red	Board Mill	Hindon
43	Majari Gramodyog Sansthan, Dehradun road	Saharanpur		Confirming	Non-GPI	Red	Board Mill	Hindon
44	Jayana Gramodyog Sansthan	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
45	Tiwaya File Board Mill Nawada	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
46	Star Gramodyog Sansthan, Manakmau	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
47	Janhit Gramodyog Sansthan, Dehradun road	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
48	Sufi Pulp and Paper Gramodyog Sansthan, Gagalheri	Saharanpur		Confirming	Non-GPI	Red	Board Mill	
49	R.K. Textiles, Gagalheri-Dehradun road	Saharanpur		Confirming	GPI	Red	Textile Dyeing	Hindon

District Shamli (05 GPIs)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
1	Maruti Papers (P) Ltd. Vill - Sikka Shamli	Shamli	Not mentioned	Non-confirming	GPI	Red	Pulp & Paper	Krishni
2	Nikita Papers (P) Ltd. Ind. Estate Shamli	Shamli	Industrial Estate Shamli	Confirming	GPI	Red	Pulp & Paper	Krishni
3	Shamli Distillery & Chem. Works. Shamli	Shamli	Not mentioned	Non-confirming	GPI	Red	Distillery	Krishni
4	Upper Doab Sugar Mill, Shamli	Shamli		Non-confirming	GPI	Red	Sugar	Krishni
5	Bajaj Hindusthan Sugar Ltd., Thanabhawan, Shamli	Shamli		Non-confirming	GPI	Red	Sugar	Krishni

District Muzaffarnagar (43 GPIs & 09 Non-GPIs)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
1	Aggarwal Duplex & Board Mills Ltd. Bhopa Road Muzaffarnagar	Muzaffarnagar	Not mentioned	Non-confirming	GPI	Red	Pulp & Paper	Kali West
2	Aristo Craft Paper Mills Pvt. Ltd. Meerut Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
3	Bindals Papers Mills Ltd. Bhopa Road, Muzaffarnagar.	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
4	Bindalas Duplex Ltd, Bhopa Road (Unit-1), Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
5	Bindalas Duplex Ltd, Bhopa Road (Unit-2) Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
6	D.L.S. Papers Pvt. Ltd., 10Km Meerut Road, Dhaulapul, Begrajpur, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
7	DDLS Paper Pvt. Ltd., Meerut Road, Begrajpur, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
8	Disha paper Industries, Jolly road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
9	Galaxy Papers pvt.ltd. Jolly Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
10	Garg Duplex & Paper Mills (P) Ltd. Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
11	K.K. Duplex Pvt. Ltd., Jansath road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
12	Krishnanchal Pulp & Papers Pvt. Ltd. (Formerly Prime Papers) Jolly Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
13	Magma Industries, Muzaffarnagar	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Basic Chemicals & Derivatives	Kali West
14	Mahalaxmi Craft & Tissues Bhopa Road, Jansath Muzaffarnagar.	Muzaffarnagar	Not mentioned	Non-confirming	GPI	Red	Pulp & Paper	Kali West
15	Meenu Papers (P) Ltd. Bhopa Road Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
16	Orient Board & Paper Mill Pvt. Ltd. Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
17	Parijat Paper Mills Ltd., Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
18	Genus papers & Boards Ltd. (Unit-2), Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
19	Shakti Craft & Tissues, Jansath road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
20	Shakumbari Pulp & Paper Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
21	S.K. Paper Mills Pvt. Ltd., Jolly Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
22	Shri Bhageshwari Paper Mills (P) Ltd., Bhopa Road Unit-1 Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
23	Shri Bhageshwari Paper Mills (P) Ltd., Bhopa Road Unit-2 Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
24	Siddheshwary Ind. Pvt. Ltd., Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
25	Sidhbali Papers mills Ltd,) Bhopal Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
26	Silverton Paper Ltd. (Unit-1) Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
27	Silverton Paper Ltd. (Unit-2) Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
28	Silverton Pulp & Paper, Bhopa Road, Muzaffarnagar.	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
29	Silverton Pulp & Paper (Unit-2), Bhopa Road, Muzaffarnagar.	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
30	Sir Shadi Lal Distillery & Chemical Works, Mansoorpur Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Distillery	Kali West
31	Shri Veer Balaji Paper Mills, Vill. Tigri, Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
32	Suyash craft & papers ltd., Velhana, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
33	Tehri Pulp & Papers Ltd. Bhopa Road (Unit-1) Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
34	Tehri Pulp & Papers Ltd. Bhopa Road (Unit-2) Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
35	Tirupati Balaji Fibres Ltd. Bhopa Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Pulp & Paper	Kali West
36	Triveni Engg. Industries Ltd. Bilaspur (Alco Chemical Complex), Jolly Road, Muzaffarnagar.	Muzaffarnagar		Non-confirming	GPI	Red	Distillery	Kali West
37	Al Noor Export, Jansath road Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Slaughter House and Meat Processing	Kali West
38	Bajaj Hindusthan Sugar Ltd., Bhaisana, Budhana, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Sugar	Hindon
39	D.S.M. Sugar Mansurpur, Meerut Road. Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Sugar	Kali West
40	H.J. Tannery Pvt. Ltd. Jolly Road muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Tannery	Kali West
41	I.P.L. (Formerly Titawi Sugar Complex), Titawi, Muzaffarnagar.	Muzaffarnagar		Non-confirming	GPI	Red	Sugar	Hindon
42	Indian Potash Ltd., Rohana, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Sugar	Kali West
43	Indian Potash Ltd. Distillery Unit Rohana Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Distillery	Kali West
44	Rati Pushp Intermediates Pvt. Ltd., Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	Non-GPI	Red	Basic Chemicals & Derivatives	Kali West
45	Uttam Sugar Mills, Khaikheri, Muzaffarnagar	Muzaffarnagar		Non-confirming	GPI	Red	Sugar	Kali West
46	Gulshan Polyoles Ltd., Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	Non-GPI	Orange	Food Processing & Calcium Carbonate	Kali West
47	Saral Chemtech LLP, Jansath Road, Muzaffarnagar	Muzaffarnagar		Non-confirming	Non-GPI	Red	Basic Chemicals & Derivatives	Kali West
48	Jain Processors, D-1, Industrial Area Begrajpur, Muzaffarnagar	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Dyeing	Kali West
49	Noor Fashion, K-19, UPSIDC Industrial Area, Begrajpur,	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Dyeing	Kali West
50	Ayman Collection, D-8, Industrial Area, Begrajpur, Muzaffarnagar	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Dyeing	Kali West
51	Shakeel Jeans, Industrial Area, Begrajpur, Muzaffarnagar	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Dyeing	Kali West

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
52	Bright Wash, Industrial Area, Begrajpur, Muzaffarnagar	Muzaffarnagar	UPSIDC	Confirming	Non-GPI	Red	Dyeing	Kali West

District Meerut-Baghpat (05 GPIs & 01 Non-GPI)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
1	M/s Saradhna Paper, Saradhna Meerut road,Meerut	Meerut	Sardhana	Conforming	GPI	Red	Paper	Hindon River
2	M/s Shri Babubali Trader, Village Madiyai Saradhna Meerut road,Meerut	Meerut	Sardhana	Conforming	GPI	Red	Textile	Hindon River
3	M/s Sardhana Dairy, Sardhana Road Meerut	Meerut	Sardhana	Conforming	Non-GPI	Orange	Dairy	Hindon River
4	M/s Shree Krishna Processing Khasra No. 1142 badruddin nagar Nanu thsil, Meerut	Meerut	Sardhana	Conforming	GPI	Red	Textile	Hindon River
5	M/s Bajaj Hindustan Ltd, (Sugar Unit) Village Kinauni,Meerut	Meerut	Kinoni Village	Conforming	GPI	Red	Sugar	Hindon River
6	M/s Bajaj Hindustan Ltd, (Distillery Unit) Village Kinauni,Meerut	Meerut	Kinoni Village	Conforming	GPI	Red	Distillery	Hindon River

District Meerut-Baghpat (01 GPI)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
7	M/s Ramala Sahkari Chini Mill, Ramala Baghpat	Baghpat	Ramala	Conforming	GPI	Red	Sugar	Krishni River

District Ghazaibad (GPIs-169, Non-GPIs-10, Closed-12, Dismanteled-23, Self closed-04, Surrendered-01, Status mot mentioned-02)

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
1	Ashoka Pulp & Paper Pvt. Ltd., 11, Loni Road Ind. Area, Mohan Nagar, GZB.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Pulp & Paper	Hindon
2	Ambika Gartex P Ltd., 42-B Rajinder Nagar Industrial Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	Dismantled			Hindon
3	Asha Prints, A-5/4, Loni Road Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Dismantled			Hindon
4	S.S. Concept (Old Name Asha Tanu Prints), A-5/3, , Loni Road Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Dismantled			Hindon
5	Shree Balaji Processors, (Old Name Hanuman Textiles), 1, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
6	Krishana Washing Service, 72/14, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
7	Laxmi Dyeing & Printing works Pvt.Ltd., S-81, Loni Road I.A., Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
8	Prem Processors, 52 Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
9	R.B. Enterpirses, 180/2 & 180/4, Rajiender Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
10	Right Wash Udyog, 72/19, Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
11	Shahi Exports P Ltd., 30-Site-2, Loni Road Ind.area Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
12	Vaishno Dyeing, 192, Rajineder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	Dismantled			Hindon
13	Krishna Enterprises (Old Name Vidhi Ventuer), Rajinder Nagar Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
14	Mohan Meakin Ltd. Mohan Nagar Ghaziabad	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Distillery	Hindon
15	Balaji wire Pvt.Ltd., 139-A, Anand Ind. Estate, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Non-GPI	Orange	Metal Surface Treatment	Hindon

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16	Jai Durge Metalizing, 67, anand Ind. Estate Mohan Nagar Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Closed			Hindon
17	Vardhman Engg. Works, 72/10-B, Gali No-6, Rajinder Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
18	Shri Ganga paper Mills Pvt.Ltd., Hapur Road Dasna	Ghaziabad	Sub Cluter E	Confirming Area	GPI	Red	Pulp & Paper	Hindon
19	Amit textiles, S-32, S.S. 0f G.T.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	Self-Closed			Hindon
20	Amko Export, A-1, B.S.Road Ind. Area Ghaziabad	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Dyeing & Textile	Hindon
21	Batik India, D-13, Udyog kunj. Dasna, Ghaziabad.	Ghaziabad	Sub Cluter E	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
22	Indian Textiles company, E-49, B.S.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
23	J.B.S. Processors, G-104, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster D/Loni Road Ind. Area	Confirming Area	GPI	Red	Textile Dyeing	Hindon
24	N.G. Tex Prints P.Ltd., E-13/2, Kavi Nagar Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
25	Suruchi Dyeing, 37, S.S.of G.T.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	Closed			Hindon
26	Exclusive Leather, khasra no.2751, Vill.Bhurgari, Dasna	Ghaziabad	Sub Cluter E	Confirming Area	GPI	Red	Tannery	Hindon
27	Triyash Enterprises, khasra no.2751, vill.Bhoor Gari, Dasna	Ghaziabad	Sub Cluter E	Confirming Area	GPI	Red	Tannery	Hindon
28	A.B. Cycle Parts Pvt.Ltd., S-24, S.S.of G.T.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
29	A.C.E.Hardware, B-5, B.S.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
30	A.S.T. Pipes, B-33, B.S.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	Non-GPI	Orange	Other	Hindon
31	Balaji Engineering works, 351, Pandav Nagar, Mehrauli, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
32	Balaji Enterprises, B-22/1/15, B.S.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon

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33	Continental Carbon India Ltd., A- 14, S.S. of G.T. Road	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Other	Hindon
34	Cosmos Engine. Component P Ltd., A-7, Electro Steel Compound, S.S. of G.T. Road, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
35	Futuro Components Pvt. Ltd. Dasna Hapur Road Ghaziabad.	Ghaziabad	Sub Cluter E	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
36	Gourang Products Pvt. Ltd, GT Road, Industrial Area Ghaziabad	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal finisihing	Hindon
37	J.D.M.Enterprises, C-223/1, B.S.Road Ind.area Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
38	Karam Chandra Rubber Pvt. Ltd., C-230, B.S.Road Ind. Area Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	Dismantled			Hindon
39	Lion Cycle & Riksha Industries, E- 10, B.S.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area				Hindon
40	Malik Niddles & allide products, C-108, B.S.Road Ind. Area Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
41	Manav Beverage P Ltd, C-128, BSR Ind.area	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Beverage	Hindon
42	Nip Man Fastners India Pvt. Ltd., C-197, B.S. Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	Closed			Hindon
43	Northern India cyco Parts, E-2, S.S. of G.T.Road, Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
44	S.D. Industries (Old Name is S.D. Enterprises), E-124, B.S. Road Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
45	S.S. Enterprises, 363, Pandav Nagar, B.S. Road Maharauli, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
46	Sakshi Metal Works, D-1/A, Kavi Nagar Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
47	Sara Exports, 35, S.S. of G.T. Road Ind. Area, Ghazizabad	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Hydrocyanic acid	Hindon
48	Shanti Nath Manufactures, A- 2/14, Kavi Nagar Ind. Area Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
49	Shital Industries, S-40, S.S. of G.T.Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon

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50	Shivam Engineering, 282, S.S. of G.T. Road Industrial Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	Non-GPI	Orange	Metal Surface Treatment	Hindon
51	Shivam Fab Tech P Ltd., 22/9, S.S. of G.T. Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
52	Shri Balaji Metal, E-17, Kavi Nagar Ind. Area, Ghaziabad.	Ghaziabad	Sub Cluter B	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
53	Silbrite Spokes P Ltd., S-28, Industries, S.S. of G.T. Road Ind.Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	Dismantled			Hindon
54	Usha Cycle, S.S. of G.T. Road Ind.Area, Ghaziabad.	Ghaziabad	Sub-cluster- F	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
55	Al Nafees Frozen Foods Exports, Hapur Road Dasna Gzb. (Integrated Meat Unit)	Ghaziabad	Sub-cluster- E	Confirming Area	Closed			Hindon
56	Al Naseer Export Pvt.Ltd., 2761, Bhoor Gari, Dasna, Ghaziabad.	Ghaziabad	Sub-cluster- E	Confirming Area	GPI	Red	Slaughter House	Hindon
57	International Agro Food, Vill. Bhoor gari, Dasna Ghaziabad.	Ghaziabad	Sub-cluster- E	Confirming Area	GPI	Red	Slaughter House	Hindon
58	Karan Frozen Food, Bhoor gari, Dasna, Ghaziabad. (W/o Rendering Plant)	Ghaziabad	Sub-cluster- E	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
59	M.D.Frozen Food Exports, Khasra No-2689, Bhoor gari Road, Dasna, Ghaziabad.	Ghaziabad	Sub-cluster- E	Confirming Area	Closed			Hindon
60	Ajay Veer Siroha, K-23, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
61	Apex Udyog, I-4, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
62	Chacha Enterprises, J-4 Appral Park, tronca city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
63	D.K. Jain, G-262, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
64	Colorise (Old Name Deepak Gambhir), E-12 Apparel Park, Sector D-1(P3), Tronica City, Loni.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
65	Denim Matching, G-141, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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66	Durgeshwari Garments Pvt.Ltd., E-13, sect-13-1, Appral Park, tronca city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
67	Ekansh Textile, K-36, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
68	Excellents Apparels Pvt. Ltd., K-52, Sec D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
69	Ghan Shyam Textiles, K-19, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
70	Galaxi Garments, K-22, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
71	Gulshan Rai Jain, G-82, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
72	Gyan Chand & Sons, G-87, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
73	Jai Mata Di Dyers, I-9, Sec D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
74	Jai Shri Dying, I-21, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
75	Krish Garments (Old Name Sanjeev Kumar), G-109, Sec D- 1(P3), Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
76	Krishna Kumar Agarwal, G-129, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
77	Laxmi Bleach (New Name Mani Bhadra Processors), G-102, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
78	Laxmi Processors, K-16, sect-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
79	M.S. Trading, E-15, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Self-Closed			Hindon

