

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO.-1155/2024
(I.A. No. 443/2024)**

IN THE MATTER OF:

KAUSHALENDRA KUMAR

....APPLICANT

VERSUS

UNION OF INDIA & ORS.

...RESPONDENT(s)

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THROUGH



BHANWAR PAL SINGH JADON

STANDING COUNSEL FOR THE STATE OF U.P. (NGT)

EMAIL- bhanwar09jadon@gmail.com

DATE: 09.01.2025

PLACE: NOIDA

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO.-1155/2024
(I.A. No. 443/2024)



IN THE MATTER OF:

KAUSHALENDRA KUMAR

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VERSUS

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JOINT COMMITTEE REPORT ON BEHALF OF DISTRICT
MAGISTRATE, GHAZIABAD IN COMPLIANCE TO THE ORDER
DATED 19.09.2024 PASSED BY THE HON'BLE NATIONAL GREEN
TRIBUNAL, PRINCIPAL BENCH, NEW DELHI.

I, Indra Vikram Singh, aged about 55 years, s/o Late Sunder Singh R/o H.No. - 01, Civil Line, P.S. Sadar Bazaar, Tehsil, Shahjhanpur, District- Shahjhanpur posted as District Magistrate, Ghaziabad, U.P. do hereby solemnly affirm and state as under:

1. That I, the Deponent in the above captioned matter am fully conversant with the facts of the case and am competent and authorized to swear the present Reply.
2. That I state that the contents of the Report has been drafted by my counsel on my instructions and the contents of the same are true to my knowledge and nothing material has been concealed therefrom.

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3. That in the present matter, the applicant alleges that there is pollution and encroachment on the Hasanpur-Lodha Wetland which was Inventorized in the National Wetland Inventory and Assessment Project (NWIA). That the NWIA was carried out by Space Applications Centre (SAC) Ahmedabad. That the applicant has further alleged that the prohibited activities under Rule 4(1) of the Wetland Rules 2017 are being carried out.
4. That it is to be submitted that the Hon'ble Tribunal vide order dt. 19.09.2024 constituted a Joint Committee comprising of the representative of the Member Secretary, Central Pollution Control Board (CPCB), Member Secretary, Uttar Pradesh Pollution Control Board (UPPCB), Regional Office, MoEF & CC, Lucknow, Member Secretary, Uttar Pradesh State Wetland Authority, Member Secretary, National Wetland Authority and District Magistrate, Ghaziabad acting as a nodal authority agency. Further, it was directed to the Joint Committee to visit and inspect the site in question.

The relevant portion of the order dt. 19.09.2024 has been reproduced herein as follows:

"7. Joint Committee will visit the site, and ascertain the truthfulness of the allegations, the sources of pollution in the wetland in question and the extent of industrial effluent flowing/discharged in the wetland. Joint Committee will get the water sample analysis of the wetland in question done, will obtain the original record indicating the area of the wetland reflected in the record and will also ascertain the existing area of the wetland to find out the extent of encroachment which has been done thereupon. The Joint Committee will complete this exercise within a period of two months and will submit the report immediately thereafter."

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8. List on 10.01.2025”

A Copy of Order dt. 19.09.2024 has been attached herein as Annexure A/1.

5. That consequently, the Joint Committee visited the site in question on 19.12.2024 and prepared their report on the same day. Hence, the Joint Committee Report is filed as under.

A Copy of the Joint Committee Report dt. 19.12.2024 has been attached herein as Annexure A/2.

