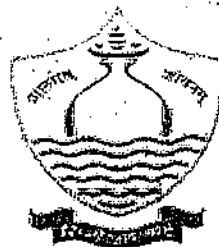


ACTION PLAN
FOR
IMPLEMENTATION OF DIRECTIONS OF
NATIONAL GREEN TRIBUNAL (NGT)



DELHI JAL BOARD

Govt. of NCT of Delhi

AECOM

ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF NATIONAL GREEN TRIBUNAL (NGT)

SEWERAGE MASTER PLAN-2031

NCT Delhi has an expanding population that has grown by more than 300% since 1971 when it stood at 4.066 million, increasing to the current level of around 20 million. As per Census 2011, Delhi had a population of 16.753 Million and as per the Delhi Master Plan 2021, the population of Delhi is projected to be 23 Million. Presently, approximately 50% of Delhi is not connected with sewerage system as shown in *Figure 1*. The wastewater services in next twenty years are likely to worsen drastically unless remedial measures are taken today.

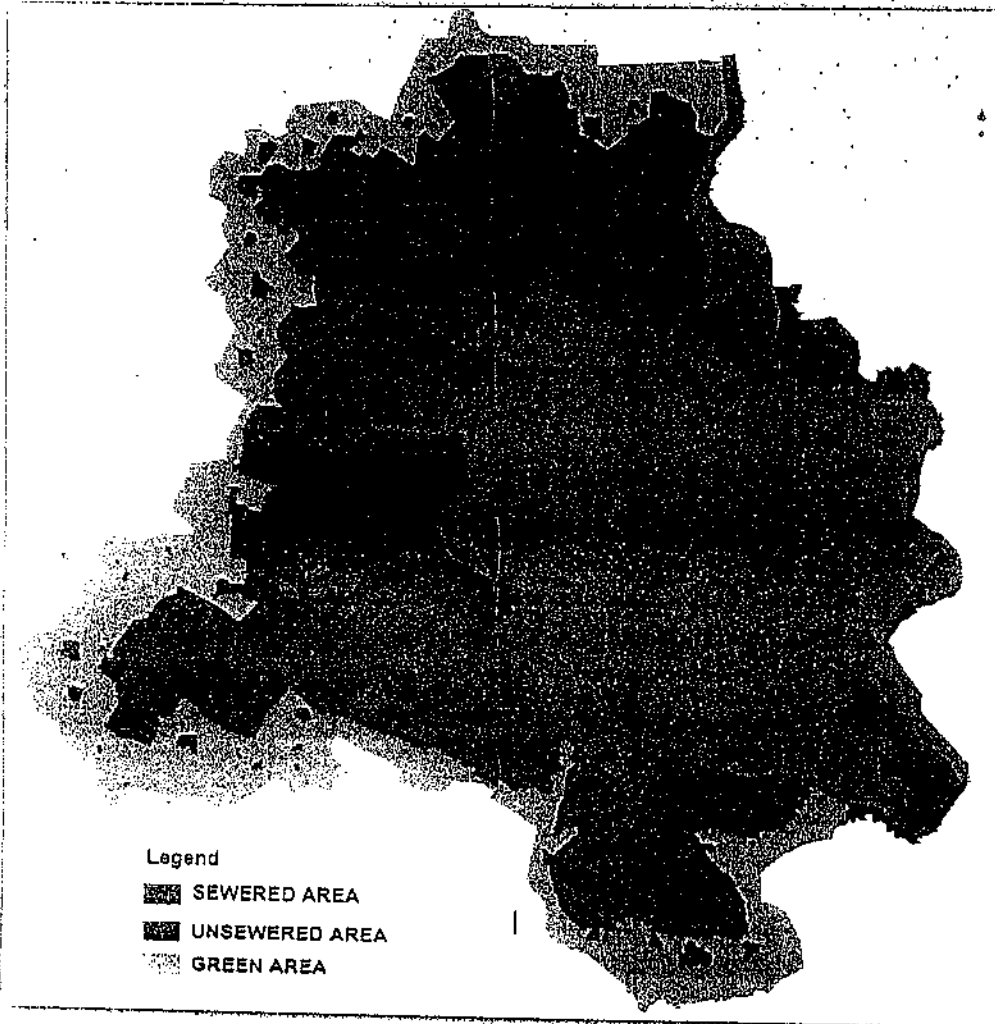


Figure 1: Sewered & Unsewered area of NCT of Delhi

For unsewered areas of Delhi, DJB got developed a holistic, integrated and sustainable Master Plan for design horizon of 2031. This master plan shall ensure that the comprehensive, technically and financially viable plans (CAPEX & OPEX) are in place for the implementation of sewerage works in unsewered areas of Delhi by integrating with existing network and sewerage infrastructure so as to bring the latter to their optimum utilization state.