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80	Nandi Enterprises, J-15, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
81	Nandi Enterprises, K-14, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
82	Om Prakash Sharma, J-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
83	Pooja Pahawa, K-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
84	Pradeep kumar, G-92, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
85	Puran Munjal, (New Name Adhunik Dyeing), H-12, Sector D- 1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
86	Quadri Processors, I-8, Sec D-1(P3), Apparel Park, Tronika City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
87	R.R. Impex, G-261, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
88	Rachita Processors, K-33 & K-34, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
89	Ragging Sons, I-13, Sec D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
90	Rajeev Kumar, G-64, Sec D-1(P3), Apparel Park, Tronica City, Loni,Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
91	Robest Infra Tech P Ltd., J-13, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
92	Roop Trading Company, E-14, sect-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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93	Roop Trading Company, K-9, sect- D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Non-GPI	Green	Yarn/Textile Processing	Hindon
94	Royal Techno Dyers, K-47, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
95	S.D. Garments, I-2, Sector-D-1, pocket-3, Appral Park, Tronica city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
96	S.S. Hosiery (Old Name is National Industries), G-264, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
97	S.T. Traders, J-5, Appral Park, Tronca city, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
98	S.V.S. Fashion, J-22, Apparel Park,Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
99	Sai Saran Garment, (New Name Lotus Knit Processing House), G- 108, Apparel Park, Sector D- 1(P3), Tronica City, Loni,Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
100	Sandeep Tyagi, G-271, Sec D-1(P3), Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
101	Sanjay Jain Jeans Dyeing, S-30, UPSIDC Ind. Area, Loni, Ghaziabad.	Ghaziabad	Sub-cluster- D	Confirming Area	Dismantled			Hindon
102	Sanjeev kumar (Shyam Washing), G-81, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
103	Sara International, G-265-266, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
104	Shafali Dyeing, G-84, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
105	Shri Paras coloration (U.B. Dyeing), G-117, Sector D-1(P), Aparels Park, Tronica City, Loni,Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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106	Siddhi Vinyak Texile P Ltd., H-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
107	Siddhi Vinyak, G-103, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Textile Dyeing	Hindon
108	Sudhir Kumar Jain, G-80, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
109	Sumer Mal (R.K. Export & Import), H-13, Apparel Park, Sector D- 1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Dismantled			Hindon
110	Sun Dyers, I-19, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Self-Closed			Hindon
111	Sunil Kumar, G-85, Apparel Park, Sector D-1 (P3), Tronica City, Loni	Ghaziabad	Sub-cluster F	Confirming Area	Self-Closed			Hindon
112	Supreme Industries, J-2, Appral Park, Tronca City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
113	Tiwari Feb, G-255, Apparel Park, Sector D-1(P3), Tronica City, Loni,Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
114	Tusar Garments (Spectrum Dye Studio), J-3, Sector D-1(P), Aparels Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
115	Vaishali Hosiery, I-17, Sec D-1, Apparel Park, Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
116	Vedanta Estate, I-11, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
117	Vedanta Estate, (New Name A.N. Processors), I-12, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
118	Vedanta Estate, J-12, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	surrenderd			Hindon
119	U-Like Industry, G-110, Apparel Park, Sector D-1(P3), Tronica City, Loni, Ghaziabad.	Ghaziabad	Sub-cluster F	Confirming Area	Closed			Hindon
120	Dev Tara Industries Ltd., Meerut Road Duhai, muradnagr	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Dyeing & Textile	Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
121	JKG, Kathuria Brothers, Leather section, A-12 Meerut Road Ind.area	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Tannery	Hindon
122	Agrawal Galvenizing, A-8/6, Sect.22 Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
123	Albert David Ltd., B-12/13, Meerut Road	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Pharma (Formulation)	Hindon
124	Chemo Pulp Tissues Pvt Ltd, A-4, sect-22, Meerut Road, Ind.area	Ghaziabad	Sub-cluster- C	Confirming Area	Non-GPI	Orange	Other	Hindon
125	Cosmos Auto India, 21 mainapur Meerut Road Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
126	Hamdard (Wakf) Laborateries, (1 &2) B-2 & 3, Meerut Road	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Pharma (Unani)	Hindon
127	Kathuria Brothers (Cycle section), A-12, Meerut Road Ind. Area. Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
128	Manohar Lal Hira Lal Ltd., 28 KM Stone Meerut Road, Duhai, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
129	Marshal Cycles, B-17/18, Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	Closed			Hindon
130	North Land Cycle co. D-21, Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
131	Ramsons Enterprises, D-21Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
132	Shri Ram Piston & Rings Ltd., Meerut Road Ind.area Gzb.	Ghaziabad	Sub-cluster- C	Confirming Area	Non-GPI	Green	Engineering	Hindon
133	Sukriti Vidyut Udyog Pvt. Ltd., D- 39, Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	Status not mentioned			Hindon
134	Techno Enterprises, A-13/12, Meerut Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
135	Ultra Electropletores, 46 Meerut Road Ind. Area Ghaziabad.	Ghaziabad	Sub-cluster- C	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
136	Unichem Laborateries, C-31, Meerut Road Ind. Area	Ghaziabad	Sub-cluster- C	Confirming Area	Non-GPI	Orange	Pharma	Hindon
137	A & A, S-50, Site-2, Loni Road Ind.area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Non-GPI	Orange	Yarn/Textile Processing	Hindon
138	A.N. Fabric Dyers, 5/6, Site-2, Loni Road Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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139	ASR Enterprises, S-124, Site-2, Loni Road Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Dismantled			Hindon
140	N.G. Textiles., 13A/10, Site-2, Loni Road I.A., Mohan NGR, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
141	Non Stop Colour, S-3, Site-2, Loni Road I.A., Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
142	Sai Processing, 7/37, Site-2, Loni Road Ind. Area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
143	Shri Bala Ji Processors, S-134, Site-2, Loni Road Ind.area, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Closed			Hindon
144	Sunny Prints, 5/7, Site-2, Loni Road, Ind.area, Mohan Nagar, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
145	Ashok Yadav & Rajesh Yadav, S- 126, Site-2, Loni Road, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	Closed			Hindon
146	Shivam Cotage P Ltd., S-110/1Site-2, Loni Road Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster D	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
147	Magnum Ventures Ltd, 18/41,Site-4 Sahibabad	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Pulp & Paper	Hindon
148	Aiden Jeans, B-49/5, Site-4 Ind. Area, Sahibabad, , Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
149	Ajanta Gartex Processors, Unit- 2,18/24, Site-4, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	Dismantled			Hindon
150	Balaji Industry, Plot No. 7, Gali No. 1, Rajinder Nagar Ind. Area, Mohan NGR., Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
151	Beauty Art Prints India Pvt.Ltd.,54/4, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
152	Colour Tuch, 56/28, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
153	G.S.Das Apprarals Pvt.Ltd., 4/44, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
154	Ganga Processors, 18/11, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
155	Ganpati Creation, C-19/1, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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156	Global Industries, A-38/1/9, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
157	Goyal Canvas Pvt.Ltd., 18/43, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
158	Goyal Processors, 42/50, Site-4, Ind. Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
159	Jyoti Dyeing, 18/8, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
160	K.K. Industries, 7/5, Site-4, Ind Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Textile Dyeing	Hindon
161	Kanhiya Enterprises, A-48/11, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
162	Krishna Print Pvt. Ltd., A-47, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
163	M.A. Garments, 20/6/21, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
164	M.J. Allied Enterprises, E-4, Site-4 Ind. Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
165	M.Y. Garments, 20/6/14, Site-4, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
166	Maha Shakti Threads mills, 56/12, Site-4 Sahibabad Ind. Area. Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
167	Mahalaxmi Dyers, 49/24, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
168	Shri Mahaveer Enterprises, 28/1/15, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
169	Nandni Processors, 4/27, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
170	Neelam Tex Prints Pvt.Ltd., 41/1, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
171	Pal Nit Fab, 54/14, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
172	Pooja Processors, 62/2/3, Site-4,Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
173	Ratan Garments, 56/29, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon

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174	Ritika Enterprises, 18/32, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
175	S.B. Feb Tech P Ltd., 28/1/24,Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
176	S.S. Prints, 56/14-15, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
177	Sahibabad Printers, 182/3, G.T.Road, Mohan Nagar,Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
178	Shiv Kumar Pawan Kumar,57/1/13, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
179	Shiva Processors, 18/6, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
180	Siddhi Vinayak (Jivo Gartex), 48/1/18, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	Dismantled			Hindon
181	Singhal Paulings Industries, 56/32, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	Non-GPI	Green	Yarn/Textile Processing	Hindon
182	SPD RAINBOW(Lavya Udyog), 56/17, Site-4, Sahibabd Ind. Area,Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
183	Tanzeem Dyeing 261, Rajaendra Nagar Ind. Area Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
184	V.S. Garments, 20/6/10, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
185	Vaishno Garments, 20/6/3, Site-4, Ind Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Textile Dyeing	Hindon
186	Ventkesh Enterprises, 48/1/7, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
187	Versha Washing, 49/25, Site-4, Ind. Area, Sahibabad, , Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Yarn/Textile Processing	Hindon
188	Advance Steel Tube Ltd. 45/3, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
189	Ajay Industrial Corporation, 20/11, Site-4, Ind. Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
190	Anuradha Fabricators, 42/10, Site-4, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
191	Bharat Electronics Ltd., Bharat Nagar, Sahibabad Industrial Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon

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192	Tata Steel Ltd., 23, Site-4, Sbd. Gzb.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Engineering	Hindon
193	Dabur India Ltd, P-22, Site 4 Sahibabad	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Pharma (Aurvedic)	Hindon
194	Dream Bath, 28/1/21, Site-4, Sahibabad Industrial Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
195	Empire Fastners, 48/1/22, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
196	Ipsa Business India Pvt.Ltd., 57/1/17-18, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
197	Machino Tech, 48/1/1-A, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
198	National Engg. Works (Old Name Mange Ram), 115, Prakash Ind. Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	Non-GPI	Orange	Metal Surface Treatment	Hindon
199	Paharpur-3 P, Plot No 19, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
200	Rachna Metal Industries Pvt. Ltd., 18/42, Site-4, Sahibabad Ind.Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
201	Rama Steel Tube Ltd., B-21, & B-3, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
202	Regency Cycles P Ltd., 16/1-B- 3&4, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
203	Sage Metal Ltd., B-7, Site-4, Shaibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
204	Shri Giri Raj Enterprises, 24-25, Prakash Ind. Estate, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
205	Singla Engrayours Pvt.Ltd., 7/26, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
206	Sona Industry, Plot No- 56/7, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
207	Spark Electrose P Ltd., A-48/9, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon
208	United Polygenious Pvt.Ltd., B- 13/1, Site-4 Sahibabad Ind. Area,Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Metal Surface Treatment	Hindon

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209	V.R.S. Food Ltd., (Vedram & Sons), Unit-1, B-56, Site-4, Sbd.Gzb.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Dairy	Hindon
210	V.R.S. Food Ltd. (Vedram & sons), Unit-2, B-33, Site-4 , Sbd. Gzb.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Dairy	Hindon
211	Al-Aali Exports (P) Ltd., B-37, Site- 4, Ind. Area, Sahibabad, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
212	Anna Associate Pvt. Ltd., 108, Site- 4 Ind. Area, Sahibabad, Ghaziabad. (W/o Rendering Plant)	Ghaziabad	Sub-cluster-A	Confirming Area	Closed			Hindon
213	Arshiya Export Pvt. Ltd.) B-67, Site-4, Sahibabad, Ghaziabad. (W/o Rendering Plant)	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
214	Fair Export (India) Pvt. Ltd., 20/1, Site-4 Ind. Area, Sahibabad, Ghaziabad. (W/o Rendering Plant)	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
215	Firgo Riffico Alana Ltd., A-15, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
216	Frigo Rifico Alana Ltd., Unit-2, A- 14/1, Site-4, Sahibabad Ind. Area, Ghaziabad. (Only Rendering)	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
217	Hind Industries Ltd., Plot No. B- 42, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	Closed			Hindon
218	M.K. Overcease Pvt. Ltd., B-63, 64, Site-4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	Closed			Hindon
219	Mirha Export Pvt.Ltd., B-36, Site- 4, Sahibabad Ind. Area, Ghaziabad.	Ghaziabad	Sub-cluster-A	Confirming Area	GPI	Red	Slaughter House and Meat Processing	Hindon
220	Moon Brewaries Ltd., Unit-1, A- 32, Site-4, Sahibabad GZB.	Ghaziabad	Sub-cluster-A	Confirming Area	Dismantled			Hindon
221	Eagle Continental Foods Pvt Ltd, Kallugarhi Dansa, Ghaziabad	Ghaziabad	Sub-cluster- E	Confirming Area	Dismantled			Hindon

District Greater Noida (18 GPIs & 50 Non-GPIs)

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1	Adarsh Thermopack Industries (P) Ltd, E-106, Site B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Tannery	Hindon
2	Bajaj Carpet (P) Ltd, Vill- Habibpur, Noida Dadri Road, Greater Noida	Gr. Noida	GNIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
3	Bir Horizons Pvt. Ltd., PLOT O. F- 79, SITE-B, Surajpur, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
4	Continental Milkose (India) Ltd, Habibpur, Kulesra, Greater Noida	Gr. Noida	GNIDA	Conforming Area	GPI	RED	Milk Processing	Hindon
5	Ganga Polyester plot no. 37, Site-C, Surajpur, Gr.Noida.	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
6	INDIA DYEING & TEXTILES PLOT NO., F-75 SITE-B G. NOIDA	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
7	Kawatra Papers (P) Ltd., Dhoom Manikpur, G.T. Road, Dadri	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Paper Mill	Hindon
8	Laxmi Fab dye (R.S.Print Fab) Printing Pvt. Ltd., Plot No- C-7, Industrial area, Site-C, Surajpur, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
9	Promotional Club, Plot No. C-1, C-2, C-3, EPIP, Industrial area, Site-5, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
10	Shree Jagdamba Knits (P) Ltd, P.No.-95,105, Site-B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
11	Suchi Paper Mills, Bisrakh Road, Chapraulla, G.T. Road, Greater Noida, G B Nagar.	Gr. Noida	GNIDA	Conforming Area	GPI	RED	Paper Mill	Hindon
12	SS Textile, Plot No. G-46, Site-B, Industrial area Surajpur, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
13	Sky Lark Dyeing (P) Ltd., Plot No.- B-2/14, Site-B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
14	Sultanpur hosiery Mills Pvt Ltd, Plot No. F-68, Site-C, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
15	Surya Processor Pvt. LTd ,BISRAKH ROAD, Vill- CHHAPRAULA, Gr.Noida	Gr. Noida	GNIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
16	Vimal Dyeing, PLOT NO.H-41, SITE-C, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Textile/Dyeing	Hindon
17	National Thermal Power Corporation Ltd., Vidyut Nagar, Dadri, G.B. Nagar	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Power Plant	Hindon
18	Mahana Leathers, Plot No. 101, Site- B, Surajpur, UPSIDC, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	GPI	RED	Tannery (Dyeing only)	Hindon
19	Aar Bee Exports,Plot No-155, Udyog Kendra, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
20	Alpha Lasertek (India)Ltd.E-50, Sector-31, Site-IV, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Security Hologram Stickers	Yamuna via Hindon
21	Amber Enterprises Ltd, Plot No-C-3, Site-4, Ksana Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
22	Aricab Fab (P) Ltd, C-4, Site-4, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Dyeing	Yamuna via Hindon
23	Asian Paints Ltd., PLOT NO-A-1, UPSIDC, Industrial Area, Site- 5, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Paint & Varnishes	Yamuna via Hindon
24	AUTOTEK STEEL ENGINEERS PVT LTD Plot.No. 2B/3, Ecotech-I, Extn-I, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
25	United Electro Platers Unit 2, D-18 Site-C, UPSIDC Ind. Area Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon
26	Capital Dyeing Works, Plot No.C-6, Site-C, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Yarn/Textile Processing	Yamuna via Hindon
27	Celebration Collections Pvt. Ltd., D-107, EPIP Industrial area, Site-V, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Anodizing	Yamuna via Hindon
28	Chaudhary Skin Trading Company, D-34, Site-B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Slaughter House	Yamuna via Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
29	CNH Industrial India Pvt. Ltd., (New Holland Tractors (P) Ltd), Plot No.-3, Udyog Kendra, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Automobile	Yamuna via Hindon
30	Colour & Style (P) Ltd, A-1/2, 8/9, Site-B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Dyeing of Fabric	Yamuna via Hindon
31	Galvano India (P) Ltd E-97, Site-B, Surajpur, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Galvenizing	Yamuna via Hindon
32	Graziano Trasmissioni India Pvt Ltd, Plot No. 14, Udyog Kendra, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon
33	Honda Cars India Ltd, Sector-40/41, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Automobile	Yamuna via Hindon
34	Honda Siel Power Product Ltd, Plot no. -5, Sec-41, Ecotech -I, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
35	India Yamaha Motor (P) Ltd., Noida-Dadri Road, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Automobile	Yamuna via Hindon
36	Indo Pump, Plot No-F-29-30, Site- B, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
37	J.M.V.L.P.S. Ltd., (Ex Name J.M.V. Earthing Equipment pvt. Ltd) Plot No-J-12, Site-C, UPSIDC, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
38	Jayanita Export (P) Ltd. PLOT NO. A-1, EPIP, KASNA, G. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
39	JBM Autotech, PLOT NO- J-5, SITE-C, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
40	JMD Enterprises, Plot No.357, Udyog Kendra, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
41	Kalpakaaru Projects Private Limited, D-10/1, Site V, Kasna Industrial Area, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon
42	KRBL Limited, 9th Mile Stone, Post Dujana , B S Roadg B Nagar,Gautam Budh Nagar	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Rice Mill	Hindon
43	L.G. Electronics, P.No.-51, Udyog Vihar, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Electronic	Yamuna via Hindon
44	Loft Furniture Design Pvt Ltd, Plot No.72, Ecotech I Extension, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
45	M.K. Leather Trading Company, D-33, Site B, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Tannery	Yamuna via Hindon
46	Material Movell India (P) Ltd, Plot.No. G-86/1, Site-5, UPSIDC, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
47	METAL TECH DESIGN (P) LTD, PLOT NO.-7 D, UDYOG KENDRA, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
48	Minda Corporation Limited, Plot No- 2D/2, Udyog Kendra, Ecotech-III, G.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon
49	Moon Beverages Ltd., 2B/1, Ecotech-III, Udyog Kendra, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Beverage (Carbonated, Soft Drinks, Soda.	Yamuna via Hindon
50	NEUMAN COMPONENTS PVT LTD, PLOT NO-35, SEC-31, KASNA, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
51	R S INFRAPROJECTS PVT LTD (Old Name R.S. Infrastructure Pvt. Ltd.) PLOT NO.12/1, Site -C, SURAJPUR, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
52	Rahul IonTech Pvt. LTd, PLOT NO-143, Udyog Kendra, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
53	RASANDIK ENGG.INDIA LTD, PLOT NO-A-1/2-1, SURAJPUR INDUSTRIAL AREA, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
54	S.P. Metaltech Pvt. Ltd., (Old name SP Wire Pvt. Ltd.,) PLOT NO. G-81, SITE -B, Industrial Area, Gr.Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
55	Shree Ram Veritech Solutions Pvt. Ltd., Plot No. 39, Ecotech-I, Ext. Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Security Hologram Stickers	Yamuna via Hindon
56	Sogo fashion pvt. Ltd, D1 & D2, Sit-B, UPSIDC, Surajpur, Greater Noida,	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Dyeing	Hindon
57	SPACK AUTOMOTIVES PVT LTD, KASNA, ROAD, SURAJPUR, GR. NOIDA	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
58	Sunshine Auto Industries PLOT NO. F-24, Site-B SURAJPUR, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
59	Surya Fresh Foods Ltd., 14, Dadri Road, Surajpur, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Beverage (Fruit Juice, Nector)	Yamuna via Hindon