6. That the Joint Committee during the inspection observed as under:

- The Hasanpur-Lodha Wetland is located 17km, east of District Headquarters Ghaziabad, surrounded by falling area in District Ghaziabad, Hapur and Gautambuddh Nagar. The Hasanpur-Lodha Wetland is a largest Wetland in NCR Delhi and is known as Hasanpur lake. According to the document attached with original application with respect to national Wetland Inventory and Assessment in year 2017-18, the lake spreads over 115.03 Hectares, which has not been identified yet.
- That with respect to recording the area of the wetland, the Revenue officials, Hapur carried out the demarcation of the Hasanpur lake falling within the Jurisdiction of District Hapur on 21.02.2024. That report of the aforementioned demarcation was prepared by the Revenue Officials, Hapur. That as per said report the total area of lake falling in Hapur is about 37, Hectares. Further it is to be noted that the measurement work of the entire lake could not be completed. That in the said demarcation report it was established that the area



of the said lake within the jurisdiction of District Hapur is encroachment free.

(The copy of the demarcation report dt. 21.02.2024 has been attached alongwith the Joint Committee Report dt. 19.12.2024 as Annexure III)

- That UP State Industrial Development Authority (UPSIDA), has developed an industrial area at Mussoourie -Gulawati road District Hapur (UP). The industrial area is in three phases. Mussoourie-Gulawati road divides the area in two part. One side phase-2, and other side phase-1, & phase-3. This industrial area is about 800 meter away to the Hasanpur - Lodha Wetland. That the committee observed that there is a network of open drains in industrial area. UPSIDA has provisioned storm water drain network at the time of development of this industrial area. Over all the existing storm water drain network is inadequate due to which the over flow of the industrial drains gets accumulated on vacant industrial land, green belt/ parks etc. Therefore a complete replacement of the existing drains with a new storm water drainage network was suggested by the Joint Committee. That report of the survey of the drains was submitted by UPSIDA.

A Copy of the UPSIDA Report has been attached herein as Annexure A/3.

- That the Joint Committee observed that the domestic waste water coming from the household of the nearby two villages in being poured into the lake.

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- That the Joint Committee collected the water samples of the water accumulated in the nearby Park, Hasanpur Drain and the Hasanpur Lake. That it was found that the flow is from the discharge of nearby villages, the B.O.D. of the sample analyzed from the park is more than 30mg/l.

Copies of the Laboratory Reports has been attached herein as Annexure A/4.

- That the Joint Committee observed that no industrial waste discharged, solid waste, Construction and Demolition (C&D) waste at the site in question.
 - That the Joint Committee has visited and updated the status of the 22 industrial unit of Respondent 17 to 38 in their report and concluded that no industrial effluent is being discharged in the said lake.
 - That the Joint Committee has also observed that the developers/builders have constructed the boundary wall. However, no construction activities were found being carried out.
7. That the following recommendations were given by the Joint Committee in their report dt. 19.12.2024:

“1. The concerned authority, District Administration, Gautam Budh Nagar may be directed to complete the measurement and demarcation of the Hasanpur Lake so that original record indicating the area of wetland and existing area to the extent to the encroachment could be ascertained.

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2. UPSIDA may be directed to ensure the complete replacement of existing drains network with a new storm water drainage network show that no water logging takes place in the said area and drainage can flow normally.
3. Ministry of Environment, Forest and Climate Change (Wetland division), New Delhi has issued office memorandum dated 08.03.2022 for the protection of wetlands as per rule 4 of the wetlands (Conservation and Management) Rules, 2017. In view of above the said area of Hasanpur Lake should be notified by the state authorities.
4. Untreated domestic waste water coming from nearby villages should be diverted.”
8. That in light of the above submissions, it is respectfully submitted that the District Magistrate, Ghaziabad has fully complied with the directions issued by this Hon’ble Tribunal vide its order dated 19.09.2024 and the Joint Committee has inspected the site in question on 19.12.2024 and has stated their observations and recommendations as mentioned above.
9. Hence, the present reply is being filed for the kind consideration and perusal of this Hon’ble Tribunal.
10. That I state that everything stated above has been stated by me in my official capacity on and derived from the official records and I state that nothing material has been concealed therefrom.