As per SMP-2031, the whole NCT of Delhi has been delineated into 12 (twelve) drainage zones as listed and shown in Figure 2 below:

- Shahdara Drainage Zone (SHD)
- Okhla Drainage Zone (OKH)
- Keshopur Drainage Zone (KSP)
- Rohini- Rithala Drainage Zone (RR)
- Coronation Pillar Drainage (COR)
- Dwarka Drainage Zone (DWK)
- Najafgarh Drainage Zone (NJF)
- Nilothi Drainage Zone (NLT)
- Narela Drainage Zone (NRL)
- South Delhi Drainage Zone (SD)
- Outer South Delhi Drainage Zone (OSD)
- Kanjhawala-Bawana (KB)

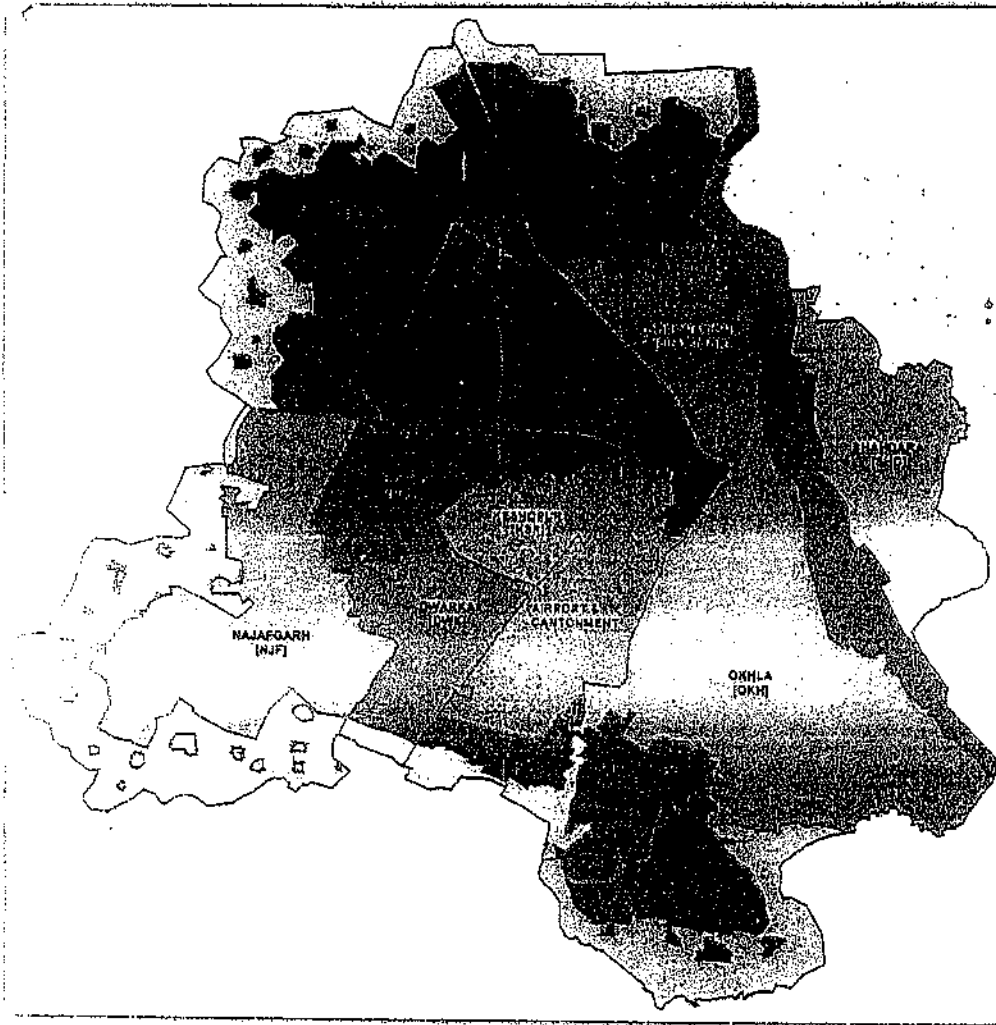


Figure 2: Proposed Drainage Zones – NCT Delhi

The Sewerage Master Plan for design year 2031 (SMP-2031) has been developed by AECOM with the need to lay additional sewerage network of around 10,000 Km. Unsewered areas of Delhi has complex situation with congestion and lesser space left for laying the sewerage utility. In view of this, trenchless technology methods such as Microtunnelling and HDD have been proposed for laying new networks as appropriate. As an immediate measures a techno-feasible option has also been convened which is to trap the sewage flowing in the drains from un-sewered areas by implementing Interceptor Sewer system. This shall cut off untreated sewage contamination in the drains towards river Yamuna. This shall be a short term immediate relief for the betterment of sanitation condition and hence quality of river Yamuna. The master planner, AECOM with inputs of DJB has wisely taken up the proposed infrastructure in the SMP-2031 by integrating with these proposed interceptor sewers. The proposed sewerage schemes under SMP-2031 shall be implemented in various phases as per intended priority over next few years.

Ramifications of SMP will ensure that the comprehensive, techno-economical plans are in place for the implementation of sewerage development and improvement works. Ramifications will also upgrade the sewerage infrastructure leading to improved sanitation conditions and also enhance the water quality in river Yamuna.