S. No	Name and Address of the industrial units/CETP)	District Unit Located	Specific Industrial Cluster/Area (If unit is located in any)	Confirming/ Non-Confirming Area	GPI/ Non-GPI	Categ. (Red/ Orange/ Green/ White)	Indust.Sector eg, Textile, Pulp and Paper etc. (includng GPI & non-GPI both)	Final recipient river (Hindon, Dhamola, Krishni, Kali West etc)
60	Technik, Plot No- O-21, Industrial area, Site-5, Surajpur, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Plastic Molded Components with Electroplating	Yamuna via Hindon
61	Terrestrial Foods Private Limited, Plot No. B-4, Site-B, Surajpur Industrial Area, UPSIDC, Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Food Industry	Hindon
62	Varun Beverages Ltd., 2, Surjapur, By Pass, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Beverage (Carbonated, Soft Drinks, Soda.	Yamuna via Hindon
63	Varun Beverages Ltd., 2E, Udyog Kendra, Greater Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Beverage (Carbonated, Soft Drinks, Soda.	Yamuna via Hindon
64	Vikas Indusrries PLOT NO.J-37 SITE-C, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
65	Mohak Carpets Pvt Ltd, Plot No. 08, Mahila Udhyami Park-II, Ecotech-III Greater Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Yarn/Textile Processing	Yamuna via Hindon
66	Hero Motors Ltd. (Puch Division), Vill-Accheja, G.T.Road, Gr.Noida	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Hindon
67	Indus Tubes Ltd. Vill. Chhaproulla, G.T. Road, Gr.Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon
68	Nippon Tube Ltd, Bisrakh Road, Vill-Chapraulla, Gr.Noida.	Gr. Noida	UPSIDA	Conforming Area	Non-GPI	RED	Metal Surface Treatment	Yamuna via Hindon

Annexure-VII: Hotspots of pollution in rivers/drains

RIVER

Sl. No	Hotspot	Priority drain	Details of Industry in the catchment
Saharanpur District			
RIVER HINDON			
1.	Origin to B/c of Star Paper Mill drain, Saharanpur	• No adequate flow (dry in lean season)	-
2.	Janta Road Bridge, Saharanpur-Dehradun Road (Saharanpur)	• Stagnant highly polluted wastewater at Janta Road Bridge	• Stagnant polluted wastewater at Janta Road Bridge. • Slaughter House -01 and Board Mills-04 in nearby catchment
3.	A/c Star Paper Mill drain to Village Maheshpur (Saharanpur)	• Star Paper Mill Drain (Mixed drain) • River Dhamola • Bajaj Sugar Mill Drain (Mixed drain)	• Star Paper Mill Drain: GPI-01 (Star Paper Mill) • Dhamola river: GPI-21 & non-GPI-01 • Bajaj Sugar Mill Drain: GPI -01
RIVER DHAMOLA			
4.	A/c of Numaesh camp drain and KD complex industrial drain (Saharanpur) to A/c of Kishanpur drain	• KD Complex Industrial drain • Paondhoi drain • Kishanpur drain	• KD Complex Industrial Drain: GPIs -04 (Textile) • Paondhoi drain & Kishanpur drain: Sewage from Saharanpur city
RIVER KRISHNI			
5.	A/c of Thaska drain	• Thaska drain (Mixed drain), Saharanpur • Sikka drain (Mixed drain), Shamli • Shamli drain (Mixed drain), Shamli	• Thaska drain: GPI-03 • Sikka drain: GPI-01 • Shamli drain: GPI-03
RIVER KALI-WEST			
6.	Origin to Dharmpur village	River encroached by farmers for farming and cultivation purposes.	-

Sl. No	Hotspot	Priority drain	Details of Industry in the catchment
7.	A/c of Sheela drain	Sheela Drain (carries wastewater of industrial area of Roorkee)	Sheela Drain: 16 Nos. industries of Industrial Areas of Roorkee
Shamli District			
RIVER KRISHNI			
8.	B/c of Sikka drain to A/c of Shamli drain	• Shamli drain (Mixed drain), Shamli	• Shamli drain: GPI-03
Muzaffarnagar District			
RIVER HINDON			
9.	B/c of Titawi village drain to A/c of Shamshan Ghat drain (Budhana)	• Titawi village drain • Dhobi Ghat drain • Sabzi Mandi drain • Shamshan Ghat drain	• Titawi village drain: GPI-01 • Dhobi Ghat drain and Sabzi Mandi drain: No industrial unit information available
RIVER KALI-WEST			
10.	A/c of Niyazupura drain to A/c of Suzroo village drain	• Niyazupura drain • Laddawala drain • Shamli Road drain • Khadarwala drain • Krishnapuri drain • Suzroo village drain	• Niyazupura drain, Laddawala drain, Shamli Road drain, Khadarwala drain, Krishnapuri drain, Suzroo village drain: No industrial unit information available, MSW dumping along drains
11.	A/c of Dhandera drain to A/c of Pur Baliyan drain	• Dhandera drain ✓ Jatt Mujhera drain (subsidiary drain of Dhandera) ✓ Kukra drain (subsidiary drain of Dhandera) ✓ Begrajpur Industrial drain (subsidiary drain of Dhandera) • Mansoorpur drain • Pur Baliyan drain	• Dhandera/Begrajpur drain: 45 units ✓ Dhandera drain: 32 units (29 GPIs & 03 non-GPIs) comprising of Pulp & Paper, Slaughter House, Tannery, Pharmaceuticals & Food Processing industries ✓ Jatt Mujhera drain: 05 GPIs (Pulp & Paper and Distillery) ✓ Kukra Drain: 02 GPI ✓ Begrajpur Industrial drain: 06 non-GPIs (Pharmaceuticals & Dyeing) • Mansoorpur drain: 02 GPIs

Sl. No	Hotspot	Priority drain	Details of Industry in the catchment
			• Pur Baliyan drain: No industrial unit identified, Deposition of MSW and Cattle dung along drain
Meerut District			
RIVER HINDON			
12.	A/c of river Kali-West to confluence of river Krishni (Meerut–Baghpat border)	• River Kali West • River Krishni	Discharge of untreated/partially treated industrial wastewater and sewage from Muzaffarnagar district.
13.	A/c of Sardhana drain (Meerut) to B/c of Upper Ganga Canal near Pura village (Baghpat)	• Sardhana drain • Kinauni drain	• Sardhana drain: GPI-03 and Non GPI-01, disposal of cattle dung along drain • Kinauni drain: GPI-02
Ghaziabad District			
RIVER HINDON			
14.	B/c of Jawli drain to A/c of Hindon Vihar drain	• Jawli Drain • Raj Nagar Extension Drain (domestic drain) • Karedha Drain (mixed drain) • Hindon Vihar drain ✓ Hindon Vihar Left Drain (domestic drain) ✓ Hindon Vihar Right Drain (domestic drain)	• Jawli Drain: CETP (Tronica City) -43 GPIs: Yarn/Textile Dying/bleaching/processing unit, 1 Non-GPI: Yarn/Textile processing • Raj Nagar Extension Drain- No industrial unit identified • Karedha Drain- GPIs: 09 & non-GPI: 01, Additional paper printing, automobile service, furniture molding and fabrication, glass printing, MS wire drawing, electrical cable manufacturing and processing units reported • Hindon Vihar Left and Right- No industrial unit identified, high deposition of cattle dung along drain and dairy cattle farming observed along drain.
15.	B/c of Rahul Vihar drain to A/c of Rahul Vihar drain	• Rahul Vihar drain (domestic drain)	• Rahul Vihar drain- No industrial unit identified, MSW dumping along drain
Gautam Buddha Nagar District			

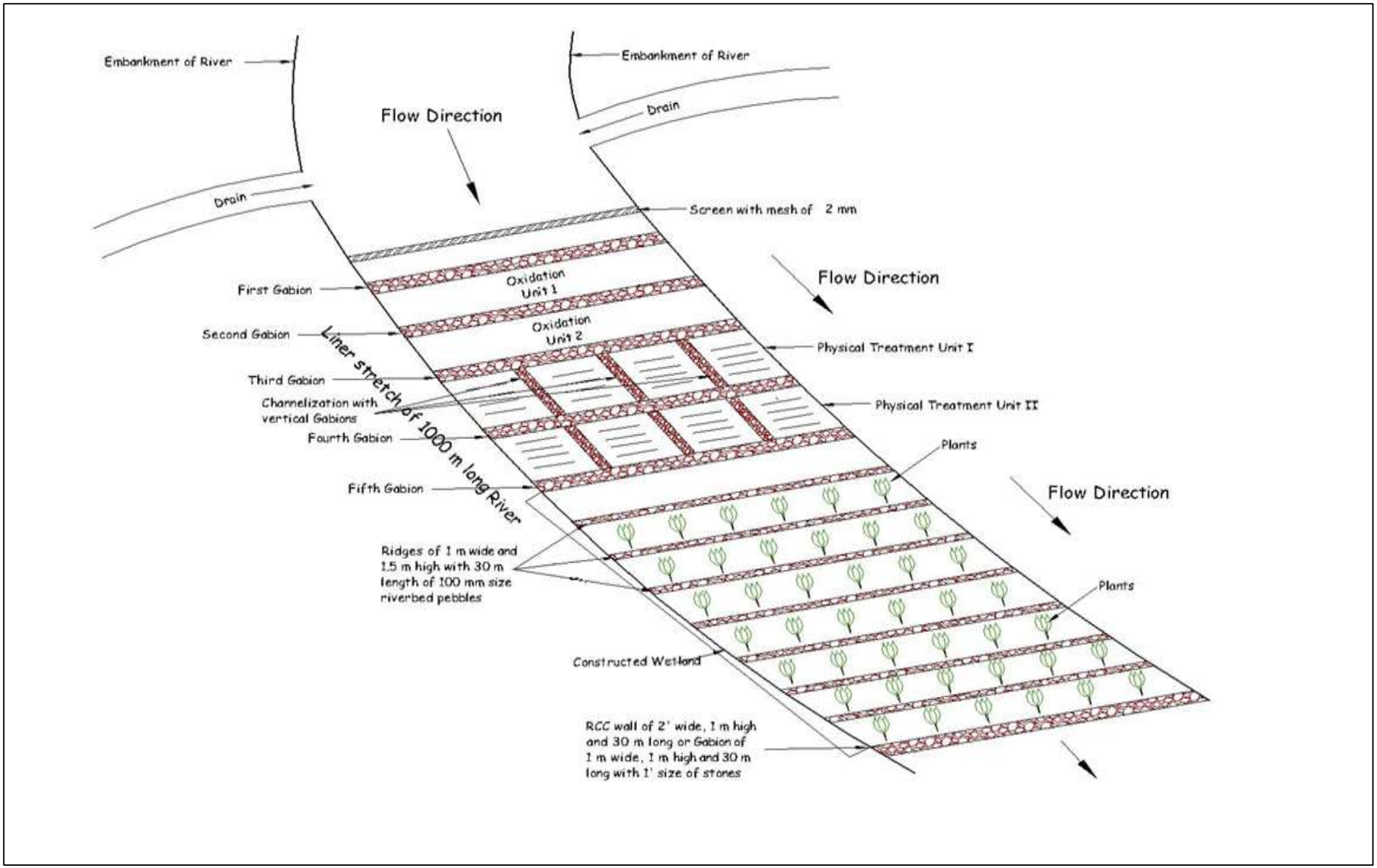
Sl. No	Hotspot	Priority drain	Details of Industry in the catchment
16.	A/c of Rahul Vihar Drain to B/c of Dasna drain	• Inventory of drains was not provided by UPPCB • Bahlolpur drain monitored regarding public complaint • Monitoring team reported many such drains discharging from both banks	• Illegal industrial units operation reported in complaint. UPPCB informed that electricity supply of 16 industrial units in Bahlolpur drain has been disconnected.
17.	A/c Dasna Drain	• Dasna drain ✓ Bhoorgarhi – Kalugarhi Drain (subsidiary drain of Dasna) ✓ B.S. Road Drain (subsidiary drain of Dasna)	• Dasna Drain: 11 GPI ✓ Dasna drain :04 ✓ Bhoorgarhi – Kalugarhi Drain :07 GPIs: Pulp & Paper (01), Tannery (02), Metal Surface Treatment (01), Slaughter House (03) ✓ B.S. Road Drain : No industrial unit identified

DRAIN

Sl. No.	Hot spot drains	River
Saharanpur district		
1.	Star Paper Mill drain	Hindon
2.	Bajaj Sugar Mill Drain	Hindon
3.	Nagdehi drain	Hindon
4.	KD Complex Industrial drain	Dhamola
5.	Pandhoi drain	Dhamola
6.	Kishanpur drain	Dhamola
7.	Sheela drain	Kali-West
8.	Thaska Drain	Krishni
Shamli district		
9.	Shamli drain	Krishni
Muzaffarnagar District		
10.	Titawi village drain	Hindon
11.	Dhobi Ghat drain	Hindon
12.	Sabzi Mandi drain	Hindon
13.	Niyazupura drain	Kali-West
14.	Laddawala drain	Kali-West
15.	Shamli Road drain	Kali-West
16.	Khadarwala drain	Kali-West
17.	Krishnapuri drain	Kali-West
18.	Suzroo village drain	Kali-West
19.	Dhandera drain	Kali-West
20.	Jatt Mujhera drain	Kali-West
21.	Kukra Drain	Kali-West
22.	Begrajpur Industrial drain	Kali-West
23.	Mansoorpur drain	Kali-West
24.	Pur Baliyan drain	Kali-West

Sl. No.	Hot spot drains	River
Meerut District		
25.	Sardhana drain	Hindon
26.	Kinauni drain	Hindon
Ghaziabad District		
27.	Jawli Drain	Hindon
28.	Karedha Drain	Hindon
29.	Hindon Vihar Drain (Right & Left)	Hindon
30.	Kaila Bhatta Drain • 12 GPIs: Pharmaceutical (02), Metal Surface Treatment (08), Textile (01), Tannery (01) • 3 Non-GPI: Pharmaceutical (01), Engineering (01) and Others paper board (01)	Hindon
31.	Arthala Drain • 1 GPI: Distillery & 1 Non-GPI	Hindon
32.	Pratap Vihar Drain	No industrial unit identified
33.	Rahul Vihar Drain	No industrial unit identified
34.	Dasna Drain (confluence with river in Gautam Buddha Nagar) ✓ Bhoorgarhi – Kalugarhi Drain ✓ B.S. Road Drain	Hindon
35.	**SHAHDARA DRAIN (RIVER YAMUNA)-GHAZIABAD STRETCH**	
36.	Sahibabad Drain • 73 GPIs: Dairy (02), Engineering (01), Metal Surface Treatment (19), Pharma (01), Pulp & Paper (01), Slaughter house and Meat (06), Yarn/Textile processing (41), Textile Dyeing (02); • 2 Non-GPI: Metal Surface Treatment (01), Yarn/Textile processing (01) GPIs: Pulp & Paper (01), Tannery (02), Metal Surface Treatment (01), Slaughter House (03)	Yamuna
37.	Indirapuri Drain ✓ Banthala drain • No industrial unit identified in Indirapuri drain • Illegal industrial units operating in the catchment of Banthala drain: Soap manufacturing unit (01) (Non-operational); Metal processing (04) treatment by using acids; Garment washing unit without ETP (01).	Yamuna