DEPONENT

09 JAN 2025



VERIFICATION

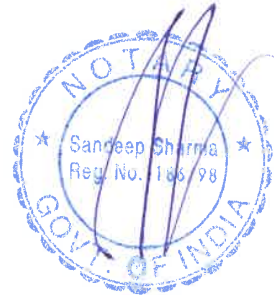
Verified at Ghaziabad on this 09 day of January, 2025, that the contents of the above affidavit from paragraphs 1 to 10 are believed to be true and correct to the best of my knowledge and belief. No part of it is false and nothing material has been concealed therefrom.



DEPONENT


ATTESTED

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Ghaziabad (U.P.)



09 JAN 2025

Item No. 01

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 1155/2024
(I.A. No. 443/2024)

Kaushalendra Kumar

Applicant

Versus

Union of India & Ors.

Respondent(s)

Date of hearing: 19.09.2024

**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: Mr. R. Jawahar Lal, Ms. Meghna Kumar & Mr. Cecil C. George, Advs.

ORDER

1. In this original application, applicant has raised the grievance in respect of pollution and encroachment on the Hasanpur-Lodha wetland which according to the applicant is inventorized in the National Wetland Inventory and Assessment project (NWIA), NWIA was carried out by Space Applications Centre (SAC), Ahmedabad. The applicant has raised a further grievance that the prohibited activities under Rule 4 (1) of the Wetlands Rules, 2017 are rampant and the authorities have not taken action to preserve the wetland and to prevent the encroachment and pollution thereof.

2. Learned counsel for the applicant has submitted that the industrial effluents from Mussoorie-Gulawathi Industrial Area through an overflow drain is being discharged in the wetland in question and support thereof he has placed reliance upon the map on Pages no. 72 and 73. He has further submitted that the industrial effluent flowing in that overflow drain is also entering the agricultural field as it is broken at some places and in support of this allegation he has placed reliance upon the photographs on Page No. 65 onwards. He has also submitted that such

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(Sandeep Sharma)
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Chandigarh (U.P.)



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industrial effluent is even entering the park and has referred to the photographs from Page No. 81 onwards. Referring to the photograph on Page No. 126 he has submitted that a road is being constructed on the wetland and referring to the photographs from Page No. 127 onwards he has submitted that the illegal dumping on the wetland is in progress. To ensure that the area of the wetland reduces and the encroachment thereon becomes easy in the original application, the applicant has given the specific suggestions:-

- (a) necessary action may kindly be taken against the Respondent Nos. 17 to 49 for violation of provisions of the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981 and the Wetlands (Conservation and Management) Rules, 2017 and Rules framed under the said enactments;
- (b) necessary action may kindly be taken against the Respondent Nos. 1 to 16 and their concerned officials for failing to implement effective measures to correct, control and prevent the aforesaid violations/ damage and hold the perpetrators, including the Respondent Nos. 17 to 49, liable and accountable for the violation of the various environmental laws;
- (c) necessary action be taken against Respondent Nos. 17 to 49 who for their personal benefits illegally converting land in and around Hasanpur-Lodha wetland by converting it in residential/industrial units causing severe threat to the wetland. It is prayed that immediate closure of such conversion of land; any dumping of waste and construction of any nature be stopped till the parties file their proper replies;
- (d) heavy penalties, in the form of compensation and exemplary costs be imposed on the Respondent Nos. 17 to 49 for violation of provisions of the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981 and the Wetlands (Conservation and Management) Rules, 2017 and Rules framed under the said enactments and on the Respondent Nos. 1 to 16 for aiding and abetting the said wrong by not taking any action;
- (e) the applicant and the villagers whose agricultural land have been impacted by the aforesaid illegal activities may be awarded appropriate compensation;

3. Counsel for the applicant has also submitted that though the complaints were made to the different authorities no action has been taken.

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Chandigarh (U.P.)



4. The OA raises substantial issue relating to compliance of environmental norms.

5. Issue notice to the respondents for filing their response/reply by way of affidavit at least one week before the next date of hearing through e-filing. If any respondent directly files the reply without routing it through his advocate then the said respondent will remain virtually present to assist the Tribunal. Applicant is directed to serve the other respondents and file the affidavit of service at least one week before the next hearing date.