DRAINAGE MASTER PLAN FOR DELHI

IIT Delhi and National Green Tribunal (NGT) are working jointly on holistic Storm Water Drainage Master Plan of Delhi. The concern of NGT is to ensure that no untreated sewage should flow into storm water drains and thus leading to rejuvenation of these drains. About 201 Storm Water Drains (SWD) have been identified as natural drains as per Drainage Master Plan-1976. Most of them are carrying sewage from sewered and unsewered areas of Delhi and there is a need to provide system to isolate sewage from SWD on immediate basis. It was suggested to prioritize the part of proposed sewerage schemes for immediate implementation to cut off sewage flow in natural SWD.

APPROACH & METHODOLOGY FOR UNSEWERED AREAS IN DELHI

Following key activities have been carried out by AECOM to prioritize the part of sewerage scheme proposed under SMP-2031 for immediate implementation to cut off sewage flow in storm water drains:

- ✓ Superimposition of 201 natural drains provided by IIT-Delhi, on proposed sewerage schemes under SMP-2031.
- Conceptual analysis of superimposed drains in co-relation with proposed sewerage schemes under SMP-2031.
- Approach for prioritization of part of proposed sewerage networks for immediate implementation works for revival of natural drains.
- Identification and tentative prioritization of proposed sewerage infrastructure comprising Waste Water Treatment Plant (WWTP), Waste Water Pumping Station (WWPS) and associated structures for implementation.
- Estimation of anticipated broad cost for execution of prioritized works as discussed above.

Map showing overall proposed sewerage schemes for unsewered areas of Delhi under SMP-2031 along with superimposed 201 natural drains has been attached. Proposed sewerage schemes for individual drainage zones have been analyzed in co-relation with superimposed natural drains. Tentative prioritization of part of sewerage networks for proposed drainage zones has been carried out and shown as highlighted portion in the maps. The maps are attached and listed below:

1. Superimposed Drains over all proposed sewerage schemes under SMP-2031
2. MAP showing tentative prioritization of overall proposed sewerage schemes
3. Shahdara Drainage Zone
4. Okhla Drainage Zone
5. Keshopur Drainage Zone
6. Rohini- Rithala Drainage Zone
7. Coronation Pillar Drainage
8. Dwarka Drainage Zone
9. Najafgarh Drainage Zone
10. Nilothi Drainage Zone

11. Narela Drainage Zone
12. South Delhi Drainage Zone
13. Outer South Delhi Drainage Zone
14. Kanjhawala-Bawana (KB)

Proposed aspects for further consideration toward stipulated objectives of NGT:

- Implementation of sewerage schemes proposed under SMP-2031 has been taken up by DJB at various drainage zones. It is suggested that an option of prioritizing the implementation schedule of contractors for execution of proposed sewerage network to cut off sewage flow in natural drains on immediate basis, can be looked into.
- It is further suggested to execute the prioritized sewerage network of proposed schemes, in the vicinity of area where other schemes are already under implementation by DJB.
- Neighboring states also contributes to the sewage flow in natural storm drains. Thereby it is necessary to take this issue on priority basis in parallel.

SUMMARY OF TENTATIVE PRIORITIZED SEWERAGE NETWORK, WWPS AND WWTP AS PER SMP-2031

- ✓ Proposed Sewerage length (Tentative): Approx. 600 km
- ✓ Proposed Pumping Stations: 26 Nos.
- ✓ Proposed Waste Water Treatment Plant Capacity: 119 MGD (32 Nos.), Capacity Range: 0.6 - 10 MGD)

ANTICIPATED BROAD COST

The anticipated broad cost for execution of works prioritized above has been estimated as INR 4,000 Crores (approx.) considering an escalation factor of 8.5% per year for 3 years. The cost has been derived based on aspects as mentioned above and is tentative only. The actual cost may vary as per detailed engineering/ study to be conducted.

TIMELINES

The proposed sewerage works are likely to be completed in a period of 2 to 3 years from the actual start of the works at site. The implementation of the works where only sewer lines are to be laid can be completed in two years whereas the works involving the construction of WWPS and WWTP, may take three years.

Implementation Schedule for prioritized works:

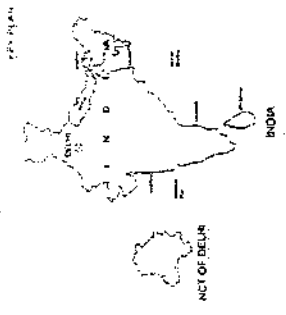
Time required/ schedule for each stage of works has been represented as follows:

STAGES	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Detailed Engineering	■	■														
Tendering		■	■													
Implementation Works			■	■	■	■	■	■	■	■	■	■	■	■	■	■

