

Item No. 02

(Court No. 1)

BEFORE THE NATIONAL GREEN TRIBUNAL

(By Video Conferencing)

Original Application No. 128/2021

(With report dated 18.08.2021)

Saurabh Tiwari

Applicant

Versus

Union of India & Ors.

Respondent(s)

Date of completion of hearing and reserving of order: 16.11.2021

Date of uploading of order on the website: 23.11.2021

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

ORDER

1. Grievance in this application is against pollution of rivers *Varuna* and *Assi* in Varanasi by discharge of untreated sewage and unauthorized constructions. Case set out in the application is that the above rivers are tributaries of river Ganga and cleaning of river Ganga cannot be imagined without first ensuring prevention of pollution of the said rivers. The pollution of the said rivers is subject matter of various media reports. Water quality of river Ganga at Varanasi is in bad condition. Fecal coliform bacteria count at Varun-Ganga confluence is 71 million per 100ML of water (Ganga Jal) and fecal coliform count at *Assi* River and Ganga confluence is 52 Million per 100ML of water and on *Assi Ghat* fecal coliform is 1 lakh 40 thousand per 100ML of Ganga Jal. Permissible limit of fecal coliform bacteria should not exceed 500 per 100ML of water. Reference has been made to a report on water quality prepared by Sankat Mochan

Foundation in Varanasi. It is further stated that there is concrete construction inside Ganga water channel at Lalita *Ghat*.

2. Vide order dated 17.06.2021, considering the seriousness of the issue and in the light of judgment of the Hon'ble Supreme Court in *Paryavaran Suraksha case*¹ and orders of this Tribunal in O.A. No. 593/2017, *Paryavaran Suraksha Samiti & Anr. v. Union of India & Ors.*, O.A. No. 673/2018, *In Re: News item published in "The Hindu" authored by Shri Jacob Koshy, titled "More river stretches are now critically polluted: CPCB"* and O.A. No. 200/2014, *M.C. Mehta v. UOI & Ors.* (relating to river Ganga), the Tribunal constituted an independent Monitoring Committee comprising of Central Pollution Control Board (CPCB), State PCB, National Mission for Clean Ganga (NMCG) and District Magistrate, Varanasi to ascertain the factual status and take remedial action. NMCG was directed to file an action taken report in OA No. 200/2014, relating to rejuvenation of River Ganga, inter alia covering status on water quality of Assi and Varuna, action taken on diversion and treatment of sewage, water quality of upstream and downstream of confluence of Assi and Varuna to River Ganga, demarcation of Flood Plain Zones of Assi, Varuna and Ganga (in the said area), in accordance with the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016.

3. Accordingly, an action taken report has been filed on 18.08.2021 by the U.P. State PCB on behalf of the joint Committee. The report mentions the minutes of meeting held on 30.06.2021 at CPCB attended by Dr. A. K. Vidyarthi, Additional Director & DH, WQM-II representing CPCB, Sh. Kalika Singh, RO, UPPCB, Varanasi representing State PCB, Sh. Rajat Gupta, SWM Specialist representing National Mission for Clean Ganga

¹ (2017) 5 SCC 326

(NMCG) and Sh. Gulab Chand, ADM representing District Magistrate, Varanasi. In the said meeting action plan for river *Varuna*, prepared in pursuance of orders of this Tribunal in OA No. 673/2018, was discussed and revised. Issues of prevention of river water pollution, river ecosystem study and groundwater recharge, sewage and surface runoff management and encroachment were identified and addressing of gaps was planned. Thereafter, water quality was monitored and river restoration plan updated. Survey of all the concerned drains, tributaries was also undertaken. The revised action plan covering Restoration and rejuvenation of *Varuna* River and Restoration and rejuvenation of *Assi* River has been proposed which includes steps like de-silting, remediation of waste, development of floodplain, bio-diversity parks, sewage management, sludge management, industrial pollution management, solid waste management, removal of encroachments and monitoring mechanism.

4. The action plan proposed is reproduced below:

“Chapter 4. Action Plan

Action Plan, Work Plan, Timelines and Implementing Agencies for restoration and rejuvenation of Varuna and Assi Rivers, Varanasi

Riverscape restoration and rejuvenation of Varuna and Assi

A. Restoration and rejuvenation of Varuna River

Action Plan 1: Restoration of catchment wetlands located at the origin and downstream from the origin before joining Basuhi river (in this stretch the river is not polluted and does not have water in dry season).

Table 4.1 Action Plan for Restoration and rejuvenation of Varuna River

<i>S. No</i>	<i>Work Plan</i>	<i>Timeline</i>	<i>Implementing Agency</i>

1.	Desilting of wetlands upto the bed level and developing embankments with inlets from the catchment Location: i) Mailhan, Phulpur, Prayagraj (25.599 571N, 82.1073 91E)	10 - 12 months	UP Irrigation and Water Resource Department under the guidance of CEMDE
2.	Development of Biotic Communities (at both the above locations and other sites including embankments.		CEMDE, University of Delhi

Action Plan 2: Restoration of Basuhi and Morwa tributaries. Both the tributaries have clean water. However, two drains meet Morwa having small quantity of discharge which get diluted and carry clean water from their catchments and irrigation canal water to Varuna.

Table 4.2 Action Plan for Restoration of Basuhi and Morwa tributaries

S. No	Work Plan	Timeline	Implementing Agency
i.	Desilting of channels if it is not done during last 10 year Location: I. Upardaha Taal/Wetland in Handia of Prayagraj district II. Kaitihawa, Tara (a small Pond) nearby Jigna Taal area in Handia, District Prayagraj (U.P) (25.38836 and 82.29644)	6 months	Irrigation and Water Resource Department
ii.	Vegetation development along the embankments and restoration riparian zone	2 years	CEMDE

Action Plan 3: Remediation of waste water that is discharged into Morwa (from two drains) and three major drains Dhoraira drain, Durga drain, Basti/ Naya Bazar drain that discharge sewage and industrial waste water into Varuna.

Table 4.3 Remediation of waste water that is discharged into Morwa

S. No	Work Plan	Timeline	Implementing Agency
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i.	<p>Remediation of waste water using Constructed Wetland System. A schematic Constructed Wetland System (CWS) is attached. These CWS are set up at the confluence of the drain with the tributary/river and extend upto 100 m in the upstream from the confluence point. The length of CWS and number of units depends on the flow of water, the BoD, CoD, TSS and DO levels of water and width of the drain.</p> <p>Locations: i) Dhoraira drain on Varuna at Bhadohi (25.417900N, 82.567600E)</p> <p>ii) Basti/ Naya Bazar drain on Varuna at Bhadohi (25.415251N, 82.576675E)</p> <p>iii) Durga drain on Varuna at Danyalpur, Varanasi (25.320033N, 82.955642E)</p> <p>iv) Burbuspur drain on Morwa at Rampura, Bhadohi (25.409475 N, 82.556622 E)</p> <p>v) Chauri Drain on Morwa at Kom, Bhadohi (25.369723N, 82.606431E)</p>	1-2 years	Designed by CEMDE and Implemented by Irrigation and water Resource Department under guidance of CEMDE, water quality will be monitored by UPPCB
ii.	Desilting of drains upto bed level and strengthening of bunds with desilted material if not done during the last 5 year	1 year	Irrigation and Water Resource Department
iii.	Vegetation development on embankments of restored drain		CEMDE

Action Plan 4: Development of Floodplain Biodiversity Park at Adikeshwar Ghat where Varuna joins Ganga not only to enhance the water quality in Ganga in the stretch but also further enhance the quality of water of Varuna before discharged into Ganga by passing through treatment wetlands. The Biodiversity also help in restoring of riparian ecosystems and in stream community and also provide aesthetic and recreation value to Ganga.

Table 4.4 Development of Floodplain Biodiversity Park

S. No	Work Plan	Timeline	Implementing Agency
i.	Plan, Design and Development of Biodiversity Park. A schematic layout of a typical floodplains Biodiversity Park is attached.	5 years	CEMDE Irrigation and Water Resource Department (supporting structure) UPPCB (monitoring water quality)

Action Plan 5: Desilting of river Varuna in stretches where heavy sedimentation has taken place.

Table 4.5 Desilting of river Varuna

S. No	Work Plan	Timeline	Implementing Agency
i.	<i>Desilting of river and Strengthening of embankments using desilted material</i>	2 years	Irrigation and Water Resource Department
ii.	<i>Vegetation Development on embankments</i>	5 years	CEMDE

Action Plan 6: *Monitoring of water quality at different sampling sites to assess the health of river ecosystems.*

Table 4.6 Monitoring of water quality

S. No	Work Plan	Timeline	Implementing Agency
i.	<i>Monitoring of water quality as per CPCB norms for river water before, during and after restoration</i>	5 years	UPPCB

B. Restoration and rejuvenation of Assi River

Action Plan 1: *Restoration of catchment wetlands at the point of origin and other wetland in the downstream to enhance the flow rates of water in the river.*

Table 4.7 Restoration and rejuvenation of Assi River

S. No	Work Plan	Timeline	Implementing Agency
i.	<i>Desilting of catchment wetlands and use of desilted material for making embankments with inlets Kandwa wetland at Varanasi point of origin (25.273258 N, 82.962083 E) and other wetland located in the downstream from the point of origin.</i>	6 months	Irrigation and Water Resource Department
ii.	<i>Remediation of sewage water that enters into catchment wetland using CWS at the mouth of the inlets before the confluence point. The length of wetland depends upon the flow of sewage and depth of water. A schematic layout of a typical CWS is attached.</i>	1 year	CEMDE and Irrigation and Water Resource Department
iii.	<i>Vegetation Development on the embankment and development of aquatic communities in the wetland.</i>	2-3 years	CEMDE

Action Plan 2: *Remediation of sewage + household industrial waste water using Constructed Wetlands at stretches in the river where width is maximum with one largest CWS at 100 m away from the confluence of river with Ganga.*

Table 4.8 Remediation of sewage and household industrial waste water using Constructed Wetlands

S. No	Work Plan	Timeline	Implementing Agency
i.	Setting up of CWS at 4 locations where width of river is maximum. The length of CWS depends upon the volume of water, quality of water, width of river. The riparian zones will also be restored.	2 years	CEMDE and Irrigation and Water Resource Department

Action Plan 3: Desiltation of river, if not desilted during the last 5 years and use of desilted material for strengthening of embankments wherever possible.