6. Having regard to the seriousness of the allegation, we also constitute a Joint Committee comprising of the representative of the Member Secretary, Central Pollution Control Board (CPCB), Member Secretary, Uttar Pradesh Pollution Control Board (UPPCB), Regional Office, MoEF & CC, Lucknow, Member Secretary, Uttar Pradesh State Wetland Authority, Member Secretary, National Wetland Authority and District Magistrate, Ghaziabad. District Magistrate, Ghaziabad will act as a nodal agency in the joint committee.

7. Joint Committee will visit the site, and ascertain the truthfulness of the allegations, the sources of pollution in the wetland in question and the extent of industrial effluent flowing/discharged in the wetland. Joint Committee will get the water sample analysis of the wetland in question done, will obtain the original record indicating the area of the wetland reflected in the record and will also ascertain the existing area of the wetland to find out the extent of encroachment which has been done thereupon. The Joint Committee will complete this exercise within a period of two months and will submit the report immediately thereafter.

8. List on 10.01.2025.

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9. Let a copy of this order along with a copy of the OA be forwarded to the Member Secretary, CPCB, Member Secretary, UPPCB, Regional Office, MoEF & CC, Lucknow, Member Secretary, Uttar Pradesh State Wetland Authority, Member Secretary, National Wetland Authority and District Magistrate, Ghaziabad. District Magistrate, Ghaziabad.

Prakash Shrivastava, CP

Arun Kumar Tyagi, JM

Dr. A. Senthil Vel, EM

September 19, 2024
Original Application No. 1155/2024
(I.A. No. 443/2024)
AS..

ATTESTED

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Ghaziabad (U.P.)



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Joint Inspection report in compliance to the Hon'ble National Green Tribunal New Delhi order Dated 19.09.2024 in the matter of OA No 1155/2024 (IA No 445/2024) Kaushalendra Kumar Versus Union of India & Ors.

1- Back Ground :-

The above matter was taken on 19.09.2024 for hearing and Hon'ble National Green Tribunal New Delhi was pleased to pass following directions:-

6. Having regard to the seriousness of the allegation, we also constitute a Joint Committee comprising of the representative of the Member Secretary, Central Pollution Control Board (CPCB), Member Secretary, Uttar Pradesh Pollution Control Board (UPPCB), Regional Office, MoEF & CC, Lucknow, Member Secretary, Uttar Pradesh State Wetland Authority, Member Secretary, National Wetland Authority and District Magistrate, Ghaziabad. District Magistrate, Ghaziabad will act as a nodal agency in the joint committee.

7. Joint Committee will visit the site, and ascertain the truthfulness of the allegations, the sources of pollution in the wetland in question and the extent of industrial effluent flowing/discharged in the wetland. Joint Committee will get the water sample analysis of the wetland in question done, will obtain the original record indicating the area of the wetland reflected in the record and will also ascertain the existing area of the wetland to find out the extent of encroachment which has been done thereupon. The Joint Committee will complete this exercise within a period of two months and will submit the report immediately thereafter.

8. List on 10.01.2025

2- Constitution of Committee:-

In Compliance to the order of the Hon'ble Tribunal dated 19.09.2024, a Joint committee consisting of following officials of the concerned department has been constituted:

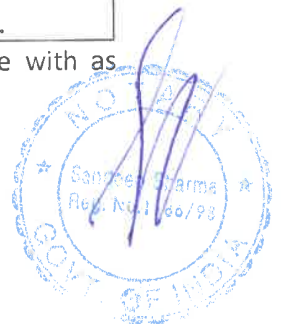
Sl no	Name of Department	Name of Committee Member
1.	One representative of member secretary, Central Pollution Control Board (CPCB).	Shri Ankur Tiwary, Scientist-E, Project office, CPCB, Agra.
2.	One representative of member secretary Uttar Pradesh Pollution Control Board.	Shri Vikash Mishra, Regional Officer, U.P. Pollution Control Ghaziabad.
3.	One representative of regional Office MOEF & CC Lucknow.	Dr. A.K Gupta, Additional Director/ scientist-E, MOEF & CC Lucknow.
4.	One representative of member secretary Uttar Pradesh State wetland Authority.	Divisional Forest Officer, Hapur.
5.	One representative of member secretary National wetland Authority.	Shri Pankaj Verma, Scientist-E (wetland Division), MOEF & CC, New Delhi.
6.	One representative of District Magistrate Ghaziabad.	Shri Chandresh Kumar, Deputy collector Ghaziabad. Smt. Lavi Tripathi, Sub Divisional Magistrate, Dhaulana, Hapur.

The copies of Nominated members of respective department is attached here with as Annexure-I.

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(Sandeep Sharma)
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Chaziabad (U.P.)



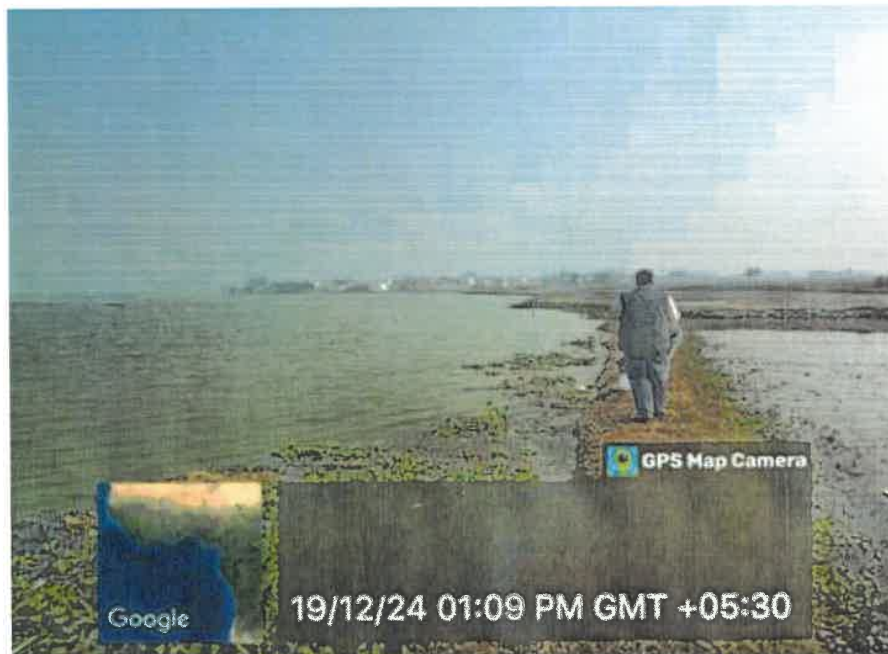
3- Sites visit of joint committee:-

In compliance of Hon'ble NGT order dated 19.09.2024 Regional Officer UPPCB Ghaziabad vide its letter dated 16.12.2024 in formed the joint committee members to gather at masurie-Gulawati Road industrial area Hapur for the site visit as scheduled on 19.12.2024 (the copy said letter is attached here with as Annexure-II). Accordingly Joint committee member were present at the said place and the joint committee visited the sites in question to ascertain the truthfulness of the allegations.