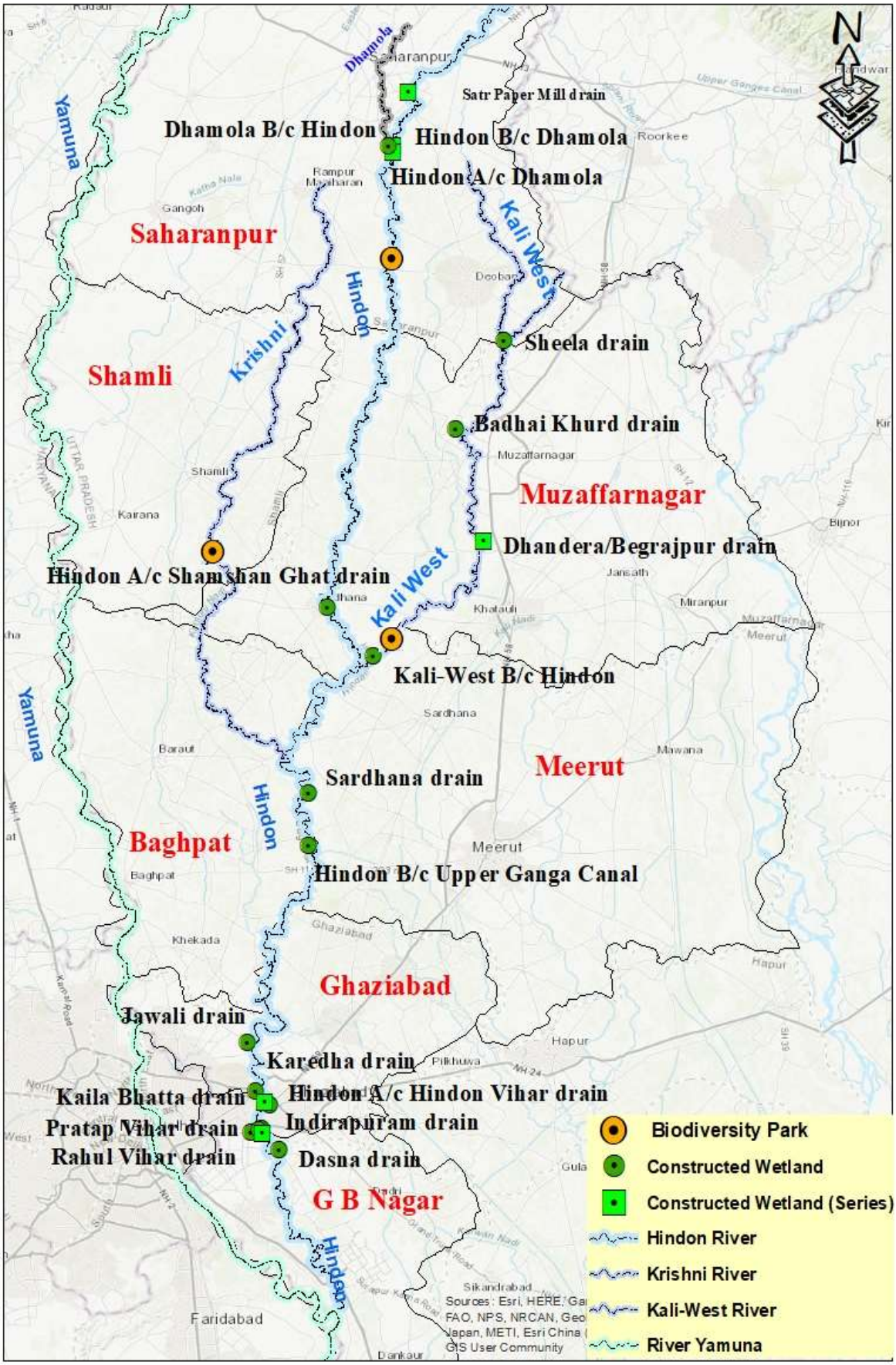
Annexure-VIII: Suggested locations on rivers Hindon, its tributaries and adjoining drains for constructed wetlands/biodiversity park



Schematic diagram of a Constructed Wetland System

Suggested locations for Constructed Wetlands/Biodiversity Park

S. no.	River	Suggested location for Constructed Wetlands (CWs)/ *Biodiversity Park*
1.	Hindon	**Saharanpur and Shamli districts:** • Series of CWs in Star Paper Mill drain before confluence with river Hindon. • Series of CWs in river Hindon before confluence & after confluence of river Dhamola. • Biodiversity Park in Saharanpur. **Muzaffarnagar district:** • CW in Badhai Khurd drain before confluence with river Kali-West. • Series of CWs in Dhandera drain before confluence with river Kali-West. • CW in river Hindon A/c with three drains of Budhana namely Dhobi Ghat drain, Sabzi Mandi drain and Shamshan Ghat drain. **Meerut and Baghpat districts:** • CW in Sardhana drain before confluence with river Hindon. • CW in river Hindon before intrusion of freshwater from the Upper Ganga Canal. **Ghaziabad district:** • CWs on Jawali drain, Karedha drain, Kaila Bhatta drain, Indirapuram drain, Pratap Vihar drain and Rahul Vihar drain before confluence with river Hindon. • Series of CWs in river Hindon (a) after confluence with Hindon Vihar drain; and (b) after confluence with Rahul Vihar drain. **Gautam Buddha Nagar district:** • CWs on Dasna drain before confluence with river Hindon.
2.	Dhamola	**Saharanpur and Shamli districts:** • CW in river Dhamola before confluence with river Hindon.
3.	Kali-West	**Saharanpur and Shamli districts:** • CW in Sheela drain before confluence with river Kali-West. **Meerut district:** • CW in river Kali-West before confluence with river Hindon near Baparsi village, Meerut. • Biodiversity Park in Meerut (before confluence with river Hindon)
4.	Krishni	**Saharanpur and Shamli districts:** • CW in Thaska drain before confluence with river Krishni or in river Krishni after confluence with Thaska drain. • CW in Shamli drain before confluence with river Krishni or in river Krishni after confluence with Shamli drain. • Biodiversity Park in Shamli (after confluence of Shamli drain)



Map showing suggested locations for constructed wetlands/Biodiversity park

Annexure-IX: River water quality data

River Hindon in Saharanpur district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Haz en)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1	Hindon	At origin Barsani water fall	Flow	8.5	-	BDL	-	10.08	BDL	BDL	5	310	10	257	-	-	0.3	-	505	BDL	BDL
2	Hindon	at Janta Road Bridge (Round I)	Flow	7.9	-	84	-	Nil	291	763	148	2816	124		159	-	8.57	-	-	BDL	-
3	Hindon	at Janta Road Bridge (Round II)	No flow (Stagnant)	7.7	289	322	16.2°C	Nil	369	612	204	2288	875	640	108	41	6	1.4	-	-	-
4	Hindon	B/c Daya Sugar Mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Hindon	B/c Daya Sugar Mill Drain (Round II)	Flow	7.9	85	269	17.7°C	Nil	80	305	101	1445	484	506	71	34	3.2	1.9	-	-	-
6	Hindon	A/c Daya Sugar Mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Hindon	A/c Daya Sugar Mill Drain (Round II)	Flow	8	130	275	18.1°C	Nil	73	292	90	1551	600	482	79.5	31	3	1.8	-	-	-
8	Hindon	A/c Nagdehi drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Hindon	A/c Nagdehi drain (Round II)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Hindon	B/c Star Paper mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Hindon	B/c star paper mill drain (Round I)	Dry	-		-		-	-	-	-	-	-	-	-		-		-	-	-
12	Hindon	A/c Star paper mill drain (Round I)	Flow	7.3	Not analysed	25	-	0.8	61	181	69	2796	Not analysed	Not analysed	5	Not analysed	1.59	0.13	-	-	-
13	Hindon	A/c Dhamola drain (Round I)	Flow	7.3	25.8	BDL <05	-	Nil	7	92	36	420	Not analysed	549	7	129	0.43	0.96	-	-	-
14	Hindon	A/c to dhamola drain (Round II)	Flow	7.7	-	40	-	Nil	24	95	83	466	67	288	7.51		0.6		901	0.2	0.3
15	Hindon	at vill Maheshpur (Round I)	Flow	7.4	10.3	BDL <05	-	0.9	14	77	24	532	Not analysed	529	8	190	0.38	1.57	-	-	-
16	Hindon	At Village Maheshpur (Round II)	Flow	7.9	-	40	-	0.35	21	83	53	472	62	296	0.43		1		895	0.02	0.3

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1	Hindon	At origin Barsani water fall	Flow	-	63	13		-	-	-	-	-	-	-	-	-	-	-	-	-
2	Hindon	at Janta Road Bridge (Round I)	Flow	-	78×10^4	45×10^4		BDL	0.006	0.011	0.007	1.387	0.177	0.706	BDL	0.039	BDL	BDL	BDL	
3	Hindon	at Janta Road Bridge (Round II)	No flow (Stagnant)	2.1	$46x10^2$	$11x10^2$	$23x10^2$	BDL	BDL	BDL	0.02	1.7	0.18	0.68	BDL	0.07	BDL	BDL	BDL	BDL
4	Hindon	B/c Daya Sugar Mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Hindon	B/c Daya Sugar Mill Drain (Round II)	Flow	1	$79x10^4$	$17x10^4$	$17x10^4$	BDL	BDL	BDL	BDL	0.47	0.03	0.41	BDL	BDL	BDL	BDL	BDL	BDL
6	Hindon	A/c Daya Sugar Mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Hindon	A/c Daya Sugar Mill Drain (Round II)	Flow	1	$46x10^4$	$11x10^4$	$79x10^3$	BDL	BDL	BDL	BDL	0.72	0.03	0.42	BDL	0.02	BDL	BDL	BDL	BDL
8	Hindon	A/c Nagdehi drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Hindon	A/c Nagdehi drain (Round II)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Hindon	B/c Star Paper mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
11	Hindon	B/c star paper mill drain (Round I)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Hindon	A/c Star paper mill drain (Round I)	Flow	-	49 x 10^2	11 x 10^2	Not analysed	BDL	BDL	BDL	BDL	0.334	BDL	0.025	BDL	0.009	BDL	-	-	-
13	Hindon	A/c Dhamola drain (Round I)	Flow	-	22 x 10^4	78 x 10^3	17 x 10^4	BDL	BDL	BDL	0.011	3.773	0.063	0.188	BDL	0.045	BDL	-	-	-
14	Hindon	A/c to dhamola drain (Round II)	Flow	-	39×10^5	38×10^5	-	BDL	BDL	BDL	0.02	1.45	BDL	0.26	BDL	0.05	BDL	BDL	BDL	BDL

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
15	Hindon	at vill Maheshpur (Round I)	Flow	-	35 x 10^5	22 x 10^5	22 x 10^3	BDL	0.003	BDL	BDL	0.371	BDL	0.241	BDL	0.053	BDL	-	-	-
16	Hindon	At Village Maheshpur (Round II)	Flow	-	92 x 10^5	54 x 10^5	-	BDL	BDL	BDL	0.01	1.35	BDL	1.71	BDL	0.05	BDL	BDL	BDL	BDL

River Dhamola in Saharanpur district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1.	Dhamola	At origin (Sansarpur)	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Dhamola	At Dhamola Village (Round I)	Flow	8.3	-	19		8.04	1.6	7	274	422	19	248	NA	-	1.2	-	693	BDL	0.2
3.	Dhamola	At Dhamola Village (Round II)	Flow	8.5	7	7	22.7° C	13.86	3	14	18	435	25	219	0.5	30	2.2	0.08	-	-	-
4.	Dhamola	B/c of Numaesh camp and KD complex drains.	Flow	7.6	-	43	-	0.36	23	100	90	454	51	324	13.32	-	0.6	-	824	0.01	0.3
5.	Dhamola	A/c of Numaesh camp and KD complex drains. (Round I)	Flow	7.7	-	46	-	0.95	37	117	145	510	73	304	0.26	-	0.8		971	0.01	0.2
6.	Dhamola	A/c Numaesh Camp Drain and KD Complex Drain (Round II)	Flow	7.8	59	57	22.2° C	Nil	42	155	119	588	95	324	11.3	46	2.3	1.45			
7.	Dhamola	B/c with river Hindon (Round I)	Flow	7.8	-	40	-	Nil	22	126	102	462	63	290	7.73	-	0.6	-	886	0.01	0.2
8.	Dhamola	B/c of river Hindon at Sadoli Hariya (Round II)	Flow	7.7	40	126	19.8° C	Nil	47	159	117	601	84	323	23.6	26	1.1	2.16	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Dhamola	At origin (Sansarpur)	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Dhamola	At Dhamola Village (Round I)	Flow	-	33×10^3	11×10^3		-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Dhamola	At Dhamola Village (Round II)	Flow	0.3	$33x10^2$	200	790	BDL	BDL	BDL	BDL	0.28	BDL	0.06	BDL	BDL	BDL	BDL	BDL	BDL
4.	Dhamola	B/c of Numaesh camp and KD complex drains.	Flow	-	92 x 105	54 x 105	-	BDL	0.011	BDL	0.043	0.566	0.006	0.325	BDL	0.042	BDL	BDL	BDL	BDL
5.	Dhamola	A/c of Numaesh camp and KD complex drains. (Round I)	Flow	-	46×10^5	21×10^5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Dhamola	A/c Numaesh Camp Drain and KD Complex Drain (Round II)	Flow	0.5	$17x10^6$	$14x10^5$	$54x10^3$	BDL	0.06	0.01	0.08	2.2	0.01	0.27	0.02	0.21	BDL	BDL	BDL	BDL
7.	Dhamola	B/c with river Hindon (Round I)	Flow	-	22×10^5	13×10^5	-	BDL	BDL	BDL	0.03	2.63	0.01	0.38	BDL	0.08	BDL	BDL	BDL	BDL
8.	Dhamola	B/c of river Hindon at Sadoli Hariya (Round II)	Flow	0.4	$13x10^5$	$68x10^3$	$33x10^3$	BDL	BDL	BDL	0.04	2.58	0.01	0.27	BDL	0.08	BDL	BDL	BDL	BDL

River Kali-West in Saharanpur & Shamli districts

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Haze n)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1.	Kali-West	Rastam	flow	7.8	2	BDL	18.2	10.2	1.1	6	23	398	18	246	0.3	12	0.1	0.06	-	-	-
2.	Kali-West	Miragpur	flow	7.9	10	BDL	19.2	9.92	3	10	26	399	19	247	0.7	14	0.7	0.16	-	-	-
3.	Kali west	A/c Deoband drain at Sanpla Khatri (Round I)	Flow	7.6	3	BDL	-	2	1.1	7	34	400	26	297	2.8	20	1.1	0.33	-	-	-
4.	Kali-West	A/c Deoband drain at Sanpla Khatri (Round II)	flow	7.5	2	BDL	20	0.7	6	25	31	333	26	312	3.8	20	0.6	0.42	-	-	-
5.	Kali-West	B/c Sheela Drain at Sapla	Flow	7.7	14	12	22.1° C	**1.2**	5	28	33	359	29	297	4.2	17	1	0.62	-	-	-
6.	Kali-West	A/c Sheela drain & B/c Bhadhai Khurd Drain	Flow	7.9	9	10	21.8° C	**1**	4	20	9	364	32	322	5	16	0.7	0.49	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Kali-West	Rastam	flow	1.2	330	78	4.5	BDL	BDL	BDL	BDL	0.74	BDL	0.19	BDL	0.02	BDL	BDL	-	-
2.	Kali-West	Miragpur	flow	1.4	$79X10^4$	$93X10^3$	450	BDL	BDL	BDL	BDL	4.86	BDL	3.23	BDL	0.27	BDL	-	-	-
3.	Kali west	A/c Deoband drain at Sanpla Khatri (Round I)	Flow		79 x 10^2	33 x 10^2	21 x 10^2	0.005	BDL	0.001	0.004	0.463	Not analysed	Not analysed	BDL	0.027	BDL			
4.	Kali-West	A/c Deoband drain at Sanpla Khatri (Round II)	flow	1.4	$33X10^4$	$78X10^3$	$49X10^2$	BDL	BDL	BDL	BDL	0.79	BDL	0.14	BDL	0.01	BDL	-	-	-
5.	Kali-West	B/c Sheela Drain at Sapla	Flow	0.3	$92x10^4$	$11x10^3$	$70x10^2$	BDL	BDL	BDL	BDL	0.77	BDL	0.15	BDL	BDL	BDL	BDL	BDL	BDL
6.	Kali-West	A/c Sheela drain & B/c Bhadhai Khurd Drain	Flow	0.3	$35x10^4$	$93x10^2$	$49x10^2$	BDL	BDL	BDL	BDL	0.66	BDL	0.23	BDL	BDL	BDL	BDL	BDL	BDL

River Krishni in Saharanpur & Shamli districts

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Haze n)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1.	Krishni	A/c Thaska drain	Flow	7.2	-	39	-	Nil	98	354	39	948	Not analysed	686	12	288	0.37	1.22	-	-	-
2.	Krishni	B/c Sikka drain	Lean Flow	7.3	68.1	24	-	Nil	57	228	180	640	Not analysed	667	Not analysed	126	0.21	1.92	-	-	-
3.	Krishni	A/c Shamli drain	Flow	7.1	86.1	7	-	Nil	57	297	263	512	Not analysed	569	Not analysed	41	0.29	1.13	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Krishni	A/c Thaska drain	Flow	-	28 x 10^5	84 x 10^4	33 x 10^3	BDL	BDL	0.004	0.008	1.926	BDL	0.484	BDL	0.044	BDL	-	-	-
2.	Krishni	B/c Sikka drain	Lean Flow	-	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	-	-	-
3.	Krishni	A/c Shamli drain	Flow	-	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	Not analysed	-	-	-