Table 4.9 Desiltation of river

S. No	Work Plan	Timeline	Implementing Agency
i.	Desilting of river up to the bed level and strengthening of embankment with desilted material	1 year	Irrigation and Water Resource Department
ii.	Development of vegetation on embankment wherever possible and restoration of riparian zone.	2-3 years	CEMDE

Action Plan 4: Development of Floodplain Biodiversity Parks at the Assi Ghat, from the historical confluence of Assi with Ganga, to the point where diverted. About 25 years ago the Assi River was diverted towards Ravidas Park from Nagwa road and it passes through Nagwa Colony and known as Nagwa drain before confluence with River Ganga. The old route of River Assi which is about 700 meters (from the point of interception Udupi Shri Krishna Madhav Temple to Sant Ravidas Park) carries household sewage and discharge into Nagwa drain. This may help in restoring the original Ghat where Assi used to confluence with Ganga and also enhance the quality of Ganga water.

Table 4.10 Development of Floodplain Biodiversity Parks

S. No	Work Plan	Timeline	Implementing Agency
i.	Plan, design and develop Biodiversity Park	5 years	CEMDE, Irrigation and Water Resource Department

Action Plan 5: Monitoring quality of water for sustaining the health of restored river ecosystem.

Table 4.11 Monitoring of water Quality

S. No	Work Plan	Timeline	Implementing Agency
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i.	Monitoring of water quality as per CPCB norms before and after restoration	5 years	UPPCB
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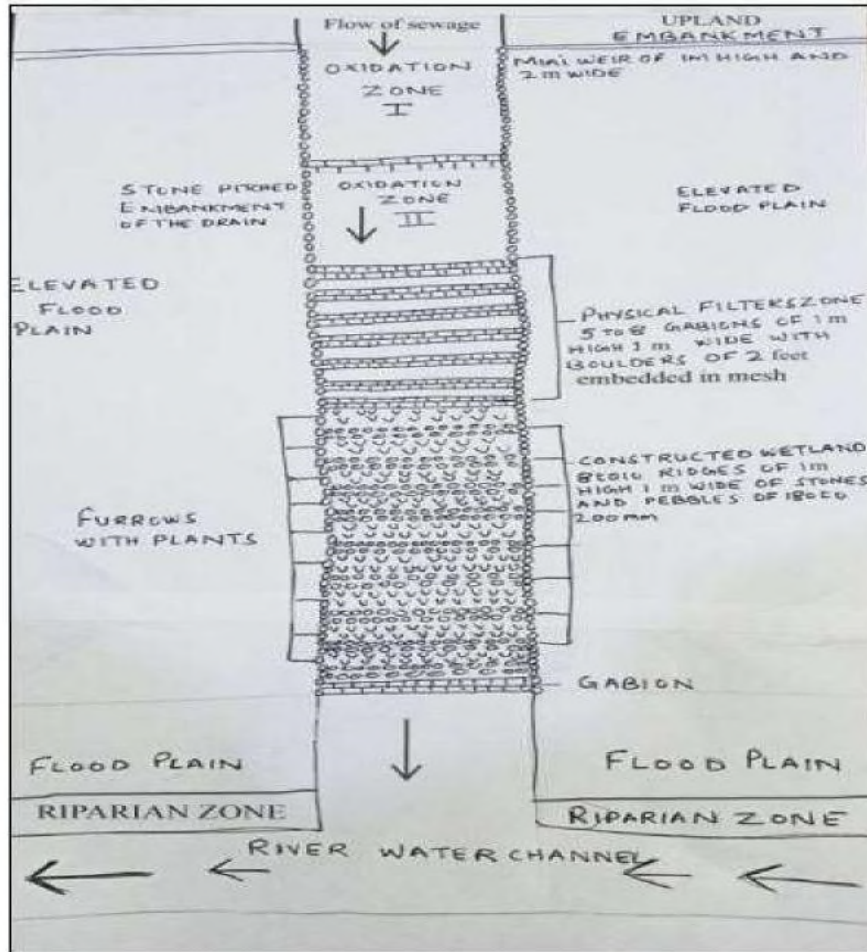


Figure : Schematic layout of a typical Constructed Wetland System for in-situ remediation of sewage/ industrial effluent of the drain that pass through Upland Elevated Floodplain of the riverscape.

Figure 4.1 Schematic Diagram of Constructed Wetland

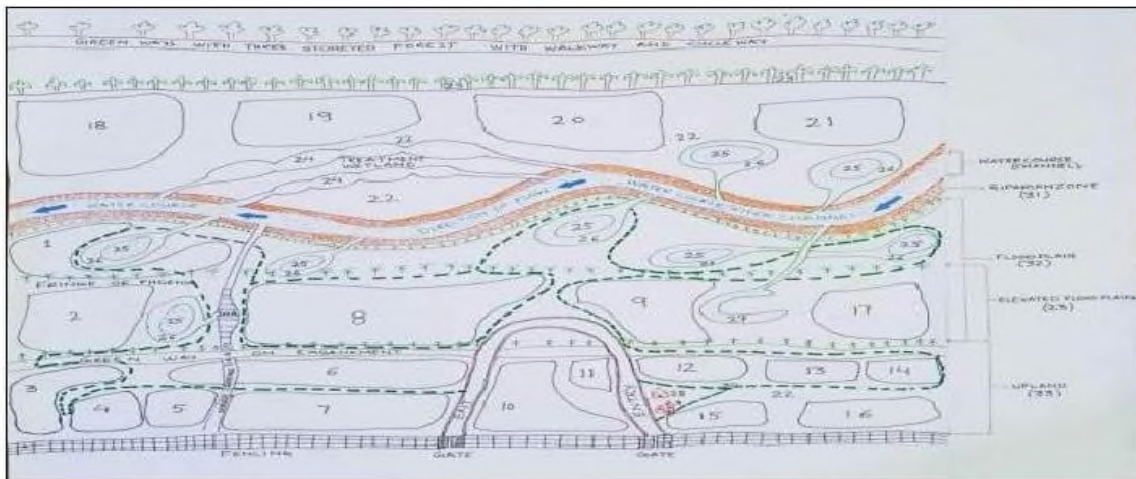


Figure : Schematic layout of a typical Biodiversity Park of the riverscape showing different structural components.
 1 - Floodplain forest on the elevated ridge; 2 - Floodplain forest with *Acacia catechu*, *Bombax* and *Ber*; 3 - Wild fruit-bearing shrubs and trees (Birding Area); 4 - Phoenix grove; 5 - Shrubland; 6 - Orchard; 7 - Bamboo thickets; 8 - Grassland with scattered trees; 9 - Aquatic garden; 10 - Recreational Park; 11 - Butterfly Park; 12 - Herbal Garden; 13 - Nursery; 14 - *Sterculia* dominated community; 15 - *Bates* dominated community; 16 - *Holoptelea* dominated community; 17 - *Terminalia aritina* dominated community; 18 to 21 - Different floodplain forest communities; 22 - Grasslands and marshes; 23 - Elevated floodplain; 24 - Treatment wetlands (natural); 24A - Constructed wetland; 25 - Catchment wetlands; 26 - Marsh; 27 - Oxbow lake; 28 - Nature Interpretation Centre; 29 - Office Campus; 30 - Dotted line (---) indicates trails; 31 - Riparian zone; 32 - Floodplain; 33 - Upland

Figure 4.2 Schematic Diagram of Biodiversity Park

Sewage Management

A. Introduction

Varanasi city is presently divided into four sewerage districts located within current municipal corporation limits. Under the present sewerage master plan the existing districts are re-aggregated into 4 Districts to correspond roughly with natural drainage catchments. These Districts are described as follows:

District 1: *District 1 is the Central City Sewerage District draining to 80 MLD Dinapur STP via 6 no. sewerage pumping stations. This area includes the old city, about 1km in breadth and 5km along the Ganga river from Assi to Raj Ghat. Density in this area is very high.*

District 2: *District 2 is further bifurcated in 3 zones name 2A,2B,2C & Future Sewerage Area 1 (FSA1). Zone 2A is the Sub-Central District on the cis-Varuna side west of the city centre and zone 2B is a slice of the trans-Varuna district along the Varuna river up to the ridge line defined by the Jaunpur road. Wastewater in these two zones will be collected at 140 MLD Chauka ghat MPS and finally treated in 140 MLD STP at Dinapur*