The joint committee perused the Hon'ble NGT order and noted the averments made by the applicant in Original Application no 1155/2024. The joint committee noted that applicant mainly alleges the pollution and encroachment on the Hasanpur-Lodha Wetland which according to the Inventoried in the National Wetland Inventory and Assessment Project (NWIA), NWIA was carried out by Space Applications Centre (SAC) Ahmedabad. The applicant has further alleged that the prohibited activities under Rule 4(1) of the Wetland Rules 2017 are being carried out

4- Observation of the site visit

1. The Hasanpur-Lodha Wetland is located 17km, east of District Headquarters Ghaziabad and surrounded by falling area in District Ghaziabad, Hapur and Gautambuddh Nagar. The Hasanpur-Lodha Wetland is a largest Wetland in NCR Delhi and known as Hasanpur lake. According to the document attached with original application with respect to national Wetland Inventory and Assessment in year 2017-18, the lake spreads over 115.03 Hectares. Photographs showing the Hasanpur Lake is given below:-



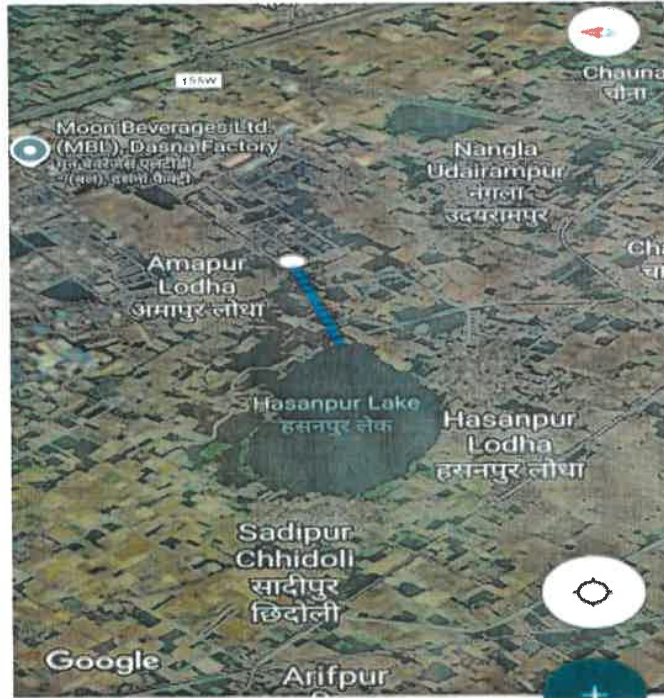
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(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Ghaziabad (U.P.)



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2. UP State Industrial Development Authority (UPSIDA), has developed an industrial area at Mossoourie -Gulawati road District Hapur (UP). The industrial area is in three phases. Mossoourie-Gulawati road divides the area in two part. One side phase-2, and other side phase-1, & phase-3. This industrial area is about 800 meter away to the Hasanpur-Lodha Wetland. Site photograph showing the location is given below:-



3. So far as the matter of original record indicating the area of wetland reflected is concerned, revenue officials during visit informed that in respect to Hasanpur lake situated on the border of District Ghaziabad, Hapur and Gautambuddh Nagar, the measurement and demarcation of the lake falling area in the Jurisdiction District Hapur had been carried out by revenue team on 21.02.2024 and the total area of lake falling in Hapur is about 37, Hectares. (The copy of said report is attached here with as **Annexure-III**). Further it was apprised to the joint committee that the revenue officials of District Ghaziabad, and Gautambuddh Nagar were not present on 21.02.2024 hence the measurement work of the entire lake could not be completed. Further discussion held with Sub Divisional Magistrate, Ghaziabad and Hapur it was apprised that area of Hasanpur Lake is not falling in the jurisdiction of District Ghaziabad.
4. The joint committee walked most of the accessible portion of the said area. Joint team observed that there are local Villages namely Hasanpur-Lodha and Shadipur Chhidoli along with boundary of the lake and domestic waste water coming from house hold is being poured in the lake.