River Hindon in Muzaffarnagar district

S. No.	Name of river	Monitoring location	Status (Dry /flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1	Hindon	B/c with Titawi drain (Round I)	Flow	6.8	Not analyzed	BDL<05	23.5	0.6	13	51	10	444	69	436	7	39	0.75	1.11	-	-	-
2	Hindon	B/c Titawi Drain (Round II)	Flow	7.7	18	12	19.5	0.66	7	47	48	611	74	311	12.6	32	BDL	1.56	-	-	-
3	Hindon	A/c with Titawi drain (Round I)	Flow	6.9	Not analyzed	BDL<05	23.1	NIL	5	36	19	420	71	372	6	45	0.57	0.4	-	-	-
4	Hindon	A/c Titawi drain (Round II)	Flow	7.8	14	24	19.2	0.6	13	54	36	515	75	323	1.6	32	0.3	1.53	-	-	-
5	Hindon	A/c Shamshan Ghat drain in Budhana town (Round I)	Flow	6.8	Not analyzed	BDL<05	21.4	NIL	9	51	26	228	82	416	8	34	0.81	1.28	-	-	-
6	Hindon	A/c Shamshan Ghat drain in Budhana town (Round II)	Flow	7.6	8	24	18.5	0.5	10	47	36	537	84	354	19.1	33	0.3	1.17	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100 ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1	Hindon	B/c with Titawi drain (Round I)	Flow	-	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	-	-	-
2	Hindon	B/c Titawi Drain (Round II)	Flow	3	$17X10^3$	$20X10^2$	450	BDL	BDL	BDL	0.01	1.35	BDL	0.59	BDL	0.04	-	-	-	-
3	Hindon	A/c with Titawi drain (Round I)	Flow	-	$14X10^3$	$17X10^2$	$13X10^2$	BDL	BDL	0.003	0.003	1.078	0.004	0.648	BDL	0.041	BDL	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100 ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
4	Hindon	A/c Titawi drain (Round II)	Flow	2.8	$13X10^4$	$20X10^3$	$22X10^2$	BDL	BDL	BDL	0.01	1.57	BDL	0.65	BDL	0.17	-	-	-	-
5	Hindon	A/c Shamshan Ghat drain in Budhana town (Round I)	Flow	-	$70X10^5$	$11X10^5$	$33X10^4$	BDL	BDL	BDL	BDL	0.558	BDL	0.387	BDL	BDL	BDL	-	-	-
6	Hindon	A/c Shamshan Ghat drain in Budhana town (Round II)	Flow	2.8	$13X10^5$	$14X10^4$	$13X10^4$	BDL	BDL	BDL	BDL	0.15	BDL	0.04	BDL	0.01	-	-	-	-

River Kali-West in Muzaffarnagar district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
1.	Kali-West	A/c with Deoband drain	Flow	8	14	BDL	22.9	4	7	19	17	446	31	296	3.8	23	1	0.4	-	-	-
2.	Kali-West	B/c Maleera village drain	Flow	8.1	5	BDL	22.8	5.3	5	9	BDL	401	28	263	1.7	15	0.8	0.36	-	-	-
3.	Kali-West	A/c Maleera village drain	Flow	7.9	8	BDL	22.9	4.7	6	18	16	410	27	305	2.4	31	1.5	0.32	-	-	-
4.	Kali-West	A/c Badhai Khurd drain	Flow	7.7	8	27	16.9	0.9	7	24	19	386	34	354	1.8	23	0.7	0.44	-	-	-
5.	Kali-West	B/c Nyazupura drain (Round I)	Flow	8	7	12	23.3	0.4	6	13	9	413	27	278	4.4	18	0.5	0.48	-	-	-
6.	Kali-West	B/c Niyaz Pura drain (Round II)	Flow	7.9	9	27	18	0.7	12	32	19	387	31	307	2.2	20	0.9	0.45	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry /flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Conductivity (µmho/cm)	NO_2^- (mg/l)	F^- (mg/l)
7.	Kali-West	A/c Laddawala drain near Shamshan ghat	Flow	7.7	47	48	18.4	NIL	38	115	66	416	38	306	7.8	29	0.2	1	-	-	-
8.	Kali-West	B/c Shamli Road drain	Flow	7.7	22	61	18.3	NIL	25	60	31	413	45	303	3.6	23	BDL	0.64	-	-	-
9.	Kali-West	B/c Drain (Suzroo village drain+Nai Basti Khalapar drain+32.5 MLD STP outlet)	Flow	7.7	49	45	23.5	NIL	28	103	127	471	39	288	10.1	13	1.1	1.44	-	-	-
10.	Kali-West	A/c Suzroo village	Flow	6.6	Not Analysed	BDL<5	23	NIL	18	72	68	448	55	396	12	24	0.93	0.81	-	-	-
11.	Kali-West	B/c Dhandera/Begrajpur drain	Flow	7.6	30	42	18.8	NIL	26	65	35	420	41	650	6.3	21	0.4	0.68	-	-	-
12.	Kali-West	A/c Dhandera/Begrajpur drain	Flow	6.9	769	289	19.3	NIL	348	1001	161	1428	268	799	11.5	177	2.5	0.43	-	-	-
13.	Kali-West	B/c Mansoorpur drain	Flow	7.5	404	151	18.1	NIL	111	436	308	740	149	489	9.2	62	1.7	0.52	-	-	-
14.	Kali-West	A/c Mansoorpur drain (Round I)	Flow	6.4	Not Analysed	BDL<05	22.1	NIL	65	293	236	672	112	459	Not Analysed	45	2.51	3.71	-	-	-
15.	Kali-West	A/c Mansoorpur drain at village Pur Baliyan Road Bridge (Round II)	Flow	7.4	234	123	18.4	NIL	87	302	235	631	114	511	9.6	37	0.5	0.51	-	-	-
16.	Kali-West	A/c Pur Baliyan drain (Round I)	Flow	6.5	Not Analysed	BDL<05	22.1	NIL	175	374	295	312	116	475	Not Analysed	94	2.71	1.26	-	-	-
17.	Kali-West	A/c Pur Baliyan village drain (Round II)	Flow	7.4	151	117	19.1	NIL	96	272	109	696	119	517	10.9	62	0.9	0.61	-	-	-

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100 ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Kali-West	A/c with Deoband drain	Flow	-	78×10^2	20×10^2	$31X10^2$	0.009	BDL	0.004	0.003	1.196	0.012	0.269	0.003	0.023	BDL
2.	Kali-West	B/c Maleera village drain	Flow	-	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
3.	Kali-West	A/c Maleera village drain	Flow	-	24×10^4	17×10^3	$17X10^2$	BDL	BDL	0.007	0.006	0.598	BDL	1.216	BDL	0.13	BDL
4.	Kali-West	A/c Badhai Khurd drain	Flow	0.2	16×10^4	41×10^2	35×10^2	BDL	BDL	BDL	BDL	0.58	BDL	0.25	BDL	0.02	BDL
5.	Kali-West	B/c Nyazupura drain (Round I)	Flow	-	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
6.	Kali-West	B/c Niyazupura drain (Round II)	Flow	0.3	24×10^3	24×10^3	16×10^3	BDL	BDL	BDL	BDL	0.59	BDL	0.48	BDL	0.02	BDL
7.	Kali-West	A/c Laddawala drain near Shamshan ghat	Flow	0.2	28×10^6	14×10^5	24×10^5	BDL	BDL	BDL	0.01	0.9	BDL	0.22	BDL	BDL	BDL
8.	Kali-West	B/c Shamli Road drain	Flow	0.2	35×10^4	35×10^4	13×10^3	BDL	BDL	BDL	BDL	0.59	BDL	0.41	BDL	BDL	BDL
9.	Kali-West	B/c Drain (Suzroo village drain+Nai Basti Khalapar drain+32.5 MLD STP outlet)	Flow	-	70×10^3	22×10^3	$13X10^3$	BDL	0.006	0.005	0.017	3.071	0.015	0.409	0.03	0.059	BDL
10.	Kali-West	A/c Suzroo village	Flow	-	49×10^4	11×10^4	$22X10^3$	BDL	BDL	BDL	0.01	1.372	BDL	0.336	BDL	0.034	BDL
11.	Kali-West	B/c Dhandera/Begraj pur drain	Flow	0.2	92×10^5	17×10^4	49×10^2	BDL	BDL	BDL	0.01	0.74	BDL	0.43	BDL	0.23	BDL
12.	Kali-West	A/c Dhandera/Begraj pur drain	Flow	0.5	17×10^{11}	11×10^{11}	33×10^6	0.01	0.02	0.06	1.31	16.95	0.13	8.27	0.11	6.13	0.05
13.	Kali-West	B/c Mansoorpur drain	Flow	0.5	21×10^6	45×10^5	78×10^4	BDL	0.01	0.02	0.2	5.49	0.05	1.93	0.03	1.42	BDL
14.	Kali-West	A/c Mansoorpur drain (Round I)	Flow	-	35×10^{10}	84×10^9	$17X10^7$	BDL	0.004	0.018	0.117	4.382	0.115	1.241	0.017	1.547	0.002
15.	Kali-West	A/c Mansoorpur drain at village Pur Baliyan Road Bridge (Round II)	Flow	0.5	21×10^7	60×10^5	45×10^4	BDL	BDL	0.02	0.19	4.26	0.03	1.34	0.02	1.18	BDL

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100 ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
16.	Kali-West	A/c Pur Baliyan drain (Round I)	Flow	-	24×10^{12}	13×10^{12}	$24X10^{11}$	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
17.	Kali-West	A/c Pur Baliyan village drain (Round II)	Flow	0.5	28×10^{9}	11×10^{8}	13×10^{5}	BDL	BDL	0.02	0.19	4.87	0.02	1.82	0.02	1.55	BDL

River Hindon in Meerut & Baghpat districts

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1	Hindon	B/c with River Kali-West	Flow	7.2	-	BDL<05	-	Nil	11	50	20	616	79	396	2	-	0.32	-
2	Hindon	A/c with River Kali-West	Flow	7.4	-	BDL<05	-	Nil	123	287	168	684	158	495	10	-	0.82	-
3	Hindon	B/c with Krishni near Barnawa	Flow	7.6	66	52	25.6°C	Nil	59	185	166	666	106	392	7.6	33	0.2	1.4
4	Hindon	B/c Sardhana drain (a/c of River Krishni) (Round I)	Flow	7.7	31	60	23.7°C	Nil	52	159	77	669	104	297	8.5	24	0.5	1.42
5	Hindon	B/c Sardhana drain (Round II)	Flow	7.1	-	BDL<05	-	Nil	110	286	110	720	89	634	8	-	0.81	-
6	Hindon	A/c Sardhana drain and B/c Kinauni drain (Round I)	Flow	7.8	36	91	23.8°C	Nil	147	268	124	879	114	272	7.5	33	0.8	1.93
7	Hindon	A/c Sardhana drain and B/c Kinauni drain (Round II)	Flow	7.3	-	BDL<05	-	Nil	163	348	174	692	129	594	21	-	0.77	-
8	Hindon	A/c of Kinauni drain	Flow	7.8	48	97	23.8°C	Nil	140	288	140	752	118	301	7.5	30	1.8	1.64
9	Hindon	B/c Upper Ganga canal at Pura Mahadev village	Flow	7.7	68	61	24.2°C	Nil	113	215	154	756	106	247	8.7	32	0.4	1.53
10	Hindon	A/c of Upper Ganga canal at Amirpur Baleni	Flow	7.9	32	15	23.1°C	5.96	10	30	82	243	22	146	1.1	35	0.4	0.22

S. No.	Name of river	Monitoring location	Status (Dry/flow)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1	Hindon	B/c with River Kali-West	Flow	11×10^4	78×10^2	-	BDL	BDL	BDL	BDL	0.69	0.03	0.68	BDL	0.03	BDL	-	-	-
2	Hindon	A/c with River Kali-West	Flow	28×10^5	14×10^5	-	BDL	BDL	0.01	0.07	2.67	0.02	0.88	0.01	0.74	BDL	-	-	-
3	Hindon	B/c with Krishni near Barnawa	Flow	79×10^4	22×10^4	94×10^4	0.006	0.002	0.011	0.063	3.33	0.014	1.092	0.009	0.491	0.002	BDL	BDL	0.007
4	Hindon	B/c Sardhana drain (a/c of River Krishni) (Round I)	Flow	23×10^5	78×10^4	23×10^5	0.005	0.002	0.01	0.051	2.62	0.012	0.794	0.006	0.38	0.002	BDL	BDL	0.006
5	Hindon	B/c Sardhana drain (Round II)	Flow	94×10^5	11×10^5	-	BDL	BDL	0.04	0.03	1.8	BDL	0.78	BDL	0.25	BDL	-	-	-
6	Hindon	A/c Sardhana drain and B/c Kinauni drain (Round I)	Flow	79×10^4	13×10^4	23×10^4	0.001	BDL	0.01	0.041	2.629	BDL	1.032	0.006	0.338	BDL	BDL	BDL	0.006
7	Hindon	A/c Sardhana drain and B/c Kinauni drain (Round II)	Flow	33×10^6	20×10^5	-	BDL	BDL	0.01	0.05	2.91	BDL	1.04	BDL	0.37	BDL	-	-	-
8	Hindon	A/c of Kinauni drain	Flow	49×10^4	11×10^4	33×10^4	0.003	0.003	0.018	0.071	4.951	0.019	1.107	BDL	0.548	0.003	BDL	BDL	0.01
9	Hindon	B/c Upper Ganga canal at Pura Mahadev village	Flow	49×10^4	11×10^4	33×10^4	0.004	0.002	0.013	0.055	3.619	BDL	0.89	0.008	0.43	0.002	BDL	BDL	0.007
10	Hindon	A/c of Upper Ganga canal at Amirpur Baleni	Flow	49×10^3	45×10^2	49×10^4	0.007	BDL	0.005	0.008	2.591	BDL	0.253	0.002	0.044	BDL	BDL	BDL	0.004

River Krishni in Meerut & Baghpat districts

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1	Krishni	B/c of Ramala drain at Budhpur village	Flow	7.7	7	78	23.8	Nil	16	71	15	576	70	297	18.7	32	0.1	3.28
2	Krishni	A/c of Ramala drain at Gopalpur Khadana	Flow	7.7	7	82	23.9	Nil	16	74	30	621	68	297	18.4	29	2	2.92

S. No.	Name of river	Monitoring location	Status (Dry/flow)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1	Krishni	B/c of Ramala drain at Budhpur village	Flow	70×10^3	13×10^3	23×10^2	0.008	BDL	0.004	0.002	0.408	BDL	0.251	BDL	0.018	BDL	BDL	BDL	BDL
2	Krishni	A/c of Ramala drain at Gopalpur Khadana	Flow	13×10^4	78×10^3	11×10^3	0.004	BDL	0.005	0.003	0.588	BDL	0.269	BDL	0.038	BDL	BDL	BDL	BDL

River Krishni in Meerut & Baghpat districts

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Colour (Hazen)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)
1	Kali West	B/c with river Hindon	Flow	7.2	BDL<05	Nil	138	336	244	700	178	634	18	1.12

S. No.	Name of river	Monitoring location	Status (Dry/flow)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1	Kali West	B/c with river Hindon	Flow	46×10^5	33×10^5	BDL	BDL	BDL	BDL	0.7	0.03	0.68	BDL	0.03	BDL

River Hindon in Ghaziabad district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1	Hindon	B/c Jawli drain	Flow	6.7	40	16	NA	1.03	3	25	58	213	27	197	2.2	20	0.3	0.12
2	Hindon	A/c Jawli Drain (Round I)	Flow	7.9	6	13	18.8	2.32	4	21	55	233	24	144	1.6	32	BDL	0.07
3	Hindon	A/c Jawli drain (Round II)	Flow	7.7	16	12	NA	0.87	3	27	39	238	28	182	2	19	0.4	0.15
4	Hindon	B/c Raj Nagar Extension drain	Flow	7.8	16	16	NA	0.57	4	38	26	635	106	279	18.5	36	0.5	1.89
5	Hindon	A/c Raj Nagar Extension drain	Flow	8	29	18	NA	0.71	4	30	39	230	30	188	3.1	20	0.2	0.3
6	Hindon	B/c Karedha Drain	Flow	7.6	-	BDL	21.2	0.85	5	22	47	303	30	165	2.8	25	0.1	0.39
7	Hindon	B/c Hindon Vihar Drain	Flow	7.4	16	40	21.3	NIL	13	60	102	279	46	198	6.4	NA	0.1	0.4
8	Hindon	A/c Hindon Vihar Drain (Round I)	Flow	7.7	-	BDL	21.9	1.41	3	21	44	277	32	165	3.3	24	0.2	0.43

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
9	Hindon	A/c Hindon Vihar Drain (Round II)	Flow	7.3	44	BDL	21.8	NIL	13	74	101	318	440	240	4.4	NA	0.1	0.18
10	Hindon	A/c Kaila Bhatta drain (Near Post Mortem House)	Flow	7.6	-	BDL	22.1	5.44	6	22	80	289	38	165	3.2	27	0.3	0.49
11	Hindon	B/c Indirapuram drain	Flow	7.7	73	9	21.2	6.38	5	22	59	472	32	155	2.6	36	0.7	0.2
12	Hindon	B/c Rahul Vihar Drain	Flow	7.5	90	24	20.5	4.2	11	45	113	304	67	210	5.5	NA	0.3	BDL
13	Hindon	A/c Indirapuram + Pratap Vihar + Rahul Vihar drain	Flow	7.5	100	13	21.5	2.25	15	44	125	338	80	185	4.1	37	0.1	0.54
14	Hindon	A/c Rahul Vihar Drain	Flow	7.4	154	55	20.8	NIL	28	139	205	636	200	274	17.4	NA	0.1	0.94