District 2 Zone 2C: *Zone 2C is the trans-Varuna District north of the Jaunpur road. Wastewater in this area generally falls to the north and to the east. FSA1 is north of the trans-Varuna District just outside the current Municipal Corporation limit. Wastewater generated in this area tends to flow north and east towards 120 MLD STP Goithaha.*

District 3: *District 3 is the BHU/Assi District south of the city including FSA 4. At present this area is mainly the Banares Hindu University campus which is fully sewerage. Wastewater discharged in this area follows natural drains flowing into river Assi nala and Nakkhi nala. FSA4 is outside the current Municipal Corporation limit and surrounds the area occupied by BHU campus. Wastewater in this area drains to Assi river and Nakkhi nala which discharge to Ganga river upstream of the water supply intake and Ghats. currently 2 STP namely 50 MLD Ramana STP and 8 MLD Bhagwanpur STP are in service in district 3.*

District 4: *District 4 include FSA-2 and FSA-3 area which is outside the current Municipal Corporation limit. FSA2 is west of the current Municipal Corporation limit, and bounded by North-eastern railway. FSA3 is west of FSA2 and bounded by the Northern railway line. Currently there is no sewage treatment facility available in district 4.*

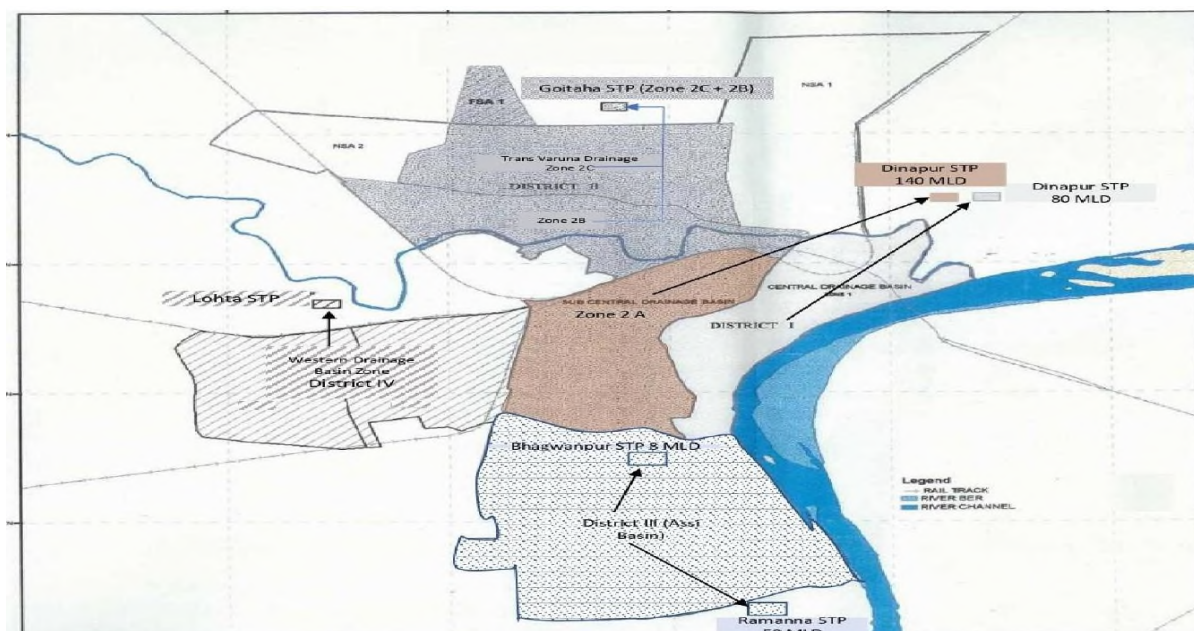


Figure 4.3 Schematic representation of sewerage district of Varanasi city

Non-Sewerage Areas (NSA)

Non-serviced areas are identified as follows:

NWA1: NSA1 is within current Municipal Corporation limits to the east of the Trans-Varuna district. It includes the local community of Sarnath. Wastewater generated in this area drains naturally into Narokar nala which is now diverted to 120 MLD Goithaha via Intermediate Pumping Station.

NSA2: NSA2 is within current Municipal Corporation limits to the extreme north west of the trans-Varuna District. Sewage generation will be diverted to 120 MLD Goithaha Varanasi

B. Sewerage master plan- 2005 (JAPAN INTERNATIONAL COOPERATION AGENCY-JICA)

JICA formulated sewerage masterplan in 2005. The plan for 2015 is explained in (Figure 1)

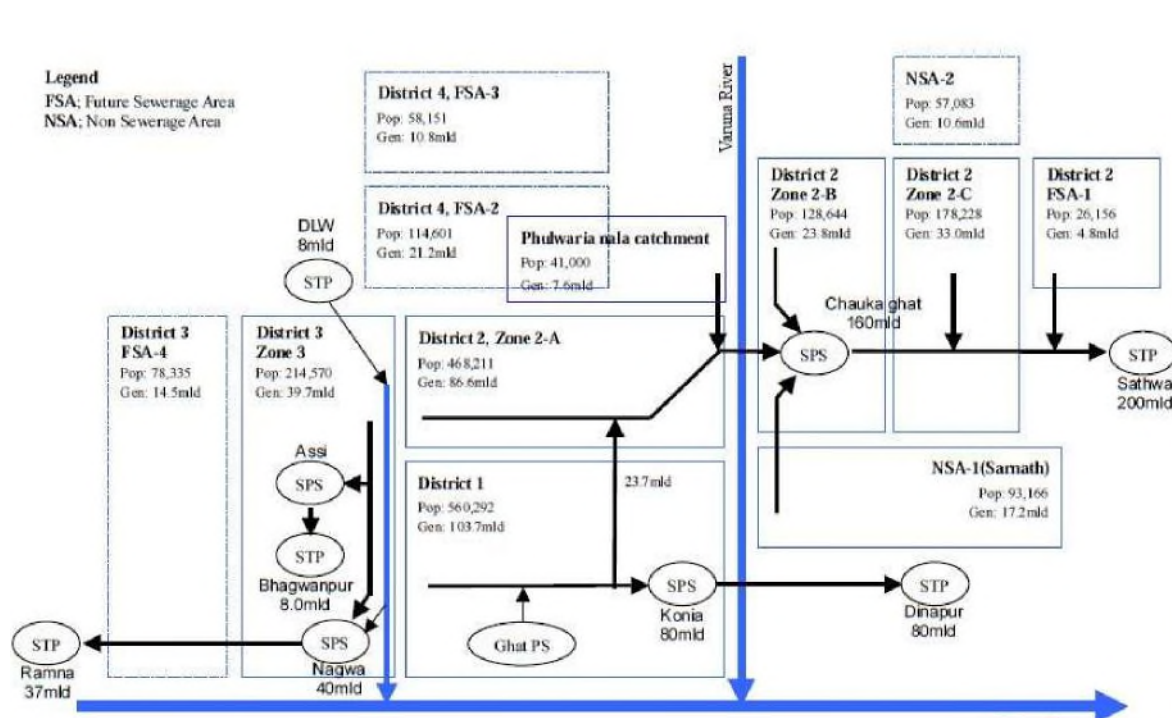


Figure 4.4: JICA Sewerage Plan for 2015

As per JICA masterplan-2005 (figure 1) the projected population in Assi catchment area for the year 2015 is $78335 + 214570 = 292,905$. The projected sewage generation was $14.5 + 39.7 = 54.2$ MLD. To cater 54.2 MLD, 8.0 MLD is to be treated by 8.0 MLD existing Bhagwanpur STP and new proposed 37 MLD at Ramna.

The plan for 2030 is explained in Figure 2

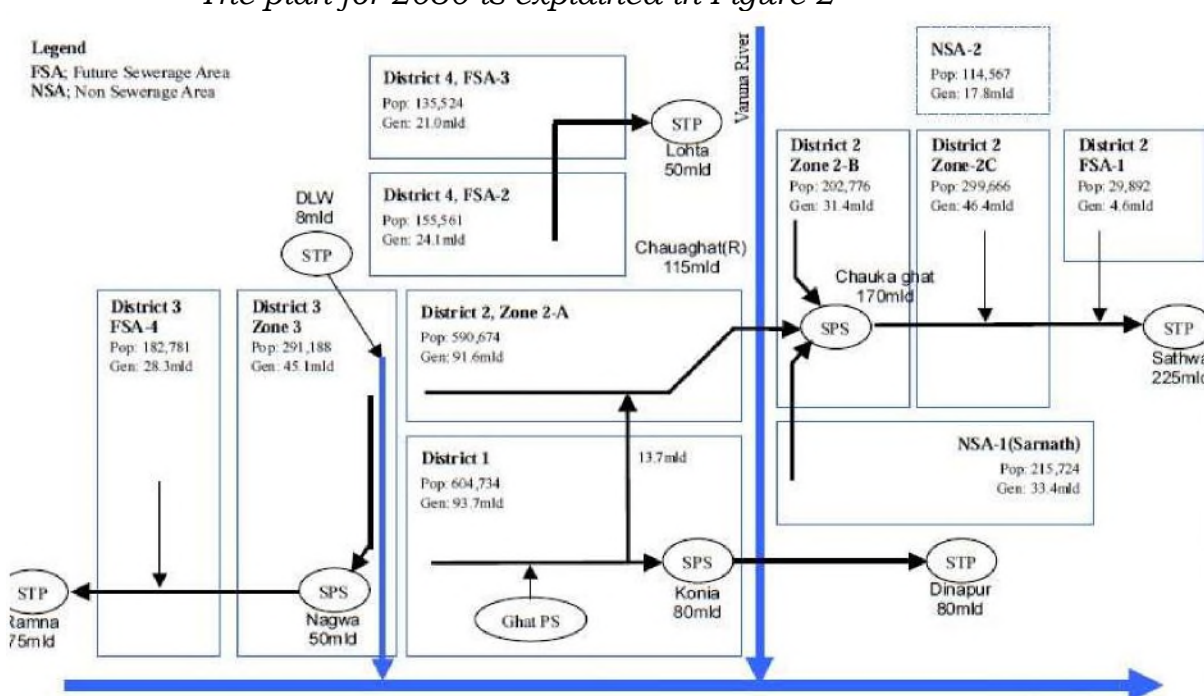


Figure 4.5: JICA Sewerage Plan for 2030

As per JICA masterplan-2005 (above) the projected population for the year 2030 is $182781 + 291188 = 476969$. The projected sewage generation was $28.3 + 39.7 = 73.4$ MLD. To cater 73.4 MLD, new 37 (2015) + 38 (2030) = 75 MLD was proposed.