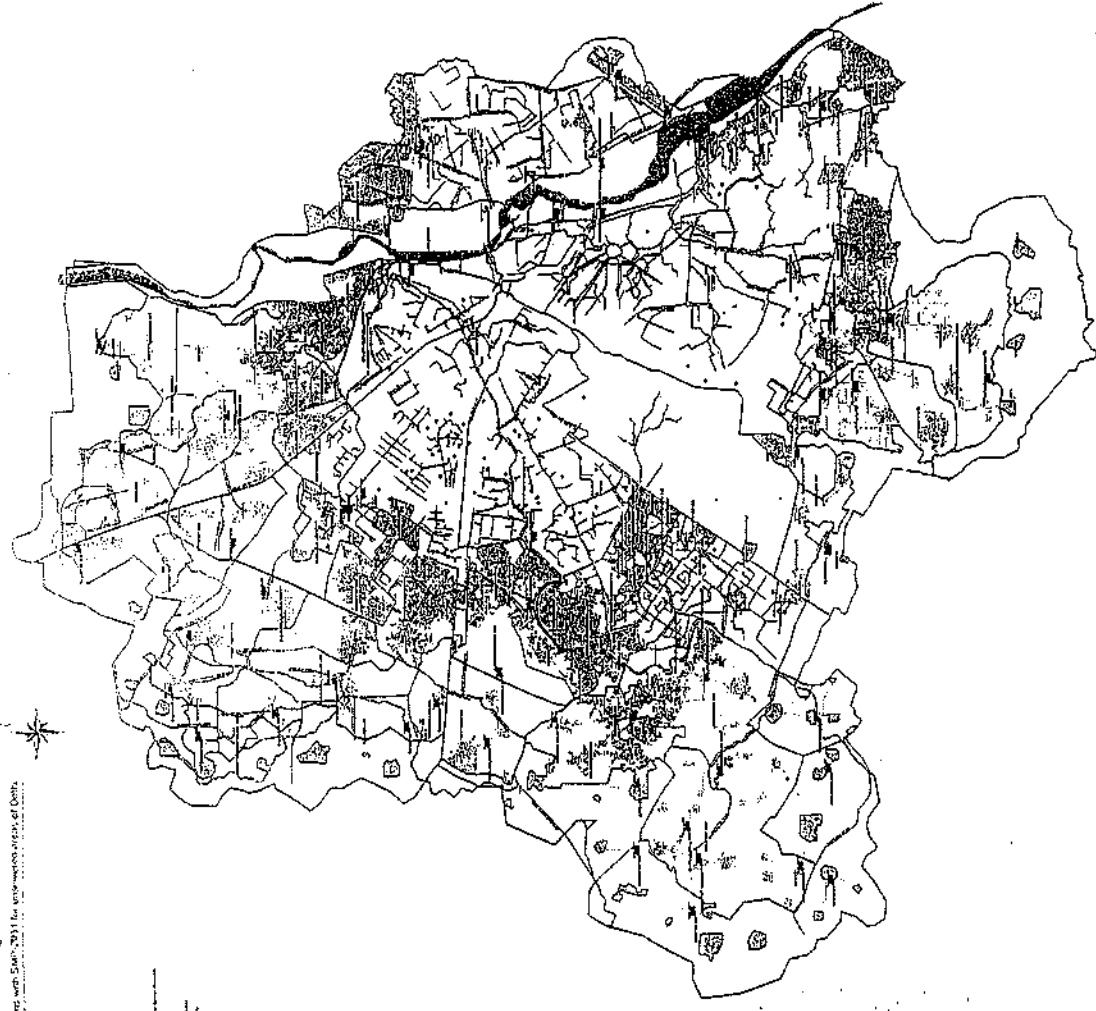
DISCLAIMER

The above exercise has been carried out considering the following aspects:

- Superimposition of 201 Natural drains over proposed schemes under SMP-2031 has been carried out based on the data provided by IIT-Delhi.
- Sewerage network prioritized is part of sewerage schemes proposed under SMP-2031 for unsewered areas of Delhi. In view of stipulated objective of NGT, further study may be carried out wherever required, to ascertain re-routing, inclusion/ exclusion of proposed networks, hydraulic design as per site feasibility. This may require additional Topographical Survey to be conducted along with GIS integration.
- The cost estimated for prioritized works excludes the cost of sewerage works already under implementation by DJB.



DRAINAGE ZONES AS PER SMP-2031



Specimen name of Drainage with Date: 2031 for implementation of Delhi...

Project Title:
**ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF
 MGT. DRAINAGE ZONE: SUPERIMPOSED DRAINS OVER ALL
 PROPOSED SEWERAGE SCHEMES UNDER SMP-2031**

Client:
DELHI JAL BOARD

AECOM
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Sl. No.	Name	Designation	Signature	Date
1	Mr.		
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3	Mr.		
4	Mr.		