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1	Hindon	B/c Jawli drain	Flow	0.1	26×10^2	12×10^2	790	BDL	BDL	BDL	0.01	1.34	0.23	BDL	BDL	0.08	BDL
2	Hindon	A/c Jawli Drain (Round I)	Flow	Not analyzed	11×10^4	21×10^3	$49x10^2$	0.005	0.004	0.004	0.008	1.226	0.114	0.205	BDL	0.058	BDL
3	Hindon	A/c Jawli drain (Round II)	Flow	0.1	13×10^3	780	330	BDL	BDL	BDL	0.02	1.3	0.25	BDL	BDL	0.1	BDL
4	Hindon	B/c Raj Nagar Extension drain	Flow	36	17×10^4	49×10^3	$63x10^2$	BDL	BDL	BDL	BDL	0.39	0.15	BDL	BDL	0.04	BDL
5	Hindon	A/c Raj Nagar Extension drain	Flow	0.2	13×10^3	17×10^2	330	BDL	BDL	BDL	0.02	1.29	0.51	BDL	BDL	0.09	BDL
6	Hindon	B/c Karedha Drain	Flow	Not analyzed	79×10^3	33×10^3	$23x10^2$	0.006	BDL	0.002	0.006	1.159	BDL	0.311	BDL	0.044	BDL
7	Hindon	B/c Hindon Vihar Drain	Flow	1	17×10^4	68×10^3	23×10^3	BDL	BDL	0.01	0.03	4.77	BDL	1.14	BDL	0.43	BDL
8	Hindon	A/c Hindon Vihar Drain (Round I)	Flow	Not analyzed	49×10^3	37×10^2	$13x10^2$	0.009	BDL	0.005	0.008	1.171	BDL	0.313	0.006	0.067	BDL
9	Hindon	A/c Hindon Vihar Drain (Round II)	Flow	0.9	31×10^5	20×10^5	33×10^3	0.01	BDL	0.02	0.03	3.75	0.05	0.65	BDL	0.63	BDL
10	Hindon	A/c Kaila Bhatta drain (Near Post Mortem House)	Flow	Not analyzed	79×10^3	17×10^3	$33x10^2$	0.012	BDL	0.01	0.011	2.213	BDL	0.798	0.003	0.225	BDL

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
11	Hindon	B/c Indirapuram drain	Flow	Not analyzed	11×10^3	45×10^2	$47x10^3$	0.004	BDL	0.01	0.011	2.513	BDL	0.288	0.004	0.098	BDL
12	Hindon	B/c Rahul Vihar Drain	Flow	1.1	22×10^3	40×10^2	46×10^2	BDL	BDL	0.03	0.03	10.41	0.02	0.95	0.01	0.4	BDL
13	Hindon	A/c Indirapuram + Pratap Vihar + Rahul Vihar drain	Flow	Not analyzed	33×10^4	68×10^3	$49x10^3$	0.005	BDL	0.02	0.018	3.587	0.011	0.329	0.008	0.1	BDL
14	Hindon	A/c Rahul Vihar Drain	Flow	3.5	70×10^4	45×10^3	14×10^4	0.01	BDL	0.03	0.06	9.76	0.08	0.99	0.02	0.4	BDL

River Hindon in Gautam Budh Nagar district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	Temp (°C)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1	Hindon	B/c Dasna drain	Flow	7.6	43	13	Not analyzed	Nil	9	48	149	324	70	190	3.6	30	0.3	0.3
2	Hindon	A/c Dasna drain	Flow	7.6	34	34	Not analyzed	Nil	29	93	175	456	100	214	8.5	34	0.4	0.7
3	Hindon	A/c Dasna drain	Flow	7.6	117	Not analyzed	22.3	NIL	66	257	68	790	248	347	26.2	30	0.3	0.57
4	Hindon	Hindon river A/c with Hawaliya drain and B/c with River Yamuna	Flow	7.7	101	35	Not analyzed	Nil	22	74	34	550	122	252	8	52	0.4	0.8

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1	Hindon	B/c Dasna drain	Flow	Not analyzed	17×10^4	45×10^3	Not analyzed	0.008	BDL	0.014	0.015	3.382	0.061	0.364	0.009	0.19	BDL	BDL	BDL	0.004
2	Hindon	A/c Dasna drain	Flow	Not analyzed	13×10^5	49×10^4	Not analyzed	0.003	BDL	0.019	0.02	4.362	0.01	0.345	0.007	0.087	BDL	BDL	BDL	0.007
3	Hindon	A/c Dasna drain	Flow	4	22×10^8	78×10^6	49×10^5	BDL	BDL	0.05	0.04	5.72	0.02	1.2	0.02	0.44	BDL	Not analyzed	Not analyzed	Not analyzed

S. No.	Name of river	Monitoring location	Status (Dry/flow)	SAR	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
4	Hindon	Hindon river A/c with Hawaliya drain and B/c with River Yamuna	Flow	Not analyzed	11×10^6	70×10^5	Not analyzed	0.004	BDL	0.028	0.025	6.362	0.013	0.367	0.011	0.11	BDL	BDL	BDL	0.011

River Yamuna in Gautam Budh Nagar district

S. No.	Name of river	Monitoring location	Status (Dry/flow)	pH	Turbidity (mg/l)	Colour (Hazen)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Yamuna	B/c with Hindon River	Flow	7.7	77	28	Nil	17	67	178	673	192	293	5.8	86	0.3	0.8
2.	Yamuna	A/c with River Hindon	Flow	7.7	45	25	Nil	14	52	89	804	234	334	7.9	106	0.4	0.8

S. No.	Name of river	Monitoring location	Status (Dry/flow)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)	Fecal streptococci (MPN/100ml)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Yamuna	B/c with Hindon River	Flow	17×10^7	11×10^7	Not analyzed	0.004	BDL	0.017	0.018	4.512	BDL	0.277	0.013	0.045	BDL	BDL	BDL	0.008
2.	Yamuna	A/c with River Hindon	Flow	70×10^5	31×10^5	Not analyzed	0.005	BDL	0.009	0.012	2.462	BDL	0.205	BDL	0.014	BDL	BDL	BDL	0.004

Annexure-X: Drain monitoring data

District Haridwar – River Kali-West

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Sheela drain at Lakhnauta	20.04	22.8°C	6	BDL (<5)	365	702	213	1204	174	3	42	2.68	BDL (<5)	NA	NA

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Sheela drain at Lakhnauta	BDL	BDL	0.006	0.022	1.769	0.022	0.43	BDL	0.114	BDL

District Saharanpur – River Hindon

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	NO2- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Daya sugar mill drain (1st round)	Dry at confluence															
2.	Daya Sugar Mill drain (2nd round)																
3.	Daya Sugar Mill drain (3rd round)																
4.	Nagdehi drain (1st round)	Dry															
5.	Nagdehi Drain (2nd round)	Very less flow	-	7.9	41	34	103	120	540	128	39	1.21	136	0.13		31×10^4	20×10^3
6.	Nagdehi Drain (3rd round)	0.74	20.2°C	7.1	BDL (<5)	**237**	**349**	216	440	100	17	5.69	22		1.73	NA	NA
7.	Star Paper Mill Drain (1st round)	23.76	-	7.3	25	61	181	69	2796	-	5	1.59	-		0.13	49×10^2	11×10^2
8.	Star Paper Mill Drain (2nd round)	Not measurable		7.1	75	83	195	99	3404	1261	4	7.91	270	0.22		24×10^4	34×10^3
9.	Star Paper Drain (3rd round)	20.75	24.8°C	7.6	107	198	338	270	**3024**	**1147**	BDL (<5)	0.95	216		BDL (<5)	NA	NA
10.	Dhamola drain	250.56	-	7.3	BDL<05	8	86	44	488	-	5	0.93	-		1.44	49×10^4	22×10^4
11.	Bajaj Sugar Mill Drain (1st round)	Low flow	-	7.3	BDL<05	20	82	117	540	Not analyzed	1	0.18	Not analyzed		0.41	24×10^5	49×10^4

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	NO2- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
12.	Bajaj Sugar Mill Drain (2nd round)	Not measurable due to less flow		6.3	14	74	211	BDL> 10	360	29	4	0.69	240	0.04		35×10^5	34×10^4

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Daya sugar mill drain (1st round)	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Daya Sugar Mill drain (2nd round)	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Daya Sugar Mill drain (3rd round)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-
4.	Nagdehi drain (1st round)	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Nagdehi Drain (2nd round)	BDL	BDL	0.004	0.007	3.574	BDL	0.571	BDL	0.025	BDL	BDL	BDL	0.007
6.	Nagdehi Drain (3rd round)	BDL	BDL	0.012	0.019	1.335	0.015	0.247	BDL	0.059	BDL	-	-	-
7.	Star Paper Mill Drain (1st round)	BDL	BDL	BDL	BDL	0.334	BDL	0.025	BDL	0.009	BDL	-	-	-
8.	Star Paper Mill Drain (2nd round)	BDL	0.003	0.006	BDL	0.753	0.034	2.021	BDL	0.032	BDL	BDL	BDL	BDL
9.	Star Paper Drain (3rd round)	BDL	0.006	0.013	0.056	1.147	BDL	0.524	0.006	0.46	BDL	-	-	-
10.	Dhamola drain	BDL	BDL	BDL	0.007	0.358	BDL	0.218	BDL	0.087	BDL	-	-	-
11.	Bajaj Sugar Mill Drain (1st round)	BDL	BDL	0.015	0.017	14.617	0.014	0.381	0.009	0.088	0.002	-	-	-
12.	Bajaj Sugar Mill Drain (2nd round)	BDL	BDL	0.058	0.006	15.15	0.015	0.232	0.006	0.032	BDL	BDL	BDL	0.015

District Saharanpur – River Dhamola

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	NO_2- (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Mad Drain at Madh Village	1.71	22.6	7.3	BDL (<5)	17	100	35	320	59	-	54	2.27	1.5	-	Not analyzed	NA
2.	Numaesh Camp drain (1st round)	10	-	7.3	18	76	197	108	612	62	BDL>01	152	1.35	-	BDL>0.01	70×10^7	21×10^7
3.	Numaish Camp Drain (2nd round)	Not measured due to unapproachable site	22.4	7.2	BDL (<5)	63	258	69	384	55	9	316	2.31	1.73	-	NA	NA
4.	Kamdhenu Complex Industrial drain (1st round)	Not measurable	-	7.5	38	204	545	1066	1496	252	5	152	2.76	-	0.32	13×10^5	13×10^5

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	NO_2- (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
5.	Kamdhenu Complex Industrial drain (2nd round)	Not measured due to unapproachable site	22.3	7.4	7	28	142	113	864	55	2	474	1.07	0.53	-	NA	NA
6.	Paondhoi Drain	Not measurable		7.3	25	64	170	208	476	54	10	167	0.88	-	0.02	49×10^{11}	22×10^{11}
7.	Kishanpur Drain	95	-	7.2	24	206	347	233	532	114	23	130	0.85	-	BDL>0.01	11×10^{7}	49×10^{6}

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Mad Drain at Madh Village	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-
2.	Numaesh Camp drain (1st round)	BDL	BDL	0.004	0.011	1.197	0.014	0.611	BDL	0.069	BDL	BDL	BDL	0.008
3.	Numaish Camp Drain (2nd round)	BDL	BDL	0.003	0.009	0.569	0.008	0.072	BDL	0.044	BDL	-	-	-
4.	Kamdhenu Complex Industrial drain (1st round)	BDL	7.098	0.103	15.958	97.05	0.014	0.611	BDL	0.069	0.006	BDL	BDL	0.008
5.	Kamdhenu Complex Industrial drain (2nd round)	BDL	0.345	0.01	0.383	6.496	0.017	0.319	0.137	0.856	BDL	-	-	-
6.	Paondhoi Drain	BDL	BDL	BDL	0.03	2.58	0.01	0.2	BDL	0.09	BDL	BDL	BDL	BDL
7.	Kishanpur Drain	BDL	BDL	BDL	0.06	4.57	0.01	0.41	0.01	0.18	BDL	BDL	BDL	BDL

District Saharanpur – River Kali-West

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Deoband Nala	12.51	20	7.2	BDL	21	77	63	620	51	11	27	0.81	1.38	13×10^{5}	49×10^{4}

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Deoband Nala	BDL	BDL	0.016	0.006	0.931	BDL	0.147	BDL	0.016	BDL

District Saharanpur – River Krishni

S. No.	Name of Drain	Flow (MLD)/reason if not measured	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Thaska drain	Flow could not be measured	7.2	39	98	354	39	948	Not analyzed	12	288	0.37	1.22	28×10^5	84×10^4

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Thaska drain	BDL	BDL	0.004	0.008	1.926	BDL	0.484	BDL	0.044	BDL

District Shamli – River Krishni

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Sikka drain	Flow could not be measured	-	7.7	24	48	256	16	1948	Not analyzed	Not analyzed	Not analyzed	0.59	0.46	Not analyzed	Not analyzed
2.	Shamli drain	93.41	-	7.2	BDL<05	48	254	130	380	Not analyzed	6	Not analyzed	0.45	0.89	Not analyzed	Not analyzed

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Sikka drain	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
2.	Shamli drain	BDL	BDL	0.013	0.023	3.941	0.015	0.237	0.005	0.062	BDL

District Muzaffarnagar – River Hindon

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Titawi drain (1^{st} round)	4.93	24	6.2	36	197	399	84	484	84	8	3.5	59	1.72	-	-
2.	Titawi drain (2^{nd} round)	2.34	NA	7.5	BDL	190	373	110	**1460**	320	12	0.35	167	2.06	17×10^6	12×10^5
3.	Dhobi Ghat drain (1^{st} round)	Flow not measurable due to less flow	22.7	6.9	BDL<05	180	455	259	632	204	29	4.51	73	2.37	-	-

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
4.	Dhobi Ghat Drain (2nd round)	Not measurable	NA	7	BDL	**574**	**1435**	**1551**	856	96	49	1.35	37	5.09	92×10^{11}	39×10^{10}
5.	Sabji Mandi drain (1st round)	Flow not measurable as the drain was covered by solid wastes	22.8	6.8	BDL<05	115	273	140	584	116	24	3.96	100	0.1	-	-
6.	Sabzi Mandi Drain (2nd round)	Not measurable	NA	7	BDL	**267**	**800**	**771**	812	106	28	1.44	61	3.48	35×10^{12}	20×10^{11}
7.	Shamshan Ghat drain (1st round)	Flow not measurable as the drain was covered by solid wastes	23.2	6.8	BDL<05	130	368	316	564	135	28	3.89	109	0.3	-	-
8.	Shamshan Ghat drain (2nd round)	Not measurable	NA	6.9	BDL	**159**	**344**	178	812	106	21	1.56	48	3.16	16×10^{9}	39×10^{7}

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Titawi drain (1st round)	BDL	BDL	0.004	BDL	12.89	BDL	0.693	BDL	BDL	BDL
2.	Titawi drain (2nd round)	BDL	BDL	0.009	0.006	3	BDL	0.254	BDL	0.024	BDL
3.	Dhobi Ghat drain (1st round)	BDL	BDL	0.02	0.181	10.66	0.095	0.361	0.015	0.193	0.004
4.	Dhobi Ghat Drain (2nd round)	BDL	BDL	0.029	0.111	**12.88**	0.267	0.38	0.017	0.354	0.005
5.	Sabji Mandi drain (1st round)	BDL	BDL	0.007	0.019	1.727	0.014	0.155	BDL	0.096	BDL
6.	Sabzi Mandi Drain (2nd round)	BDL	BDL	BDL	0.114	**12.93**	0.171	0.376	0.019	0.092	0.005
7.	Shamshan Ghat drain (1st round)	BDL	BDL	0.121	0.034	3.976	0.029	0.286	0.009	0.113	0.002
8.	Shamshan Ghat drain (2nd round)	BDL	0.003	0.005	0.013	1.663	0.071	0.174	BDL	0.092	BDL

District Muzaffarnagar – River Kali-West

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Badhai Khurd drain (1st round)	41.85	-	7.2	BDL<05	45	161	31	468	Not analyzed	12	Not analyzed	0.36	1.27	35×10^{10}	13×10^{10}
2.	Badhai Khurd drain (2nd round)	6.75	21.6	7.1	BDL (<5)	104	298	241	476	84	6	123	2.17	2.61	Not analyzed	Not analyzed