However, in 2014 situation, JICA relooked into the sewerage masterplan and revised the capacity of 75 MLD to 59.8 MLD (50 MLD new Ramana STP + Existing 9.8 MLD Bhagwanpur).

Action plan for Varuna catchment

Trans Varuna Catchment

It consists of sewage District 2 B and 2 C. A new STP of 120 MLD is constructed at Goitha and working efficiently. Around 40 MLD flow is treated. The STP capacity is sufficient for next 15 years. No new STP or upgradation of existing STP is proposed.

Cis Varuna Catchment

It consists of District 2 A. The present sewage flow from district 2 A is 80 MLD, which is being pumped from Chauka ghat pumping station and treated at Dinapur new 140 MLD STP.

In addition, new 140 MLD STP shall also treat 40 MLD flow diverted from Shahi Nala.

Recommendations

- 140 MLD Dinapur need to be upgraded to meet discharge standard.
- A new STP is needed to cater the future population for District 2 A.
- Action plan to treat wastewater from Durga drain discharging to Varuna River should be prepared.
- Interceptor drain plan is under execution by UP Irrigation Department. All designs should be checked by expert authorities.

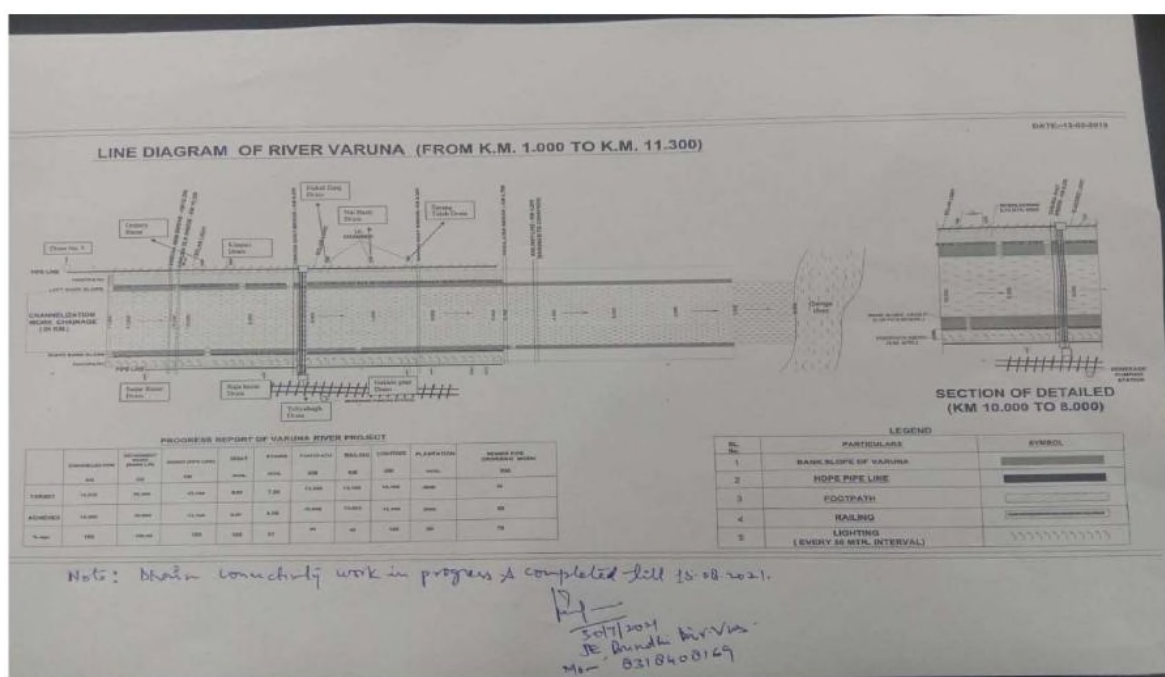


Figure 4.9: Interceptor drain plan of Varuna River

Existing condition in Assi catchment

At present, as per CPCB measurement (12-15th July 2021), the flow in Assi River is around 92 MLD. In addition, STP at Bhagwanpur also

treat 8.0 MLD flow and discharges into River Ganga via Nakha drain. Hence total discharge in Assi catchment is $92 + 8 = 100$ MLD. However, water supply in municipal area of Assi catchment is only 26 MLD.

The pumping capacity at Nagwa Pumping Station to cater 50 MLD Ramana STP is only 50 MLD, 8 MLD is treated at Bhagwanpur STP and rest $92 - 50 = 42$ MLD discharges directly into the River Ganga.

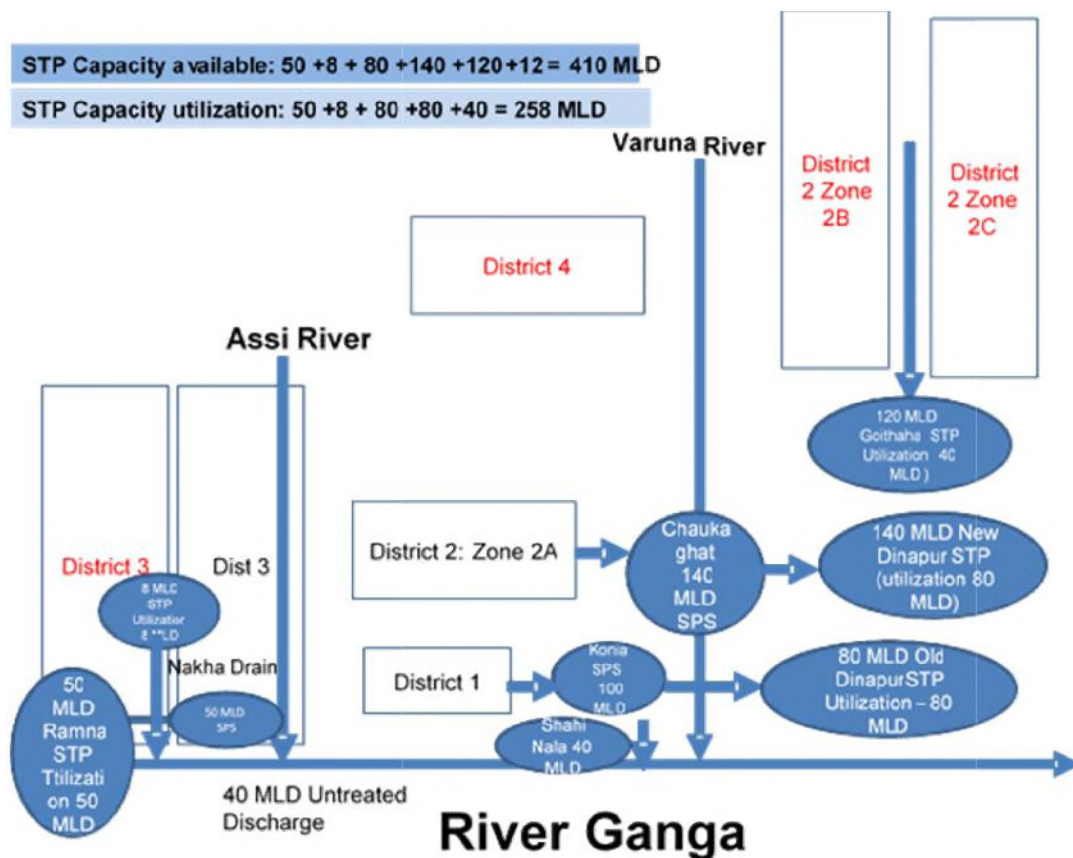


Figure 4.12 Present sewerage Situation of Varanasi City

This rapid increase in flow to Assi River is due to:

1. Unprecedented residential/commercial growth is due to large no. of developmental projects during last 4-5 years owing to VIP constituency, which seems convincing.
2. The growth within the city is limited due to constraint of land availability. Assi -BHU area and Trans Varuna area is vast open for development. Hence, increment significantly in migratory/floating population.
3. Untreated wastewater from Sewerage District 2 & 4.
4. Much higher water consumption than prescribed 135 lpcd because of unregulated water usage i.e., personnel source of water-submersible pumps etc, which has no control of water usage.

Recommendations

A. Short Term plan

1. Presently actual discharge is mixed with rainfall. Actual dry weather flow can only be ascertained after rainy season. Detailed

assessment of excess discharge is required to be done and hence future forecasting is to be done accordingly.