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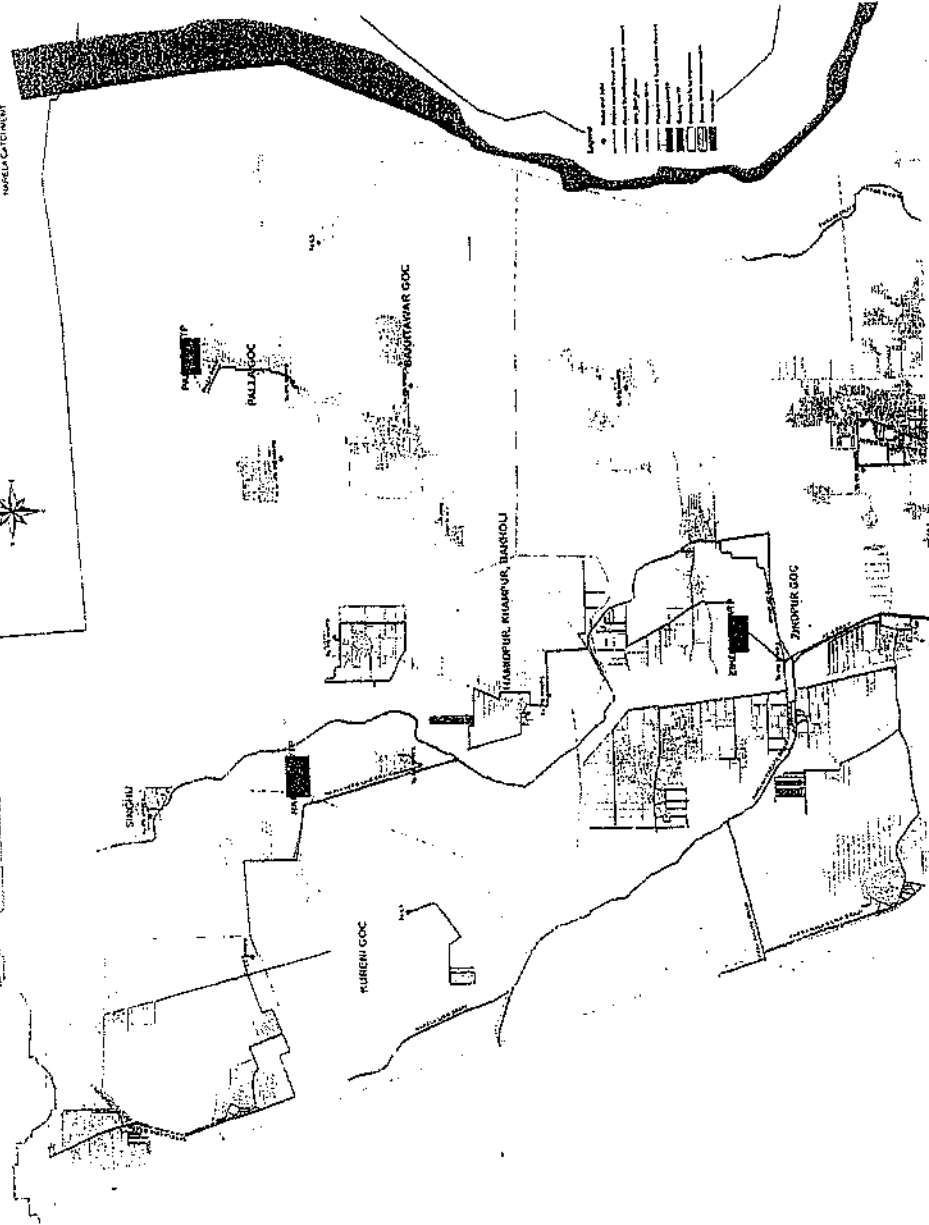
PLAN



DRAINAGE ZONES AS PER SMP-2001



Superimposition of Drains with SMP-2001 for Intersected areas of Delhi
NAGLA CATCHMENT