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5. The joint committee visited the industrial area. The committee observed that there is a network of open drains in industrial area. UPSIDA has provisioned storm water drain network at the time of development of this industrial area. The old network is of brick work that deteriorated/ damaged with the time. So UPSIDA constructed RCC drains at selected stretches. Over all the existing storm water drain network is inadequate due to which the over flow of the industrial drains gets accumulated on vacant industrial land, green belt/ parks etc. Therefore a complete replacement of the existing drains with a new storm water drainage network is required. However outlet of industrial area is connected to Hasanpur drain near about 3.0 K.M. near Ganga Canal which eventually meets in Hindon River through kot Escape in Greater Noida.
6. The joint committee collected the water samples accumulated in park and deposited to the Regional Laboratory of UPPCB, Ghaziabad for analysis. The parameters of samples is tabulated below:

Sl.N	Sampling location	pH	colour	odour	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	UPSIDA Park No-6	6.80	Turbid	Faint	36.0	292.0	58.0
2.	UPSIDA Park No-4	6.61	Turbid	Faint	38.0	298.0	64.0

The flow is from the discharge of nearby villages, the B.O.D. of the sample analyzed is more than 30mg/l.

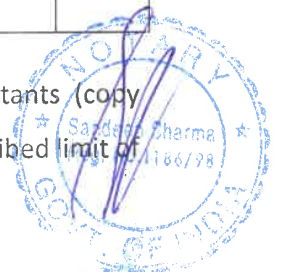
7. The joint committee collected the sample of Hasanpur Drain and deposited to the Regional Laboratory of UPPCB, Ghaziabad for analysis. The parameters of sample is tabulated below:-

Sr. N	Sampling location	pH	colour	odour	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	Hasanpur drain near the lake village Hasanpur-Lodha (Near origin point).	7.20	Turbid	Faint	14.40	242.0	58.0
2.	Industrial drain before confluence of Hasanpur Drain.	8.50	Turbid	Faint	54.0	321.0	120.0

Therefore, as per general standards for discharge of environmental pollutants (copy enclosed as Annexure-IV), the pH is within the limits i.e. 7.2-8.5 against prescribed limit of

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(Sandesh Sharma)
Reg. No. 1138/98
NOTARY PUBLIC
Ghaziabad (U.P.)



5.5-9. Further, B.O.D., C.O.D. and TSS of Hasanpur drain near the lake village Hasanpur-Lodha (near origin point) are within the prescribed limits of 30mg/l, 250 mg/l and 100 mg/l respectively, whereas, B.O.D., C.O.D. and TSS of Industrial drain before confluence of Hasanpur drain are exceeding the prescribed limits.

8. The joint team collected the water samples from the Hasanpur-Lake and deposited to the Regional Laboratory of UPPCB, Ghaziabad for analysis. The parameters of sample is tabulated below:-

Sr. No	Sampling location	pH	colour	odour	Dissolved Oxygen (D.O) Mg/l	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	Hasanpur Lake near village Hasanpur-Lodha.	7.2	Colour less	Odour less	7.30	3.0	26.0	34.0
2.	Hasanpur Lake towards industrial area.	7.40	Colour less	Odour less	7.20	3.1	28.0	36.0

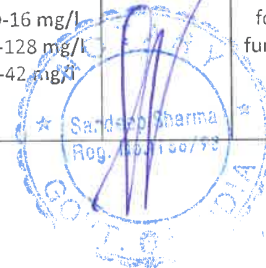
Therefore, as per primary water quality criteria [GSR 742 (E), dt. 25.09.2000, copy enclosed as **Annexure-V**], the pH is within the limits i.e. 7.2-7.4 against prescribed limit of 6.5-8.5; B.O.D. being 3mg/l of Hasanpur Lake near village Hasanpur-Lodha is within the limit whereas, B.O.D. being 3.1mg/l of Hasanpur Lake towards industrial area marginally exceeds the prescribed limit of 3mg/l. Further, D.O. at both the locations are as per standards.