2. *There should be 24-h proper flow measurement of Assi River by both Area velocity and V notch method after the monsoon season.*
3. *Controlling wastewater from other sewerage districts.*
4. *There should be check and control on non-revenue water (NRW). NRW is defined as loss of water through leakages and illegal usage.*
5. *Based on the flow measurement, water supply and population projection, a new STP need to be proposed either at Ravinder Puri Culvert (on the bank of Assi River around 1km upstream of confluence) or at Ramana existing 50 MLD STP site wherever found feasible. The DPR for additional STP is to be prepared after flow assessment and population projection.*

B. Long Term Plan

1. *Wastewater generation is very high, hence proper 24 x 7 water supply with metering is needed to control wastewater generation and non-revenue water. A JICA project is underway to control non-revenue water*
2. *Laying of complete sewerage system for the entire city.*
3. *9.8 MLD Bhagwanpur STP need to be decommissioned and new STP for higher capacity for future projections with new standards need to be constructed.*
4. *Banaras Locomotive Works STP should be upgraded to meet discharge standard.*

Action plan for Ganga catchment

The sewage from District 1 (Old Varanasi) is treated in old 80 Dinapur STP. It is pumped from Konia Pumping station.

Recommendations

Old Dinapur STP (80 MLD) need to be decommissioned and new STP for higher capacity for future projections (as well as Shahi Nala Flow) with new standards need to be constructed.

Action plan for trans- Ganga

One new 10 MLD STP is constructed and treating around 8.0 MLD flow.

Recommendations

- *It is recommended that due to recent infrastructural development, there shall be rapid increase in population in near future.*
- *It is assumed that 10 MLD full flow shall be reached within next 1-2 years. Hence, authorities should start planning for the next phase so that no untreated wastewater discharge from the trans Ganga in near future.*

Table 4.12: Action Plan for sewage management in catchment of river Varuna, Assi and Ganga in Varanasi

Sl No	Sewerage District	Estimated Sewage Generation 2030 (MLD)	Pumping Station	River catchment	Existing Sewage Treatment Facility	Key issues	Proposed Action Plan	Implementing Agencies	Timeline for Action
1	District 1	93.7	Konia MPS, Saraiya P.S.3.7 MLD	Cis Varuna	80 MLD STP Dinapur	<ul style="list-style-type: none"> • District 1 covers the old part of the city Varanasi including most of the markets and tourist destinations • The district has very less scope of further escalation in sewage generation in near future • Approx.80 MLD sewage Generated inthis district currently reaches 80 MLD Dinapur STP for treatment through Konia and Saraiya Pumping station via Old Trunk Sewer • The rest of the sewage from old trunk sewer is discharged into river Ganga through closed conduit at Shahi Nala Outfall, Rajghat • Dinpaur 80 MLD STP has completed the design life and it was designed as per old discharge standards resulting in non-compliance of STP to norms prescribed by NGT 	New STP of higher capacity for future projections with new standard to be constructed after decommissioning of 80 MLD STP at Dinapur.	UttarPradesh Jal Nigam & National Mission for Clean Ganga	Preparation of DPR – 3 Month Approval of DPR – 3 Months Award of Work – 6 Months Completion of Work – 2 years Total Time required – 36 months
							Management of rest of the sewage from old trunk sewer, presently discharging at Shahi Nala outfall through pumping to 140 MLD STP Dinapur.	Uttar Pradesh Jal Nigam	Work to be completed – 3 months

2	District 2A	225.3 (including NSA 1&2 & FSA-1	Chauka Ghat MPS (140 MLD), Cis Phulwaria Varuna MPS (7.6 MLD)	140 MLD STP Dinapur	<ul style="list-style-type: none"> Chaukaghat pumping station is currently pumping only 70- 80 MLD to Dinapur 140 MLD STP. The interception and diversion of Shahi Nala outfall at Rajghat to Chaukaghat pumping station through a new rescue trunk sewer is proposed and work is underway The Cis-interceptor line at Varuna bank will also intercept the untapped drains on the cis Varuna bank to Chauka Ghat pumping station for pumping to Dinapur 140 MLD STP 	The 140 MLD STP requires upgradation to meet the norms prescribed by Hon'ble NGT including nutrient removal	Uttar Pradesh Jal Nigam & National Mission for Clean Ganga	<p>Preparation of DPR for upgradation – 3 months</p> <p>Approval of Work – 3 months</p> <p>Award of Work for upgradation – 3 months Completion of upgradation – 6 months</p> <p>Total time required - 12- 14 months</p>
					<ul style="list-style-type: none"> ASP technology based 140 MLD Dinapur STP without tertiary filtration No Biological nutrient removal (BNR) system Under capacity utilization I&D of drains (mainly Shahi Nala) is not completed Damaged & non-functional I&D structure 	<ul style="list-style-type: none"> Design of interceptor plan needs to be checked by expert agency and tapping shall be executed completely I&D work of drains falling into Varuna in Cis-Varuna area shall (mainly Shahi Nala) to be completed and tapped to STPs for treatment 	Irrigation Department, Uttar Pradesh Jal Nigam & subject expert	<p>Design finalization – 1 month</p> <p>I&D work completion with final tapping and pumping provisions – 2 months</p> <p>Total time required- 3 months</p>

3	District 2B		Narokhar IPS (7.6 MLD)	Trans Varuna	120 MLD STP Goitaha	<ul style="list-style-type: none"> • Trans Varuna area contains zone 2B & 2C sewage districts which has its sewage reaching partially for treatment at Goithaha STP through 7.6 MLD Narokhar pumping station and rest quantity by gravity. • An interceptor line is under commissioning in trans Varuna river bank for interception of 7 drains in the area discharging into Varuna currently and other small minor outfalls from lanes • The interceptor line has not been connected with pumping station currently and the interceptor system is open to flow • This interceptor line will pump the sewage to 140 MLD Dinapur STP for treatment through Chauka Ghat MPS as an interim measure • The Goithaha STP is currently functioning at around 30-40 MLD treatment (Under capacity utilization) • Currently the catchment area of Goithaha STP has less population density so the capacity utilization is less and it is targeted to achieve future utilization 	<ul style="list-style-type: none"> • Design of interceptor plan needs to be checked by expert. • Interception and diversion have to be completed at the earliest by the executing agencies 	Irrigation Department, Uttar Pradesh Jal Nigam & subject expert	<p>Design finalization – 1 month</p> <p>I&D work completion with final tapping and pumping provisions – 2 months</p> <p>Total time required- 3 months</p>
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4	District 2C					<ul style="list-style-type: none"> • I&D of the Trans Varuna area is not completed. • Damaged & non-functional I&D structure meant for intercepting the Trans Varuna bank drains. 	<p>A new comprehensive sewage management plan for trans Varuna needs to be developed which can cater all the drains of trans Varuna area in Varanasi.</p>	<p>Uttar Pradesh Jal Nigam, Varanasi Municipal Corporation, Irrigation Department and Urban Development Department</p>	<p>Preparation of DPR – 6 months Approval of Work – 6 months Award of work – 6 months Execution of work – 2 years Total time required- 36-42 months</p>
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5	District 3	73.5	Nagwa MPS (50 MLD)	Assi River	50 MLD STP Ramana, 8 MLD STP Bhagwanpur	<ul style="list-style-type: none"> • Estimated much higher water consumption/discharge than prescribed • Unregulated water uses and flow of freshwater from Kanchanpur talab and other water bodies in the low-lying areas joining river Assi shall be identified and fresh water channels shall be separated from the sewerage line/drain 	<ul style="list-style-type: none"> • Detailed assessment of excess discharge in dry weather • Control on NRW 	Varanasi Municipal Corporation, Urban Development Department and Uttar Pradesh Jal Nigam	
						<ul style="list-style-type: none"> • Estimated approximately 50% Non -revenue water (NRW) is consumed of total freshwater usags • Excess wastewater around 40- 45 MLD goes directly to Ganga River from the bypass point of Nagwa 50 MLD pumping station 	<ul style="list-style-type: none"> • A new STP of adequate capacity to treat the excess approx. 50 MLD flow from the Assi river outfall. 	Uttar Pradesh Jal Nigam & National Mission for Clean Ganga	Preparation of DPR – 3 Month Approval of DPR – 3 Months Award of Work - 6 Months Execution of work – 2 years
						<ul style="list-style-type: none"> • Bhagwanpur STP treats the sewage from Banaras Hindu University campus and treated sewage discharged through the Nakha drain which also carries untreated sewage from the Bhagwanpur local area and nearby areas of district 3. 	<ul style="list-style-type: none"> • New STP at Bhagwanpur of requisite capacity to be constructed as per new norms & flow data to cater the needs of BHU • and nearby municipal areas. 	Uttar Pradesh Jal Nigam & National Mission for Clean Ganga	Preparation of DPR – 3Months Approval of DPR – 3 Months Award of Work - 6 Months Completion of Work - 2 years Total Time required – 32- 34 months