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
3.	Maleera village drain	Flow not measurable due to less flow	26.5	7.2	14	54	187	66	996	223	15	122	4.41	3.33	Not analyzed	Not analyzed
4.	Badhai Khurd drain	33.32	22.1	7	BDL<05	30	106	37	576	63	11	47	1.57	1.19	Not analyzed	Not analyzed
5.	Nyazupura drain (1st round)	17.5	23.6	6.8	BDL<05	119	398	347	496	100	21	56	3.31	1.01	Not analyzed	Not analyzed
6.	Niyazupura drain (2nd round)	17.07	19.2	7.3	BDL<05	230	552	380	640	119	37	71	2.33	2.41	-	-
7.	Laddawala drain at Origin	Could not be measured due to inappropriate site	19	7.2	BDL<05	222	508	300	600	26	-	49	2.74	4.11	-	-
8.	Laddawala drain b/c with river Kali-West near IPS-I (1st round)	92.27	23.4	6.8	BDL<05	163	504	342	616	114	26	49	5.62	2.53	Not analyzed	Not analyzed
9.	Laddawala drain b/c with river Kali-West near IPS-I (2nd round)	65.94	19.5	7.2	BDL<05	259	1150	1230	576	149	49	56	2.48	2.48	-	-
10.	Shamli Road drain (1st round)	Flow not measurable due to unapproachable site	23.7	6.8	BDL<05	202	694	520	312	82	29	51	4.37	2.08	Not analyzed	Not analyzed
11.	Shamli Road drain (2nd round)	Location not accessible for flow measurement	18.3	7.2	BDL<05	117	291	121	672	149	40	44	2.66	3.58	-	-
12.	Khadarwala drain	Flow not measurable as the drain was flowing in closed pipeline	23.7	6.6	BDL<05	164	568	431	284	88	21	33	4.27	1.19	Not analyzed	Not analyzed
13.	Krishnapuri drain	Flow not measurable as the drain was flowing in closed pipeline	23.8	6.7	BDL<05	122	444	364	484	84	25	41	3.89	2.48	Not analyzed	Not analyzed
14.	Suzroo village drain+Nai Basti Khalapar	25.92	23.1	6.9	BDL<05	111	571	933	476	88	25	17	0.39	1.89	Not analyzed	Not analyzed

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
	drain+32.5 MLD STP outlet															
15.	Nai Basti Khalapar drain	17.59	23.4	7	BDL<05	36	135	79	364	110	12	BDL< 05	0.98	2.07	Not analyzed	Not analyzed
16.	Suzroo village drain	6.48	23.6	6.8	BDL<05	63	224	139	348	151	24	38	1.71	1.63	Not analyzed	Not analyzed
17.	Dhandera/Begrajpur drain (1st round)	148.18	23.3	6.3	BDL<05	547	1322	789	1856	398	15	259	8.51	0.84	Not analyzed	Not analyzed
18.	Dhandera/Begrajpur drain (2nd round)	112.13	22.3	6.5	7	968	2214	1622	2452	594	2	167	16.6	0.76	-	-
19.	Dhandera drain near Tehri Pulp and Paper Ltd.	0.58	26.1	7.6	BDL<05	20	90	190	328	40	-	80	0.41	0.84	-	-
20.	Dhandera drain b/c Jatt Mujheda drain	54.23	24.7	6.4	20	948	2011	1188	2808	446	-	499	14.93	0.96	-	-
21.	Dhandera drain at Jansath Road (1st round)	66.99	27.9	5.9	146	922	2106	1357	3548	568	17	522	17.25	0.44	Not analyzed	Not analyzed
22.	Dhandera drain at Jansath Road (2nd round)	Could not be measured due to sludge blanket formation and solid waste deposition	25	6.4	20	1114	2413	924	3164	89	-	170	17.5	1.31	-	-
23.	Dhandera drain d/s Bhopa Road (near Silvertoan Papers Ltd.)	19.3	25.1	7.3	BDL<05	30	137	70	1080	446	-	110	1.51	1.02	-	-
24.	Dhandera drain a/c Kukra drain at Meerut-Haridwar Bypass Road	Could not be measured due to inappropriate site	22.9	6.8	BDL<05	495	2080	1838	2076	85	-	55	3.1	1.31	-	-
25.	Jatt Mujheda drain d/s Bindal Duplex Pvt. Ltd.	Could not be measured because of high sludge deposition	25.2	7.3	BDL<05	103	280	272	1096	347	-	39	0.75	0.96	-	-
26.	Jatt Mujheda drain b/c Dhandera drain	8.06	24.9	6.4	BDL<05	2230	4264	1230	4148	950	-	414	18.3	1.42	-	-
27.	Kukra drain	26.47	18.8	7.2	BDL<05	62	219	163	876	56	-	92	1.02	2.21	-	-
28.	Begrajpur industrial drain (1st round)	1.92	21.5	2.3	146	936	3444	58	7884	431	28	1141	47.96	0.18	Not analyzed	Not analyzed

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
29.	Begrajpur Industrial area drain (2nd round)	1.73	23.1	<02	BDL<05	187	474	192	2584	1584	18	584	21.1	0.88	-	-
30.	Mansoorpur drain at Origin	Could not be measured due to covered drain	18.3	7.2	BDL<05	60	222	205	480	16	-	50	0.8	3.12	-	-
31.	Mansoorpur drain near Husenpur Bopara village	-	29.3	4.9	BDL<05	571	1426	164	1000	161	16	75	5.24	2.7	Not analyzed	Not analyzed
32.	Mansoorpur drain near Husenpur Bopara village	3.13	20.7	6.9	10	579	1261	388	2188	129	-	202	7.68	2.94	-	-
33.	Mansoorpur drain b/c river Kali-West	0.98	22.6	6.8	5	404	870	254	2024	564	4	66	1.84	2.14	-	-
34.	Pur Baliyan drain at Origin	Could not be measured as drain was covered with cow dung, solid waste & animal waste	18.9	7.3	BDL<05	174	479	315	1328	34	-	104	3.97	3.89	-	-
35.	Pur Baliyan drain b/c River Kali-West (1st round)	1.99	24	6.9	BDL<05	188	425	338	820	100		88	8.02	4.89	Not analyzed	Not analyzed
36.	Pur Baliyan drain b/c River Kali-West (2nd round)	2.51	18.8	7.4	5	252	520	332	980	188	82	56	5.31	2.91	-	-

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Badhai Khurd drain (1st round)	BDL	BDL	BDL	BDL	0.947	BDL	0.359	BDL	0.039	BDL
2.	Badhai Khurd drain (2nd round)	BDL	BDL	0.008	0.025	4.525	0.028	0.186	BDL	0.083	BDL
3.	Maleera village drain	BDL	BDL	BDL	BDL	0.795	BDL	0.327	BDL	0.014	BDL
4.	Badhai Khurd drain	BDL	BDL	BDL	BDL	0.785	BDL	0.479	BDL	BDL	BDL
5.	Nyazupura drain (1st round)	BDL	BDL	0.009	0.032	3.037	0.022	0.201	0.006	0.106	BDL
6.	Niyazupura drain (2nd round)	BDL	BDL	0.01	0.044	3.205	0.014	0.24	0.006	0.124	BDL
7.	Laddawala drain at Origin	-	-	-	-	-	-	-	-	-	-
8.	Laddawala drain b/c with river Kali-West near IPS-I (1st round)	BDL	0.021	0.007	0.043	2.735	0.038	0.241	0.005	0.129	BDL
9.	Laddawala drain b/c with river Kali-West near IPS-I (2nd round)	BDL	0.014	0.017	0.084	5.904	0.052	0.308	0.011	0.282	0.002
10.	Shamli Road drain (1st round)	BDL	BDL	0.013	0.058	5.486	0.229	0.216	0.008	0.219	BDL
11.	Shamli Road drain (2nd round)	BDL	BDL	0.005	0.015	1.472	0.017	0.26	BDL	0.086	BDL
12.	Khadarwala drain	BDL	0.039	0.01	0.089	4.034	0.03	0.21	0.008	0.219	BDL
13.	Krishnapuri drain	BDL	0.093	0.012	0.155	3.601	0.043	0.18	0.01	0.252	BDL

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
14.	Suzroo village drain+Nai Basti Khalapar drain+32.5 MLD STP outlet	BDL	0.003	0.041	0.1	26.8	0.056	0.504	0.029	0.371	BDL
15.	Nai Basti Khalapar drain	BDL	BDL	0.009	0.035	4.907	0.012	0.244	0.006	0.091	BDL
16.	Suzroo village drain	BDL	BDL	0.004	0.019	1.432	0.006	0.158	BDL	0.055	BDL
17.	Dhandera/Begrajpur drain (1st round)	BDL	0.013	0.102	0.557	20.81	0.095	2.655	0.068	5.023	0.015
18.	Dhandera/Begrajpur drain (2nd round)	BDL	0.042	0.08	1.374	22.83	0.239	12.25	0.167	7.908	0.089
19.	Dhandera drain near Tehri Pulp and Paper Ltd.	-	-	-	-	-	-	-	-	-	-
20.	Dhandera drain b/c Jatt Mujheda drain	-	-	-	-	-	-	-	-	-	-
21.	Dhandera drain at Jansath Road (1st round)	BDL	BDL	0.07	0.428	26.72	0.129	3.313	0.076	5.427	0.019
22.	Dhandera drain at Jansath Road (2nd round)	-	-	-	-	-	-	-	-	-	-
23.	Dhandera drain d/s Bhopa Road (near Silvertoan Papers Ltd.)	-	-	-	-	-	-	-	-	-	-
24.	Dhandera drain a/c Kukra drain at Meerut-Haridwar Bypass Road	-	-	-	-	-	-	-	-	-	-
25.	Jatt Mujheda drain d/s Bindal Duplex Pvt. Ltd.	-	-	-	-	-	-	-	-	-	-
26.	Jatt Mujheda drain b/c Dhandera drain	-	-	-	-	-	-	-	-	-	-
27.	Kukra drain	-	-	-	-	-	-	-	-	-	-
28.	Begrajpur industrial drain (1st round)	BDL	0.008	0.237	2.121	27.96	0.244	3.728	0.129	6.437	0.005
29.	Begrajpur Industrial area drain (2nd round)	0.048	0.058	0.055	1.053	8.911	0.697	10.9	0.132	17.67	0.027
30.	Mansoorpur drain at Origin	-	-	-	-	-	-	-	-	-	-
31.	Mansoorpur drain near Husenpur Bopara village	BDL	BDL	0.013	0.014	21.32	0.014	0.609	0.007	0.177	BDL
32.	Mansoorpur drain near Husenpur Bopara village	-	-	-	-	-	-	-	-	-	-
33.	Mansoorpur drain b/c river Kali-West	BDL	BDL	0.018	0.091	15.13	0.046	0.401	0.01	0.189	0.004
34.	Pur Baliyan drain at Origin	-	-	-	-	-	-	-	-	-	-
35.	Pur Baliyan drain b/c River Kali-West (1st round)	-	-	-	-	-	-	-	-	-	-
36.	Pur Baliyan drain b/c River Kali-West (2nd round)	BDL	BDL	0.01	0.023	5.344	0.025	0.268	0.005	0.112	0.002

Meerut District – River Hindon

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Sardhana drain (1st round)	33.43	24.5	7.5	370	263	770	458	-	118	49	10.69	45	1.84	-	-
2.	Sardhana drain (2nd round)	16.85		7.3	5	460	1555	1173	1164	198	35	9.91	78		94×10^7	11×10^7
3.	Kinauni drain (1st round)	Dry														
4.	Kinauni drain (2nd round)															

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Sardhana drain (1st round)	BDL	BDL	0.014	0.073	4.527	0.016	1.043	BDL	0.135	0.002
2.	Sardhana drain (2nd round)	BDL	BDL	0.065	0.183	10.739	0.038	1.262	0.011	0.386	BDL
3.	Kinauni drain (1st round)	Dry									
4.	Kinauni drain (2nd round)										

Baghpat District – River Krishni

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Ramala drain	0.6	24°C	7.2	12	11	59	45	16	0.95	275	1.03	0.95	BDL	BDL	0.007	0.007	2.439	BDL	0.206	BDL	0.019	BDL

Ghaziabad District – River Hindon

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Jawli drain (1st round)	Measurement not possible	-	7.7	BDL<05	33	107	305	2216	1049	6	26.64	179	1.55	-	-
2.	Jawli drain (2nd round)	flow was not measured due to less flow	-	7.6	15	55	221	93	4600	218	BDL<01	2.03	168	0.64	22×10^4	20×10^4
3.	Raj Nagar Extension drain	48	-	7.5	BDL<05	36	117	64	1020	40	23	81	60	0.78	24×10^7	13×10^6
4.	Karedha Drain (1st round)	Measurement not possible	-	6.6	BDL<05	167	538	522	2376	1039	54	2.39	154	0.36	-	-
5.	Karedha Drain (2nd round – 1st occasion)	Flow could not be measured due to solid waste dumping	24	7.8	BDL<05	139	529	244	2608	922	NA	2.36	157	0.54	16×10^{13}	39×10^{11}
6.	Karedha Drain (2nd round – 2nd occasion)	Flow could not be measured due to solid waste dumping	23.5	7.5	5	158	639	384	1980	592	28	0.28	143	-	16×10^{13}	16×10^{13}
7.	Hindon Vihar Left drain (1st round)	11.41	-	7.0	24	181	574	353	1344	343	33	5.27	120	2.95	-	-
8.	Hindon Vihar Left drain (2nd round)	16.6	23.3	7.3	BDL<05	302	803	601	1212	272	32	2.37	130	1.43	49×10^{11}	23×10^{11}
9.	Hindon Vihar Right drain (1st round)	15.65	-	7.1	20	639	2018	4766	1036	216	41	3.16	90	3.03	-	-
10.	Hindon Vihar Right drain (2nd round)	7.85	23.4	7.3	BDL<05	168	656	639	1296	262	43	1.19	77	4.21	22×10^9	12×10^8
11.	Kaila Bhatta Drain	33.97	-	7.2	BDL<05	71	278	166	1736	627	23	3.09	66	3.21	-	-
12.	Arthala Drain	Measurement not possible	-	6.6	BDL<05	52	208	159	2256	862	22	1.94	141	0.26	-	-

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
13.	Indirapuram Drain	Measurement not possible	-	7.1	98	88	285	197	1320	431	23	2.46	72	4.87	-	-
14.	Pratap Vihar Drain	27.91	-	7.1	123	102	422	622	1004	559	26	4.07	47	0.88	-	-
15.	Rahul Vihar Drain (1st round)	Measurement not possible	-	7	145	206	736	734	2664	1940	47	7.05	86	1.85	-	-
16.	Rahul Vihar Drain (2nd round)	Flow could not be measured due to solid waste dumping	23.7	7.2	BDL<05	176	743	550	2784	1213	44	3.54	93	1.11	26×10^9	40×10^8
17.	Bhoorgarhi drain after confluence of Kalugarhi drain (makes Dasna Drain)	Measurement not possible	-	7.2	167	97	329	152	1552	539	46	6.21	56	1.61	-	-
18.	B.S. Road Drain Before Confluence with Dasna Drain	Measurement not possible	-	7.2	74	84	259	171	860	186	24	3.30	64	1.02	-	-

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Jawli drain (1st round)	BDL	0.003	0.086	0.196	12.303	0.055	4.181	0.06	1.984	0.003
2.	Jawli drain (2nd round)	BDL	BDL	0.007	0.03	0.222	BDL	4.056	0.011	0.05	BDL
3.	Raj Nagar Extension drain	BDL	BDL	0.005	0.006	0.304	BDL	0.096	0.005	0.04	BDL
4.	Karedha Drain (1st round)	BDL	BDL	0.257	0.175	111.171	3.37	1.621	0.078	6.315	0.006
5.	Karedha Drain (2nd round – 1st occasion)	BDL	BDL	0.269	0.225	0.225	0.251	1.295	0.416	1.818	0.002
6.	Karedha Drain (2nd round – 2nd occasion)	BDL	BDL	0.135	0.118	8.167	0.149	0.613	0.613	0.954	0.002
7.	Hindon Vihar Left drain (1st round)	BDL	BDL	BDL	0.032	2.671	0.024	0.212	0.005	0.508	BDL
8.	Hindon Vihar Left drain (2nd round)	BDL	BDL	0.024	0.039	0.039	0.017	0.291	0.007	0.538	BDL
9.	Hindon Vihar Right drain (1st round)	BDL	0.004	0.077	0.249	38.021	0.124	0.634	0.048	0.813	0.015
10.	Hindon Vihar Right drain (2nd round)	BDL	BDL	0.028	0.085	0.085	0.048	0.778	0.025	0.486	0.004
11.	Kaila Bhatta Drain	BDL	BDL	0.168	0.031	2.186	0.018	0.189	0.016	0.213	BDL
12.	Arthala Drain	BDL	BDL	0.031	0.17	65.021	0.198	0.679	0.021	1.012	0.003
13.	Indirapuram Drain	BDL	BDL	BDL	BDL	0.032	BDL	0.003	BDL	0.013	BDL
14.	Pratap Vihar Drain	BDL	BDL	0.002	BDL	0.682	0.01	0.071	BDL	0.022	BDL
15.	Rahul Vihar Drain (1st round)	BDL	BDL	0.032	0.089	3.254	0.014	0.266	0.033	0.268	BDL
16.	Rahul Vihar Drain (2nd round)	BDL	BDL	0.017	0.06	5.084	0.019	0.312	0.009	0.333	BDL
17.	Bhoorgarhi drain after confluence of Kalugarhi drain (makes Dasna Drain)	BDL	BDL	0.013	0.031	7.698	0.023	0.48	0.011	0.108	0.003

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
18.	B.S. Road Drain Before Confluence with Dasna Drain	BDL	BDL	0.023	0.038	5.296	0.013	0.233	0.007	0.116	BDL

Ghaziabad District – River Yamuna

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
1.	Indrapuri drain	Measurement not possible	-	6.9	BDL<05	90	242	210	2112	980	28	182	12.80	3.01	-	-
2.	Banthala Drain u/s illegal industries (1st round)	Measurement not possible	-	**2.5**	BDL<05	234	460	833	**13060**	363	13	471	15.55	6.52	-	-
3.	Banthala Drain u/s illegal industries (2nd round)	2.3	22.5	<2	BDL<05	*	633	756	19352	*	24	*	*	-	70×10^6	46×10^6
4.	Banthala Drain b/c Indrapuri drain (1st round)	Measurement not possible	-	6.9	10	175	611	862	1604	490	35	136	11.60	4.72	-	-
5.	Banthala Drain b/c Indrapuri drain (2nd round)	Flow could not be measured due to solid waste dumping	-	6.9	19	119	673	568	1580	485	40	150	3.61	-	21×10^{10}	20×10^9
6.	Ponding near Soap Factory (Banthala drain catchment) (2nd round)	-	21.1	7.5	15	762	1748	1118	3004	485	53	650	2.05	-	-	-
7.	Sahibabad Drain	111.81	-	6.4	BDL<05	155	489	281	2408	200	32	2.85	40	2.84	-	-

*Sample was highly acidic therefore analysis could not be carried out.