Project Title

ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF NCT, NAGLA DRAINAGE ZONE

Client



DELHI JAL BOARD

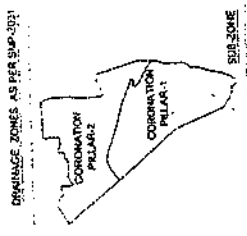
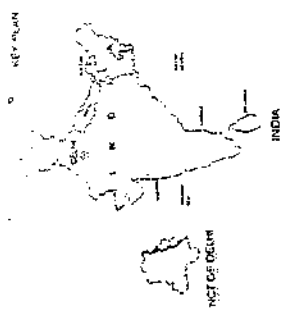
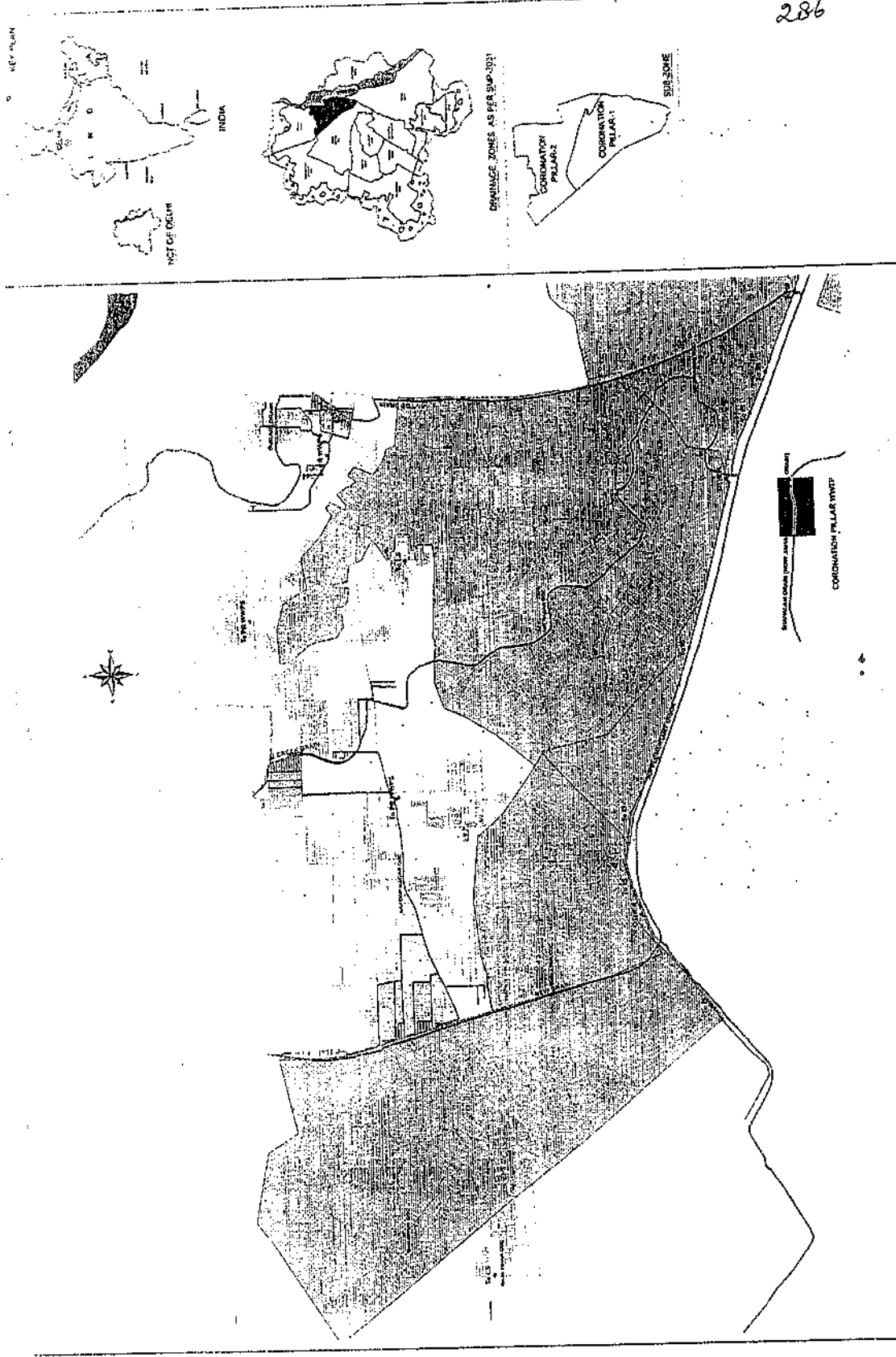
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13th Floor
14th Floor
15th Floor

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Checked by	
Approved by	
Project Manager	
Client Representative	

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Project Title

ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF MET-CORONATION PILLAR DRAINAGE ZONE

Client

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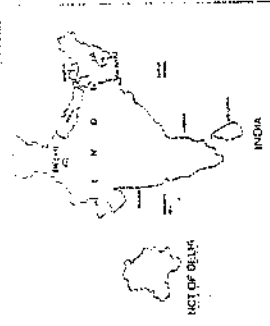
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DELHI JAL BOARD

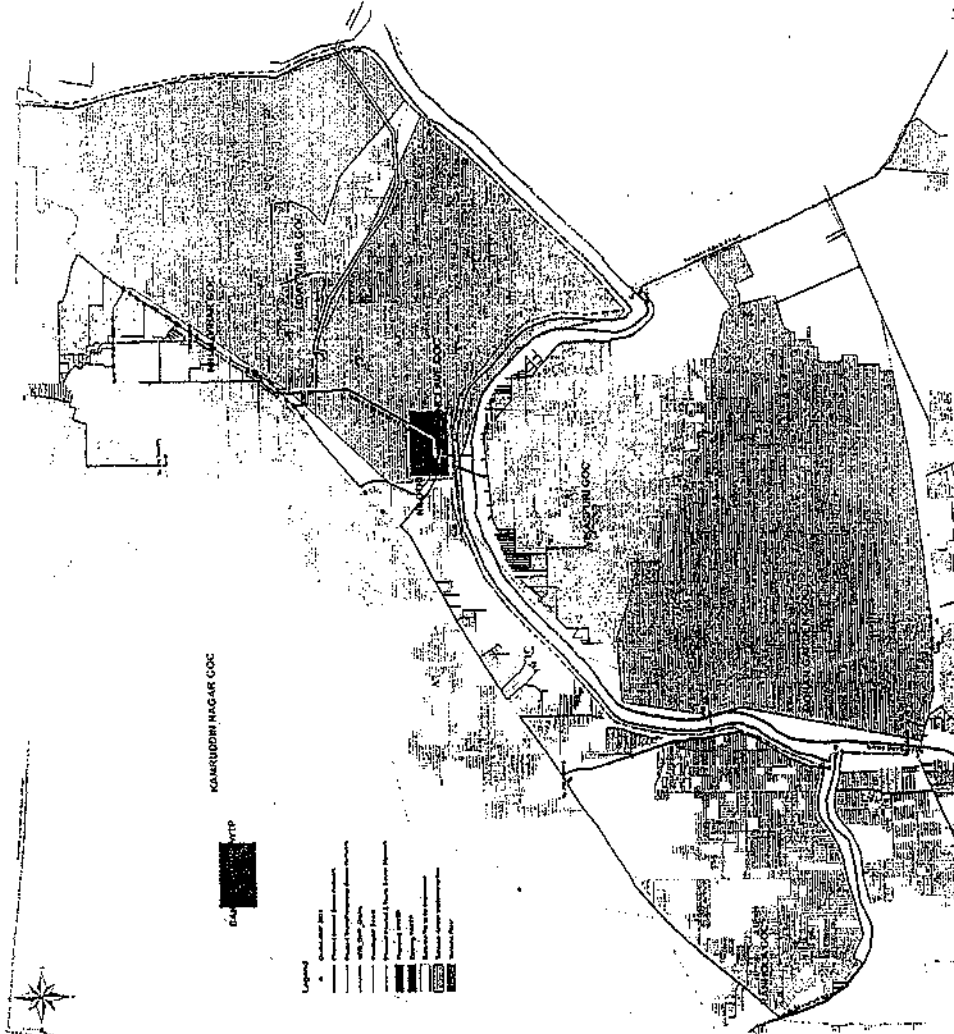
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DRAINAGE ZONES AS PER DMP-2011