						<ul style="list-style-type: none"> The Bhagwanpur STP is designed to treat 9.8 MLD sewage (8 + 1.8) but currently only 8 MLD plant is operated and 1.8 MLD unit is nonoperational The Bhagwanpur STP treats around 10 MLD sewage working overcapacity The Bhagwanpur STP has completed its designed life Large areas in adjoining district 4 and district 4 has recently been added in Municipal area and has no sewage management system existing which contributes to excess flow from district 2 & 4 reaching river Assi. 			
						<ul style="list-style-type: none"> Restoration of origin & stretches of river Assi (with land availability) through constructed wetlands. Separation of freshwater channels/storm water drains and sewerage system 	Irrigation Department, Varanasi Municipal Corporation, Urban Development Department and Uttar Pradesh Jal Nigam	Within 6 months	
6	District 4	45.1	None	Cis Varuna	Not available	<ul style="list-style-type: none"> Most part of the Sewerage district 4 has recently been included in the Varanasi Municipal Area and estimation and planning for the newly added areas is underway Currently no dedicated treatment facility available No sewerage networks Untreated sewage directly discharges in R. Varuna. The Durga (Lohta) drain is the major drain discharging to River Varuna from the district 	In-situ treatment at Durga Drain through Constructed Wetland as interim measure. New STP of requisite capacity to be constructed as per	CEMDE Delhi University, Irrigation Department, Varanasi Municipal Corporation. Uttar Pradesh Jal Nigam & National Mission for Clean Ganga.	Preparation of feasibility reports & DPR – 02 Months Approval of Work – 3 Months Award of work and implementation – 3 Months Total Time required – 8- 12 months Preparation of DPR – 01 Month Approval of DPR – 3 Months Award of Work - 6 Months

						<ul style="list-style-type: none"> Actual discharge status is unknown Lohta STP (50 MLD) is proposed by 2030 (JICA report) 	new norms & flow data. Detailed assessment of excess discharge in dry weather	Irrigation Department, Uttar Pradesh Jal Nigam, Urban Development department	Completion of Work - 2 years Total Time required - 32- 34 months Within 2 months
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7	Banaras Locomotive Work (BLW)	50 Staff colonies	Cis Varuna	12 MLD	<ul style="list-style-type: none"> • The BLW campus has a STP of 12 MLD installed inside campus to treat the sewage generated in the campus. • The BLW campus lies in the Assi river catchment. • At least one drain originates from the campus and two drains passes near the BLW campus and ultimately discharges into river Assi • DLW-1 originates from the campus and carries treated sewage and storm water from the BLW campus • DLW-2 originates from the Manduwadih area and flows near the BLW campus • DLW-1 and DLW-2 ultimately meets river Assi near Sunderpur Chauraha • DLW-3 originates from the Kanchanpur taal area and carries pond water and waste water from nearby low-lying areas • DLW 3 meets river Assi near the DLW campus trans of DLW-Chunar Road. • Around 2-3 MLD wastewater from this drain is treated at BLW STP for sometime 	<ul style="list-style-type: none"> •BLW STP has outlived its designed life •BLW STP shall be upgraded/new STP to be installed to meet norms prescribed by NGT including for coliform count 	BLW Engineering Department, UP Jal Nigam, National Mission for Clean Ganga	Preparation of DPR – 01 Month Approval of DPR – 3 Months Award of Work - 6 Months Completion of Work - 2 years Total Time required – 32- 34 months
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					<ul style="list-style-type: none"> • The 12 MLD STP at DLW operates at around 4 MLD only and the inlet raw sewage shows weak sewage characteristics with low organic load • STP has no disinfection system to control Coliform count in treated sewage 	<ul style="list-style-type: none"> •Reason for weak organic load characteristics of sewage at inlet of BLW STP shall be explored • Water audit of water usage and discharge from BLW campus may be done 	BLW Engineering Department, UP Jal Nigam, Uttar Pradesh Pollution Control Board	Within 1-2 Month
						Sources of sewage and freshwater in the drains near the BLW campus ultimately discharging into Assi river shall be identified and separated for reducing the flow in Assi river at interception point	BLW Engineering Department, Irrigation Department, Urban Development Department, UP Jal Nigam, Uttar Pradesh Pollution Control Board	<ul style="list-style-type: none"> •Identification of sources of waste and freshwater – 1 Months •Preparation of action plan for separation of freshwater channels/storm water and waste water carrying drains– 6 Months

Table 4.13: Road map for execution of proposed action Plan for restoration of Varuna & Assi river

Sr. No.	Sewerage District /region	Existing Sewage Treatment Facility	Proposed Action/remedial measure	Project Activity		
				Work Plan	Time line	Implementation Agency
		80 MLD STP	Decommissioning of existing STP and construction	Condition assessment & feasibility report (CAFR)	1 Month	UP Jal Nigam/ Other government organization
				Approval of CAFR	1 month	NMCG

1.	District 1	Dinapur	of new STP of higher capacity for future projections with new standard	Submission of DPR	2 Months	UP Jal Nigam/ Other government organization
				Administrative approval & estimated sanctioned	2 months	NMCG
				Tendering & award of project	2 months	NMCG
				Basic Engineering Package (BEP) submission	3 months	UP Jal Nigam/ Other government organization /EPC
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university
				Construction & Commissioning	2 years	UP Jal Nigam/ EPC contractor/others
2.	District 2A	140 MLD STP Dinapur	Upgradation of STP as per new NGT norms.	Submission of DPR	2 Months	UP Jal Nigam/ Other government organization
				Approval & Tendering	3 months	NMCG
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university
			Design of interceptor plan	Construction & Commissioning	1-2 years	UP Jal Nigam/ EPC contractor/ Other government
				Submission of existing drawing & review proposal	1 month	UP Irrigation department
				Approval & Tendering	3 months	NMCG
				Design assessment of interceptor plan	2 months	IIT/MNIT/Deemed university
				Approval, Tendering and project award	3-4 month	NMCG

			needs to be checked by expert	Construction & commissioning	3-4 month	UP Irrigation
			I&D work of Shahi Nala	Tapping and diversion of Sahi nala to 140 MLD STP	1-2 months	Project is under execution by UP Jal Nigam
			I&D work of drains in cis Varuna region	I&D work of drains up to 140 MLD MPS Chaukaghat	1-2 months	Project is under execution by UP irrigation department
3.	District 2B	120 MLD STP	I&D work of drains in trans Varuna region	I&D work of drains up to 140 MLD MPS Chaukaghat as an interim measure	1-2 months	Project is under execution by UP irrigation department
4.	District 2C	Goitaha	Development of new comprehensive sewage	Condition assessment & feasibility report (CAFR)	1 Month	UP Jal Nigam/ Other government organization
				Approval of CAFR	1 month	NMCG
				Submission of DPR	2 Months	UP Jal Nigam/ Other government organization
			management plan for trans Varuna	Administrative approval & estimated sanctioned	2 months	NMCG
				Tendering & award of project	2 months	NMCG
				BEP submission	3 months	UP Jal Nigam/ Other government organization /EPC
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university
				Construction & Commissioning	1-2 years	UP Jal Nigam/ EPC contractor/others
		50 MLD STP	Assessment of excess discharge of Assi River	Detailed assessment of excess discharge of Assi River in dry weather &	3-4 months	UP Jal Nigam

5.	District 3	Ramana, 8 MLD STP Bhagwanpur	Design, construction and commissioning of new tapping arrangement	Condition assessment & feasibility report (CAFR)	1 Month	UP Jal Nigam/ Other government organization	
				Approval of CAFR	1 month	NMCG	
				Submission of DPR	2 Months	UP Jal Nigam/ Other government organization	
			MPS, rising main & STP of requisite capacity as per new norms & flow data.	Administrative approval & estimated sanctioned	2 months	NMCG	
				Tendering & award of project	2 months	NMCG	
				BEP submission	3 months	UP Jal Nigam/ Other government organization /EPC contractor	
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university	
				Construction & Commissioning	1-2 years	UP Jal Nigam/ EPC contractor/others	
				Restoration of Origin & stretches through constructed wetlands	Submission of design details & drawing of CWS	1 month	CEMDE
					Submission of DPR for desilting, civil work etc.	2 months	Irrigation and water resources department/
					Approval, Tendering and project award	3-4 month	NMCG
					Desilting and civil construction	3-4 months	Irrigation and water resources department/
					Vegetation development & commissioning	1-2 years	CEMDE
				Decommission of 8 MLD STP Bhagwanpur And Design, Construction and	Condition assessment & feasibility report (CAFR)	1 Month	UP Jal Nigam/ Other government organization
Approval of CAFR	1 month	NMCG					
Submission of DPR	2 Months	UP Jal Nigam/ Other government organization					

			commission of new STP as per new norms and flow data	Administrative approval & estimated sanctioned	2 months	NMCG
				Tendering & award of project	2 months	NMCG
				BEP submission	3 months	UP Jal Nigam/ Other government organization /EPC contractor
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university
				Construction & Commissioning	1-2 years	UP Jal Nigam/ EPC contractor/others
		Not	In-situ development of Constructed Wetland System in Durga Drain as interim measure	Submission of design details & drawing of CWS	1 month	CEMDE
				Submission of DPR for desilting, civil work etc.	2 months	Irrigation and water resources department/ Other government organization
				Approval, Tendering and project award	3-4 month	NMCG
				Desilting and civil construction	3-4 months	Irrigation and water resources department/ Other government
				Vegetation development & commissioning	1-2 years	CEMDE
			Design & construction of new STP of	Condition assessment & feasibility report (CAFR)	1 Month	UP Jal Nigam/ Other government organization
				Approval of CAFR	1 month	NMCG