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Indrapuri drain	BDL	BDL	0.080	0.061	1.524	0.011	3.668	0.034	0.186	BDL
2.	Banthala Drain u/s illegal industries (1st round)	0.031	0.639	12.698	52.199	6035.983	2.398	58.199	19.798	791.793	0.98
3.	Banthala Drain u/s illegal industries (2nd round)	BDL	0.003	0.096	0.714	15.86	0.265	1.709	0.061	0.977	0.006
4.	Banthala Drain b/c Indrapuri drain (1st round)	BDL	BDL	0.050	0.454	12.483	0.059	0.876	0.025	0.317	BDL
5.	Banthala Drain b/c Indrapuri drain (2nd round)	BDL	BDL	0.055	0.53	19.34	0.059	2.041	2.041	0.752	0.003

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
6.	Ponding near Soap Factory (Banthala drain catchment) (2nd round)	BDL	1.051	2.378	10.53	1732	0.724	12.84	12.84	168.6	0.456
7.	Sahibabad Drain	0.015	BDL	0.121	0.237	14.971	0.046	0.771	0.09	0.715	0.003

Greater Noida District – River Hindon

S. No.	Name of Drain	Flow (MLD)/reason if not measured	Temp (°C)	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	NH_3-N (mg/l)	NO_3^- (mg/l)	SO_4^{2-} (mg/l)	PO_4^{3-} (mg/l)	Total Coliform (MPN/100 ml)	Fecal coliform (MPN/100 ml)
1.	Dasna Drain	412.06	-	7.3	BDL<05	73	356	293	960	263	25	0.43	84	2.68	21×10^7	92×10^6
2.	Gaur City Drain	Measurement not possible	-	7.3	BDL<05	90	280	195	785	172	13	0.88	57	2.91	35×10^7	22×10^7
3.	Hawaliya Drain	Measurement not possible	-	7.7	BDL<05	19	97	52	712	138	16	0.28	141	1.24	22×10^6	14×10^6
4.	Kot Escape Canal Drain	Measurement not possible	-	7.7	BDL<05	5	57	21	724	98	2	1.36	129	0.99	16×10^6	16×10^6

S. No.	Name of Drain	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Dasna Drain	BDL	BDL	0.019	0.032	2.907	0.018	0.139	0.023	0.422	0.019	-	-	-
2.	Gaur City Drain	BDL	BDL	0.009	0.031	1.423	0.013	0.075	BDL	0.439	0.009	-	-	-
3.	Hawaliya Drain	BDL	BDL	0.013	0.017	2.335	BDL	0.144	0.012	0.449	0.013	-	-	-
4.	Kot Escape Canal Drain	BDL	BDL	0.008	0.012	1.044	0.056	1.586	0.009	0.269	0.008	-	-	-

Annexure-XI: Groundwater data

District Saharanpur – River Hindon

S. No.	Monitoring location	District	pH	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	EC (µmho/cm)	Cl^- (mg/l)	F^- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Total Alkalinity as $CaCO_3$ (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Village Paragpur	Saharanpur	7.2	BDL	23	1186	1621	298	0.4	400	135	134	15	5	2.9	207	216	9.1	0.1
2.	Village Maheshpur	Saharanpur	7.4	BDL	10	678	1267	114	0.4	619	69	92	31	10	2.4	456	105	4.5	0.07
3.	Near Janta Bridge at Gagalheri	Saharanpur	7.6	BDL	BDL	288	554	17	0.3	293	50	0.2	42	1	0.2	320	13	0.2	0.16

S. No.	Monitoring location	District	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Village Paragpur	Saharanpur	BDL	BDL	0.001	BDL	0.623	-	-	0.006	0.541	BDL
2.	Village Maheshpur	Saharanpur	0.001	BDL	0.001	BDL	0.067	-	-	BDL	BDL	BDL
3.	Near Janta Bridge at Gagalheri	Saharanpur	BDL	BDL	BDL	BDL	11.82	BDL	0.3	BDL	2.61	BDL

District Saharanpur – River Kali-West

S. No.	Monitoring location	District	pH	Conductivity (µmho/cm)	Colour (Hazen)	COD (mg/l)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Total Alkalinity as $CaCO_3$ (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Kalalhati	Saharanpur	7	1228	BDL	8	125	BDL	272	76	37	21	9	1	452	54	BDL	-
2.	Dharampur	Saharanpur	7.3	984	BDL	6	68	0.3	375	64	129	54	14	2.8	378	31	0.6	-
3.	Chandpur	Saharanpur	7.6	491	BDL	BDL	12	0.5	228	51	32	25	9	1.3	290	BDL	BDL	-

S. No.	Monitoring location	District	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Kalalhati	Saharanpur	BDL	BDL	BDL	BDL	3.98	BDL	1.53	BDL	0.04	BDL
2.	Dharampur	Saharanpur	BDL	BDL	BDL	BDL	0.08	BDL	0.1	BDL	0.02	BDL
3.	Chandpur	Saharanpur	BDL	BDL	BDL	BDL	4.64	BDL	0.11	BDL	0.32	BDL

District Saharanpur – River Dhamola

S. No.	Sampling location	pH	Conductivity (µmho/cm)	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	Cl^- (mg/l)	Total Hardness (mg/l)	Total Alkalinity as $CaCO_3$ (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	K (mg/l)	PO_4^{3-} (mg/l)	SAR	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	F^- (mg/l)
1.	Near Numaesh Camp at Santnagar	7.3	1157	BDL	8	694	68	532	573	29	0.2	4	BDL	0.3	180	0.3	21	0.2
2.	Sadoli Hariya Village	7.3	1083	BDL	35	598	161	353	365	25	1.5	3	BDL	0.5	67	0.5	47	0.5

S. No.	Sampling location	District	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Near Numaesh Camp at Santnagar	Saharanpur	BDL	BDL	BDL	0.01	18.48	0.02	0.35	BDL	3.63	BDL
2.	Sadoli Hariya Village	Saharanpur	0.04	BDL	BDL	0.07	34.23	0.05	1.42	0.02	8.07	BDL

District Muzaffarnagar – River Hindon

S. No.	Monitoring location	District	pH	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	Conductivity (µmho/cm)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Total Alkalinity as $CaCO_3$ (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Titawi village	Muzaffarnagar	8	78	BDL	280	489	14	0.1	160	32	51	20	5	1.7	232	12	BDL	BDL

S. No.	Monitoring location	District	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Titawi village	Muzaffarnagar	BDL	BDL	0.001	BDL	3.526	BDL	0.053	BDL	0.727	BDL

District Muzaffarnagar – River Kali-West

S. No.	Monitoring location	District	pH	Conductivity (µmho/cm)	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Total Alkalinity as $CaCO_3$ (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Suzroo village	Muzaffarnagar	7.8	508	BDL	BDL	284	23	0.2	190	40	17	22	5	0.5	228	BDL	BDL	BDL
2.	South Krishnapuri drain	Muzaffarnagar	7.8	520	6	BDL	280	8	0.4	196	31	32	30	6	1	290	5	BDL	BDL
3.	Begrajpur village	Muzaffarnagar	7.9	490	BDL	BDL	286	24	0.2	199	43	18	23	6	0.6	183	11	4.1	BDL
4.	Lechhera village	Muzaffarnagar	7.5	981	9	12	603	63	0.6	372	32	10	73	1	0.2	357	45	1.2	0.07
5.	Husenpur Bopara	Muzaffarnagar	7.9	342	9	5	222	15	0.5	217	22	3	40	1	0.1	199	BDL	2.3	0.06
6.	Near confluence point of Dhandera/Begrajpur drain with river Kali-West	Muzaffarnagar	7.9	340	9	5	207	11	0.3	215	27	4	37	1	0.1	220	BDL	0.2	0.08
7.	Near Mansoorpur drain	Muzaffarnagar	7.9	1394	18	15	907	66	0.3	714	141	9	90	3	0.1	544	156	2.1	0.09

S. No.	Monitoring location	District	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Suzroo village	Muzaffarnagar	BDL	BDL	0.001	0.002	4.748	BDL	0.09	BDL	0.314	BDL
2.	South Krishnapuri drain	Muzaffarnagar	BDL	BDL	0.002	0.129	7.949	0.031	0.11	BDL	1.783	BDL
3.	Begrajpur village	Muzaffarnagar	BDL	BDL	0.001	BDL	0.484	BDL	0.128	BDL	0.162	BDL
4.	Lechhera village	Muzaffarnagar	BDL	BDL	BDL	BDL	1.22	BDL	0.02	BDL	0.35	BDL
5.	Husenpur Bopara	Muzaffarnagar	BDL	BDL	BDL	BDL	0.15	BDL	BDL	BDL	BDL	BDL
6.	Near confluence point of Dhandera/Begrajpur drain with river Kali-West	Muzaffarnagar	BDL	BDL	BDL	BDL	0.06	BDL	0.05	BDL	BDL	BDL
7.	Near Mansoorpur drain	Muzaffarnagar	BDL	BDL	BDL	BDL	0.01	BDL	1.34	BDL	BDL	BDL

District Meerut – River Hindon

S. No.	Monitoring location	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	Conductivity (µmho/cm)	Cl^- mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Alkalinity (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Groundwater at Khiwai more	7.4	BDL	NA	BDL	491	832	16	0.3	202	48	52	21	8	1.6	419	22	2.1	BDL
2.	Groundwater at Kalina Village	7.4	BDL	NA	BDL	432	773	24	0.4	243	41	34	35	6	1	266	19	1.9	0.08
3.	Groundwater at Kinauni Village	7.3	BDL	NA	BDL	578	965	66	0.3	285	68	49	29	9	1.4	419	34	3.2	0.08

S. No.	Monitoring location	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Groundwater at Khiwai more	0.001	BDL	0.001	0.001	1.078	BDL	0.059	BDL	0.477	BDL	BDL	BDL	0.003
2.	Groundwater at Kalina Village	0.002	BDL	0.001	0.004	2.279	BDL	0.043	BDL	0.311	BDL	BDL	BDL	0.006
3.	Groundwater at Kinauni Village	0.003	BDL	BDL	0.002	0.405	BDL	0.056	BDL	0.394	BDL	BDL	BDL	0.003

District Baghpat – River Krishni

S. No.	Monitoring location	pH	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	Conductivity (µmho/cm)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Alkalinity (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Groundwater at Budhpur Village	7.7	BDL	BDL	829	1439	14	0.2	165	25	234	26	8	7.8	112	56	1.7	0.07
2.	Groundwater at Ashara Village	7.7	BDL	BDL	404	752	18	0.3	128	45	27	4	6	1.1	79	44	0.3	0.05

S. No.	Monitoring location	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Groundwater at Budhpur Village	0.006	BDL	BDL	BDL	0.011	BDL	0.045	BDL	0.004	BDL	BDL	BDL	0.016
2.	Groundwater at Ashara Village	0.002	BDL	0.004	0.028	5.393	BDL	0.114	BDL	1.051	BDL	BDL	BDL	0.004

District Ghaziabad - River Hindon

S. No.	Monitoring location	pH	Colour (Hazen)	COD (mg/l)	TDS (mg/l)	Conductivity (µmho/cm)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Alkalinity (mg/l)	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)
1.	Karedha Village	7.6	BDL	BDL	431	734	58	0.3	289	66	48	31	8	1.2	286	32	0.1	BDL
2.	Pratap Vihar	8.0	6	BDL	1326	2671	645	1.7	197	36	480	27	9	14.3	183	44	0.4	BDL
3.	Chajarsi Village	7.2	BDL	BDL	1054	1928	314	0.2	396	118	170	25	10	3.7	365	49	1.8	0.38
4.	Near Jawli drain	7.2	BDL	BDL	555	804	105	0.7	295	52	19	41	2	0.2	282	19	BDL	BDL
5.	Behrampur (Near Rahul Vihar Drain)	7.6	BDL	12	1470	2239	440	0.4	321	79	384	31	10	9.3	386	270	8.7	BDL
6.	Lohia Vihar (Near Hindon Vihar right Drain)	7.5	BDL	5	453	730	50	0.2	274	72	103	24	7	2.6	373	31	1	BDL
7.	Near Karedha drain	7.3	37	14	1082	1806	362	BDL	691	178	152	62	14	2.4	477	12	0.2	BDL

S. No.	Monitoring location	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)
1.	Karedha Village	0.003	BDL	0.001	0.002	0.029	BDL	0.004	BDL	0.014	BDL
2.	Pratap Vihar	BDL	BDL	0.089	0.027	4.645	0.013	0.174	0.119	0.408	0.003
3.	Chajarsi Village	BDL	BDL	0.022	0.028	2.096	0.013	0.124	0.019	0.212	BDL
4.	Near Jawli drain	BDL	BDL	BDL	BDL	0.95	-	0.08	BDL	0.16	BDL
5.	Behrampur (Near Rahul Vihar Drain)	BDL	BDL	BDL	BDL	0.09	BDL	0.02	BDL	0.16	BDL
6.	Lohia Vihar (Near Hindon Vihar right Drain)	BDL	BDL	BDL	BDL	8.35	BDL	0.1	BDL	2.18	BDL
7.	Near Karedha drain	BDL	BDL	BDL	BDL	1.34	-	-	BDL	0.5	BDL

District Noida – River Hindon

S. No.	Monitoring location	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Alkalinity (mg/l)	Turbidity	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	NH3-N (mg/l)
1.	Under Hindon River Bridge	7.6	6	8	19	7	519	116	0.3	256	64	103	24	15	2.8	290	BDL	BDL	0.1	BDL	7.4

S. No.	Monitoring location	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	Under Hindon River Bridge	BDL	BDL	BDL	BDL	0.034	BDL	0.058	BDL	0.009	BDL	BDL	BDL	0.004

District Greater Noida – River Hindon

S. No.	Monitoring location	pH	Colour (Hazen)	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Cl^- (mg/l)	F- (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Na (mg/l)	Mg (mg/l)	K (mg/l)	SAR	Alkalinity (mg/l)	Turbidity	SO_4^{2-} (mg/l)	NO_3^- (mg/l)	PO_4^{3-} (mg/l)	NH_3-N (mg/l)
1.	New Haibatpur	7.8	BDL	3	9	BDL	665	192	0.5	210	43	212	26	6	6.6	116	BDL	7	0.1	BDL	0.2
2.	Baba Bhumiya Temple	7.6	12	6	13	36	498	142	0.3	268	59	104	30	7	2.8	257	108	BDL	0.2	BDL	BDL

S. No.	Monitoring location	As (mg/l)	Cd (mg/l)	Cr (mg/l)	Cu (mg/l)	Fe (mg/l)	Pb (mg/l)	Mn (mg/l)	Ni (mg/l)	Zn (mg/l)	Co (mg/l)	Sb (mg/l)	Se (mg/l)	V (mg/l)
1.	New Haibatpur	BDL	BDL	0.001	BDL	0.042	BDL	0.033	BDL	BDL	BDL	BDL	BDL	0.01
2.	Baba Bhumiya Temple	0.002	BDL	0.003	0.003	10.71	0.019	0.203	0.001	1.754	BDL	BDL	BDL	0.003

Annexure-3

Item No. 01 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 569/2023
(I.A. No. 719/2023)

Alok Kumar Applicant

Versus

Union of India & Ors. Respondent(s)

Date of hearing: 25.09.2023

CORAM: HON'BLE MR. JUSTICE PRAKASH SHRIVASTAVA, CHAIRPERSON
HON'BLE MR. JUSTICE ARUN KUMAR TYAGI, JUDICIAL MEMBER
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER

Applicant(s): Mr. Prashant Kanha, Adv. for Applicant

ORDER

1. This original application raises the issue of illegal encroachment and pollution caused by unauthorized residential colonies and constructions on river Hindon floodplain, basin and embankment in violation of the environmental norms.

2. The emphasis is in respect of the floodplains of river Hindon in Ghaziabad and Gautam Budh Nagar and the stand is that in the master plan 2021 of both the districts, the floodplains and embankments have been shown as River Protected Areas and Green Area respectively but inaction on the part of the concerned authorities has amplified the rate of encroachment which is against the principle of sustainable development.

3. Issue notice to the Respondents.

4. Learned Counsel appearing for the Applicant is directed to serve the Respondents and file affidavit of service before the next date of hearing.

5. The Respondent are directed to file their response before the next date of hearing.

6. List the matter along with O.A. No. 275/2023, Mahesh Kumar v. State of Uttar Pradesh & Ors on 02.11.2023.

Prakash Shrivastava, CP

Arun Kumar Tyagi, JM

Dr. A. Senthil Vel, EM

September 25, 2023
Original Application No. 569/2023
(I.A. No. 719/2023)
JG