KAMRUDDIN NAGAR GOC
DMP-2011

Legend

- 1. Open Space
- 2. Road Right of Way
- 3. Road Right of Way
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- 19. Road Right of Way
- 20. Road Right of Way

Project Title: ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF NCT-DELHI TR DRAINAGE ZONE

Client: DELHI JAL BOARD

AECOM

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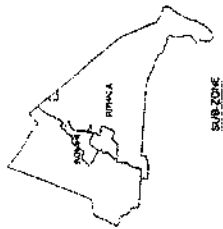
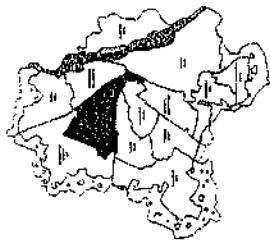
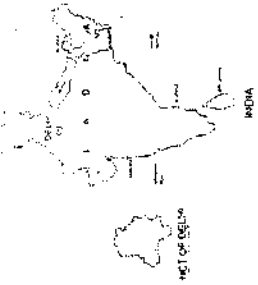
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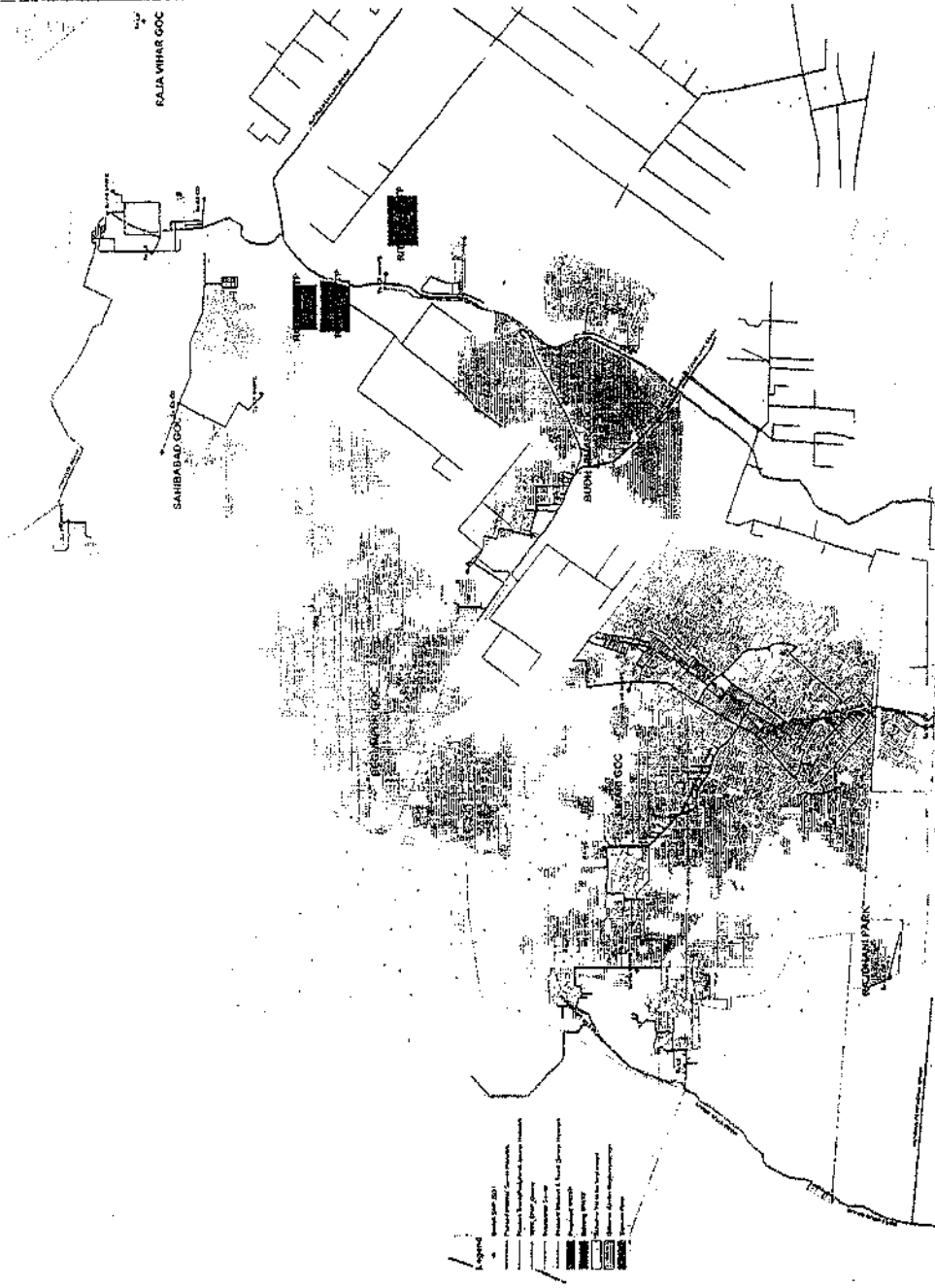
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MC PLAN