6.	District 4	available	requisite capacity as per new norms & flow data	Submission of DPR	2 Months	UP Jal Nigam/ Other government organization
				Administrative approval & estimated sanctioned	2 months	NMCG
				Tendering & award of project	2 months	NMCG
				BEP submission	3 months	UP Jal Nigam/ Other government organization /EPC contractor
				Design & Engineering approval	2 months	IIT/MNIT/Deemed university
				Construction & Commissioning	1-2 years	UP Jal Nigam/ EPC contractor/others
7.	Varuna origin	Not available	Restoration of catchment origin of R. Varuna	Submission of design details & drawing	1 month	CEMDE
				Submission of DPR for desilting, channeling etc.	2 months	Irrigation and water resources department/
				Approval, Tendering and project award	3-4 month	NMCG
				Desilting, channeling and other construction work	10-12 months	Irrigation and water resources department/
				Biotic community	1-2 years	CEMDE
		Not	Desilting of R Varuna & In-situ development of Constructed Wetland System in Dhoraira, Naya	Submission of design details & drawing of CWS	1 month	CEMDE
				Submission of DPR for desilting, civil work etc.	2 months	Irrigation and water resources department
				Approval, Tendering and project award	3-4 month	NMCG
				Desilting and civil construction	3-4 months	Irrigation and water resources department

8.	Along R. Varuna	available	Bazar, Bubuspur and Chauri drains	Vegetation development & commissioning	1-2 years	CEMDE
9.	Varuna confluence	Not available	Development of flood plain Biodiversity Park	Demarcation of flood plain of R. Vruna at confluence	3-4 months	Irrigation and water resources department
				Submission of DPR for planning, design & development of Biodiversity park	3-4 months	CEMDE
				Approval, Tendering and project award	3-4 month	NMCG
				Development of Biodiversity park	4-5 years	CEMDE

Performance assessment of STPs and requirement for upgradation /augmentation

The estimated sewage generation of Varanasi (including Ramnagar) is approximately 330 MLD (201718) (as per data received from UPPCB). Total 7 STPs (5 commissioned and 2 under trial) with total capacity of 421.8 MLD (361 MLD for commissioned STPs and 60 MLD for under trial STPs) have been installed for the treatment of the generated sewage. Utilized capacity of the commissioned and operational STPs is approximately 210 MLD.

Characteristics of raw sewage received at inlet of STPs located in Varanasi have BOD ranging from 10.5 mg/l to 52.4 mg/l, COD ranging from 45.7 mg/l to 193 mg/l indicating weak sewage as compared to typical municipal wastewater (BOD: 200-250 mg/l, COD: 350-500 mg/l); is received at inlet of the STPs. The weak sewage strength could be due to dilution of the sewage from septic tanks and addition of grey water from households etc.

As per inspections conducted in last 2 years, the treated sewage from STPs is found non-complying with respect to the discharge norms. As per inspection dated 23.06.2021, reduction in BOD was found in range 38% to and 85%. Similarly, reduction in the COD was found in range 39% to 81%. STPs meet the prescribed norm for Total Nitrogen (10 mg/l) only when raw sewage with low Total Nitrogen (around 10 mg/l) is received. This necessitates upgradation and augmentation of these STPs. The measure suggested for the upgradation and augmentation of STPs are mentioned in the table below.

Discharge norm for Fecal coliform (230MPN/100ml) is not achieved in all STPs. 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 inflow at STP at Bhagwanpur is ranging from 8-14 MLD which is above the designed capacity (9.8 MLD). This STP needs capacity enhancement after detailed study for capacity requirement. STPs at Dinapur and Goithaha are underutilized. The reason for less inflow into STPs should be studied and areas without sewerage network should be provided with sewerage network and connected to respective STP.

Online continuous Effluent System (OCEMS) is installed at 12 MLD STP, BLW only. OCEMS should be installed at remaining 6 (4 operational and 2 under trial) STPs and connected to CPCB/ SPCB server at the earliest for on-line monitoring of the STPs.

Table 4.14: Performance assessment of STPs of Varanasi and requirement for their upgradation and augmentation.

Sr. No	STPs	Technology & Process used	Designated Capacity (MLD)	Maximum Utilised Capacity (inspection date)	Inlet characteristics (mg/l)	Discharge to river	Operational/ Non-operational/ Non-functional	Compliance with respect to discharge standards (2021)	Suggested upgradation and Augmentation
1	Dinapur (Old) STP	TF followed by ASP	80	70 (23.06.2021)	BOD – 46.4, COD – 160, TSS – 169 TN – 7.02 (23.06.2021)	Ganga through open channel	Operational	Mostly found non-complying for FC	<ol style="list-style-type: none"> 1. Installation of Anoxic treatment of adequate capacity before existing ASP. Return activated sludge flow (about 75% of inflow) may be ensured in the existing ASP 2. Optimization of existing disinfection system 3. Installation of OCEMS 4. Provision for sewerage network in uncovered areas
2	Dinapur (New) STP	ASP	140	125 (23.02.2021)	BOD-52.4 COD-161 TSS- 138	Varuna river through pipeline	Operational	Mostly found non-complying for TN and FC	<ol style="list-style-type: none"> 1. Installation of Anoxic treatment of adequate capacity before existing ASP. Return activated sludge flow (about 75% of inflow) may be

					TN-16.5 (23.06.2021)				ensured in the existing ASP 2. Optimization of existing disinfection system. 3. Installation of OCEMS 4. Provision for sewerage network in uncovered areas
3	Bhagwanpur BHU STP	ASP	9.8	14 (23.06.2021)	BOD-24.9 COD-92.2 TSS- 1242 TN- 8.83 (23.06.2021)	River Ganga through Nakkhi Nala	Operational	Mostly found non-complying for TN and FC	1. Installation of Anoxic treatment of adequate capacity before existing ASP. Return activated sludge flow (about 75% of inflow) may be ensured in the existing ASP. 2. Optimization of existing disinfection system. 3. Installation of OCEMS 4. Capacity Enhancement
4	Goithaha STP	SBR	120	55 (23.06.2021)	BOD-56.3, COD-193 TSS- 491	River Ganga via Sharda Canal	Operational	Mostly found non-complying for FC	1. Installation of Anoxic treatment of adequate capacity before existing ASP. Return activated sludge flow (about 75% of inflow) may be

					TN- 6.49 (23.06.2021)				ensured in the existing ASP. 2. Optimization of existing disinfection system 3. Installation of OCEMS 4. Provision for sewerage network in uncovered areas
5	BLW (formerly DLW) STP	ASP	12	5 (23.02.2021)	BOD-10.5, COD-45.7, TSS- 19.1 TN- 6.13 (23.06.2021)	Reused (may reach Ganga through Assi river)	Operational	Mostly found Non-Complying for FC	1. Disinfection system of adequate capacity

Note: Compliance status as per Hon'ble NGT order dated 30.04.2019. (pH: 5.5- 9.0; BOD: 10 mg/l; TSS: 20 mg/L; COD: 50 mg/L; Total Nitrogen (TN): 10 mg/L; Total Phosphorus (for discharge into ponds and lakes): 01 mg/L; Faecal Coliform: Desirable limit 100 MPN/100 ml, Permissible limit 230 MPN/100ml)

Sludge Management Plan

Treatment and disposal of sewage sludge are major factors in the design and operation of all wastewater treatment plants. Two basic goals of treating sludge before final disposal are to reduce its volume and to stabilize the organic materials. Stabilized sludge does not have an offensive odour and can be handled without causing a nuisance or health hazard. Sludge management is an issue of great concern due to its potential threat to human health and the environment with necessitated explicit regulations to organize their production and use. Currently adopted sludge management plan practices as provided by UP Jal Nigam for management of generated sludge is tabled below;

Table 4.15: Sludge management plan for generated STPs sludge

Sr No.	Name of STP	Capacity (MLD)	Approximate Generation of Sludge (Tonnes/Yr.)	Disposal of sludge	Remarks
1	Dinapur	80	8250	Being used as ingredient of Fertilizer by local farmers/manufactures	Since, removal of Nitrogen and Phosphorous is not part of the design process, hence the sludge has nutritional value and is being used as an ingredient of fertilizer.
2	Dinapur	140	6500		
3	Bhagwanpur	9.8	275	Being used in Horticulture.	
4	Goithaha	120	4350	Being used in land fill at various locations.	Process design of STPs contains provision for removal of Nitrogen and Phosphorous, hence
5	Ramana	50	5200	Proposed to be used in land fill at STP site itself.	generated sludge doesn't have nutrients.
6	Ramnagar	10	740	Proposed to be used in land fill at STP site itself.	

Industrial Pollution Control

Industrial Pollution Management

During recent survey, 118 water polluting industries located in Varanasi and Bhadohi having potential to discharge into river Ganga and its tributary Varuna were inventoried which comprised Textile/Yarn (54 units), Sari Printing (33 units), Metal surface treatment (23 units), slaughter houses & meat processing (03 units), food & beverage (03 units) and Heavy engineering & Loco (02). Out of 118, 87 units are from textile/yarn and Sari printing sector.

Action Plan for prevention of pollution from Textile Cluster

Central Pollution Control Board (CPCB) has formulated the ‘Charter for Water Recycling and Pollution Prevention in Textile industries’ in consultation with experts from the departments of Chemical Engineering & Technology, IIT (BHU), Textile Engineering Department, IIT Delhi, Polymer and Fiber Technology, IIT Delhi, Fibre and Textile Processing, ICT, Mumbai, UP Textile Technology Institute, Kanpur and Textile industries **(Annexure-V)**.

Charter is based on participatory approach and one of the important objectives of charter is to setup a bench mark for water consumption & optimize the use of water & chemicals in processing. Charter is formulated, with a view to envisage upgradation of the status of textile industries in sustainable manner in terms of process technology upgradation, adoption of best practices, improved environmental performance, substantial reduction in the fresh water consumption and waste water generation, improvement in effluent treatment including tertiary treatment and optimize water recycling. Compliance with the prescribed standards is mandatory. There will be no compromise with regard to the industry not meeting the prescribed standards.