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Project Title

ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF NGT-PONHREKOTHALA DRAINAGE ZONE

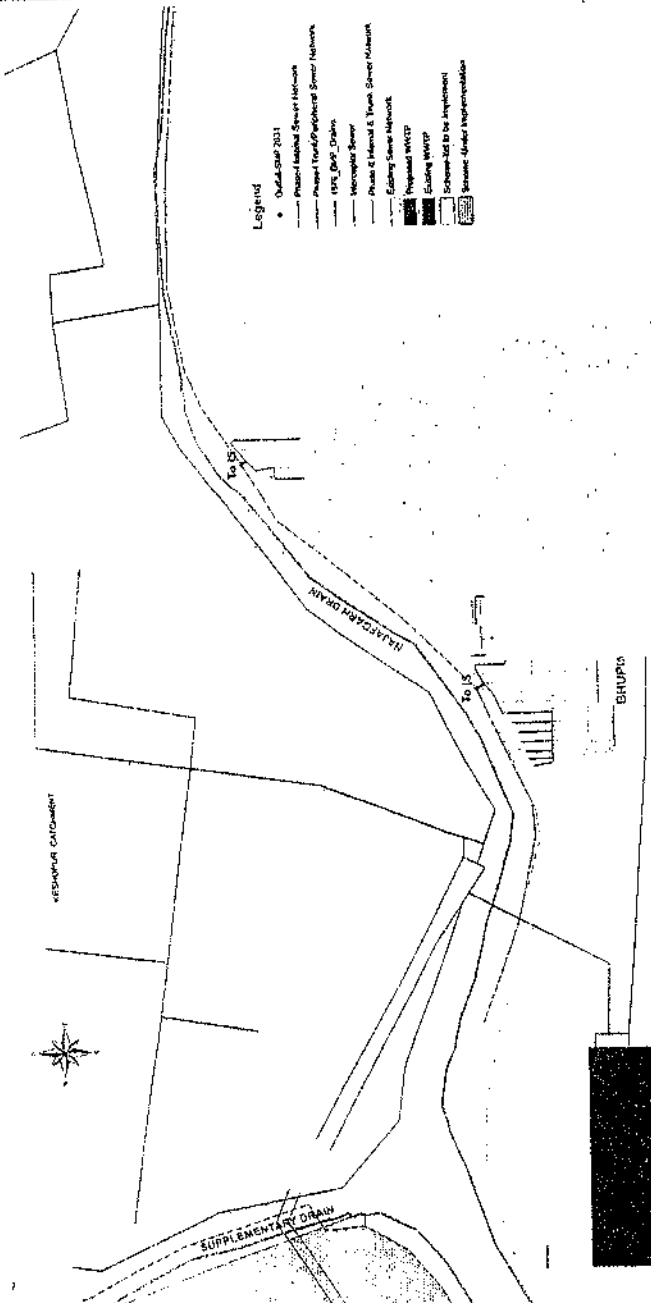
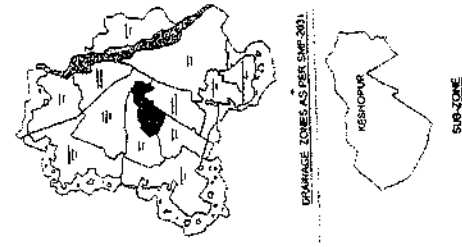
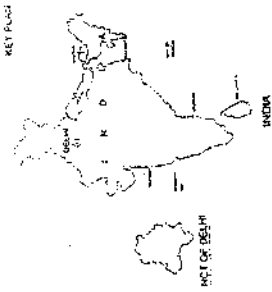
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AECOM

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 1-81-334-8888

NO.	REVISION	DATE	BY	CHKD BY



- Legend**
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 - Proposed Sewer Network
 - Proposed Storm Drainage Network
 - Proposed Sewer Network
 - Proposed Storm Drainage Network
 - Proposed WWTTP
 - Existing WWTTP
 - Scheduled for the Implementation
 - Sewerage Under Implementation

Project Title
ACTION PLAN FOR IMPLEMENTATION OF DIRECTIONS OF NGT- KESHAPUR DRAINAGE ZONE



Client
AECOM
 11th Floor
 200 Connaught Place
 New Delhi - 110048

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Date: 10/01/2018

Project No: 100/2017

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