Charter prepared for textile industries was launched in the workshop with the textile units at Kanpur on 05.04.2019. For implementation of Textile Charter to all River Ganga Main Stem GPIs, UPPCB issued direction under section 33A of Water (Prevention and control of Pollution), 1974 on 08.05.2019.

Charter was discussed with textile mills and experts at a workshop organized by Carpet Export Promotion Council at **Bhadohi on 6th August, 2018**. A workshop was also organized by UPPCB on implementation of “Charter for water recycling and pollution prevention in Textile industry” was held on **15th Oct, 2019 at Bhadohi**.

As per data available with CPCB, during 2020, there were 31 textile sector GPIs in Bhadohi cluster and out of 31, 22 Textile units have prepared their individual action plan which were reviewed and the suggestions has been communicated to individual unit in the month of March-April, 2020 for implementation of recommendations as per charter.

However, during recent survey 54 yarn/textile and 33 sari printing units have been inventoried in Bhadohi, Jaunpur and Varanasi region in catchment of river Ganga and Varuna. Therefore, it is suggested that charter should be implemented in textile industrial cluster located in catchment of river Ganga and its tributaries in Uttar Pradesh in effective manner which will results in reduction in the fresh water consumption and waste water generation, optimize water recycling and overall improved environmental performance of industrial unit in sustainable manner. A monitoring committee may also be constituted to monitor the implementation status of charter in textile sector in a prescribed time frame.

Solid waste management

Proper Solid waste treatment system based on Indore or Goa model need to be prepared along with Waste to Energy system.

The un-segregated solid waste dumped in open plots or ponds/low lying areas within 500 meter of river Varuna in Varanasi contribute air and ground water pollution. The estimated quantity of legacy waste in this dumping site is approximately 30000 MT.

Management of legacy waste having adequate capacities for collecting, transporting and disposing of the municipal solid waste produced on a day-to-day basis as well as legacy waste trapped in the dumpsites is proposed to be done.

Illegal disposal of Construction and demolition waste in floodplain zone of river Varuna and Assi shall be prohibited.

Solid waste management plan of Varanasi City

Varanasi city has an estimated population of 15, 31,458 in 2020 based on projections for population taking 2011 population as base. Owing to its rich tourism potential, the estimated daily flow of tourists and pilgrims to the city is 25,000. The total area within Varanasi Nagar Nigam (VNN) is 82.1 km square for 90 wards and 86 more Villages have been merged with VNN area of 195 Sq km. The average waste generation of Varanasi is 0.400 kg per capita per day. The city at present generates 600 MT (Approx.) of waste per day at the rate of 0.400 Kg per capita per day and decadal population growth of 2.67 per Year (as per trend of rate of population growth in last 10 year: 2001-2011)

Table 4.16: Population Projection and waste generation for Varanasi City

Year	House Hold	Population	Waste generation MT/Day (approx) @ 400 gm per capita per day
2011	191278	11,98,491	479.39
2021 (for 90 Wards)	248300	15,31,458	612.58
2021 (For 86 Newly merged villages-20 wards)	151759	4,76,779	190.71
2035 (for 110 Wards)	512012	29,64,678	1185.87
2050 (for 110 wards)	655375	40,93,136	1637.25

The Government of India published the Solid Waste Management Rules, 2016, the Rules are now applicable beyond Municipal areas and extend to urban agglomerations, census towns, notified industrial townships, etc.

Administrative setup for MSW Management in Varanasi

The area falling under Varanasi Municipal Corporation is currently divided into 5 zones and 14 Subzone and 90 wards for administrative purposes and 86 newly merged villages. The details are annexed as Annexure VII.

Table 4.17: Manpower Engaged in Varanasi Nagar Nigam (VNN) for MSW Management	
Designation	No
Municipal Commissioner	1
Additional Municipal Commissioner	1
Municipal Health officer	1
Executive Engineer's. (Transport & Processing-SWM)	2
Zonal Officers	5
Zonal Health officers	1
Sanitary & Food Inspector	14
Account Clerk	01
Account Officer	02
Safai Supervisors	93 (VNN-38 and Varanasi Waste Solution-40)
Safai Mitra's and drivers	5784 (VNN Safai Mitra's = 4171, VWSPL Safai Mitra-850, VNN drivers = 331, VWSPL Drivers-195, Rag Pickers = 237)

- Currently there are no 100% door to door collections in 90 wards of Varanasi. Most of the households, shops, and establishments throw their waste just outside their premises, on streets, in drains, in open spaces, in water bodies, and in other inappropriate places.
- These litters swept away by street sweeping and lifted by means of handcart or rickshaw trolley by Sweepers and waste collectors of VNN, this led to unsanitary condition across the city.
- Varanasi Nagar Nigam outsourced M/s Varanasi Waste solution Pvt. Ltd. For door to door collection in 90 wards, mechanized road Sweeping approx.. 22.1 km. daily basis (Sant. Athulananda to BHU) and toilet cleaning work of Varanasi.
- Apart from door to door collection three Ngo's named Anthill Services Pvt. Ltd; career consulting pvt. Ltd, Jan Vikas Kalyan Samiti; Engage for IEC activities for sanitation awareness in their respective wards.
- The length of roads, streets, lanes, bye-lens in the city is approximately 1200 km in the total and approx. length of drains 2400 km area within Varanasi Nagar Nigam of 82.1 km square. Street sweeping starts between 8:00 AM and continues up to 2:00 PM.

The detailed action plan for MSW management in Varanasi city is enclosed as Annexure-VII

Encroachment

Removal of encroachment from lower floodplain zone of river Varuna and Assi. Demarcation and notification of floodplain zone by introducing pillars to further prevent encroachment in River Varuna and Assi.

Monitoring Committee

a. Supervisory Committee – *It may supervise the implementation of proposed action plan for restoration and rejuvenation of River Varuna and Assi. The committee may consist of representative from District Magistrate, Varanasi Vikash Pradhikaran, Irrigation Department, Forest Department, Municipal Corporation, UP Jal Nigam, Urban Development Department, NMCG, UPPCB and CPCB under the chairmanship of Commissioner of Varanasi division, meeting to be held on quarterly basis.*

b. Execution Committee – *The committee may responsible for execution of proposed action plan for restoration and rejuvenation of River Varuna and Assi. The committee may consist Varanasi Vikash Pradhikaran, Irrigation Department, Forest Department, Municipal Corporation, UP Jal Nigam, Urban Development Department, SMCG and SPCB under the chairmanship of District Magistrate of concerned district, meeting to be held on monthly basis.”*

5. The report shows that there are serious issues adversely affecting rivers *Varuna* and *Assi* calling for remedial action in the form of desilting, remediation of waste water, development of constructed wetland systems and bio-diversity parks, apart from management of sewage, industrial pollution and solid waste which requires concerted and continuing steps and monitoring.

6. Since the issues and remedial steps have been identified by the joint Committee and exhaustive recommendations for remedial action made, there is need for execution of the action plan at the ground level in the light of above report. This requires coordination among the concerned departments including the Local Bodies, District Administration and State Government.

7. Accordingly, the Supervisory and Execution Committees suggested in the report may take further action. In terms of suggestions of the

Committee, problem of choking at the origin point of said rivers may be remedied by taking restoration measures. The execution Committee may meet atleast once in a month under the Chairmanship of District Magistrate, Varanasi and the Supervisory Committee may meet on quarterly basis under the Chairmanship of Commissioner, Varanasi Division, as suggested. The District Magistrate as well as Commissioner, Varanasi Division may have full time environmental coordinators attached to them directly for this purpose either out of the existing incumbents or by specially engaging a suitable person for the task. It will be appropriate that minutes of the meeting of the District Magistrate as well as Commissioner, Varanasi are placed on their respective websites, which may enable public information and participation. Having regard to the significance of the issue and need for prompt action for keeping the important rivers pollution free, the timelines need to be shortened which aspect may be considered by the Execution and the Supervisory Committees. We request the Oversight Committee constituted by this Tribunal headed by Justice S.V.S. Rathore, former Judge of the Allahabad High Court to oversee the steps taken in the matter, if necessary, by periodically interacting with the Execution and Supervisory Committees.

8. We further direct the NMCG and CPCB to monitor progress of implementation of action plan in accordance with the Namami Gange project.

9. The action plan may be placed on the website of CPCB and also circulated by CPCB to the River Rejuvenation Committees of all the States/UTs through respective State PCBs/PCCs, for appropriate consideration of their respective action plans to the extent found necessary.

10. The issue of funding of the projects proposed may be worked by the NMCG and the Chief Secretary, UP and wherever Namami Gange funds are found inadequate, it will be the responsibility of the State of UP to provide the same.

The application is disposed of.

A copy of this order be forwarded to CPCB, NMCG, Chief Secretary, UP, Additional Chief Secretary, Irrigation Department, UP, State PCB and District Magistrate and Commissioner, Varanasi Division by e-mail for compliance.

A copy of this order be also provided to all other concerned departments by the Additional Chief Secretary, Irrigation Department, UP.

A copy of this order be also forwarded to Justice S.V.S. Rathore, former Judge of the Allahabad High Court by e-mail.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Dr. Nagin Nanda, EM

November 23, 2021
Original Application No. 128/2021
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