9. The joint committee conducted the detailed survey of the area and no industrial waste water was found being discharged into Hasanpur Lake further during the survey no solid waste, C&D at waste etc. was found being disposed of in Hasanpur Lake.
10. The joint committee during visit observed that fish farming is being carried out in some area of the Hasanpur Lake by contractor.
11. According to original application 22 industries (Respondent No-17 to 38) are mentioned. The joint committee visited the industrial units (Respondent No-17, 19, 20, 21, 23, 25, 26, 28, 34 and 37). Observations made during visit and as per record of UPPCB of remaining industrial units, status is tabulated as below:-

S. No	Respondent No.	Name & address of the industries	Operational status	Nature of industry	Product	Effluent generation (KLD)	Treatment facility	Status of sample report	Status of CTO	Remark
1	17	Al Naved Exports Private Limited, C-5, UPSIDC Industrial Area, Massorie-Gulawathi Road,	Operational	Meat Processing	Frozen Meat 15 MT/day	Domestic-1.5 KLD Industrial-25 KLD	ETP Installed	pH-6.86 BOD-16 mg/l COD-128 mg/l TSS-42 mg/l	31.12.2027	ETP was found functional.

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NOTARY PUBLIC
Ghaziabad (U.P.)



		Hapur, Uttar Pradesh-201015								
2	18	Alien India Agro Food, Plot No. A-37, Massorie-Gulawathi Road Industrial Area, Hapur, Uttar Pradesh-201015	Operational	Bone Mill	MBM Crushed Bone Fish Meal Pet Food & Tallow	Domestic-0.6 KLD	Septic tank	-	31.12.2024	Industrial effluent is not generated.
3	19	Shri Rathi Steel Limited, Plot No. E & C 133-152. Phase-III, UPSIDC Industrial Area, Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Not Operational	Rolling Mill	RE-ROLLING OF TMT STEEL BARS (H.S.D.BAR) - Quantity 2000	Domestic-7.0 KLD	Septic tank	-	31.07.2027	At the time of inspection unit not operational due to own reason.
4	20	Space Chem, B-51-53, UPSIDC Industrial Area, Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Fabrication	SS & MS Steel Fabrication	Domestic-2.0 KLD	Septic tank	-	31.03.2025	Industrial effluent is not generated.
5	21	Gemak Engineering Solutions, Plot No. F-521, Phune 11, UPSIDC Industrial Area, Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Fabrication	MILK TANK, BULK MILK COOLER - 10 MT/Day (Fabrication process only)	Domestic-0.6 KLD	Septic tank	-	31.07.2027	Industrial effluent is not generated.
6	22	Centra Mack B-22/5, UPSIDC Industrial Area, Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Not Operational	Tyre Pyrolysis	Manufacturing Of Pyrolysis Oil-4.0 Mt/Day, Carbon Black-3.0 Mt/Day & Steel Wire-1.5 Mt/Day	Domestic-0.5 KLD Industrial-0.5 KLD	ETP installed	-	31.07.2027	At the time of inspection unit not operational due to own reason.
7	23	S.N. Chemicals, E-29-30, UPSIDC Industrial Area, Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Blending & Mixing	Industrial thinner through mixing process-5000 Ltr/Day	Domestic-0.5 KLD	Septic tank	-	31.07.2027	Industrial effluent is not generated.
8	24	Weedicide India, E-9, UPSIDC Industrial Arca Massorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Pesticides Formulati on	Pesticides Formulation	Domestic-0.6 KLD	Septic tank	-	31.07.2028	Industrial effluent is not generated.
9	25	Krishna Organics, D-6, UPSIDC Industrial Arco Mansorie-Gulawathi Rood, Hapur, Uttar Pradesh-201015	Operational	Blending & Mixing	Thinners-180 MT/month, Paints -100 MT/month	Domestic-0.6 KLD	Septic tank	-	31.07.2027	Industrial effluent is not generated.

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10	26	MGL Pharma & Chemicals Pvt. Ltd. F-665-666, Phase 1, UPSIDC Industrial Area, Mansoriz-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Pharmaceuticals	Bulk Drugs (Intermediate and API)-1.0 MT/Day	Domestic-1.5 KLD Industrial-4.5 KLD	ETP Installed	-	31.12.2025	-
11	27	RRK Polymers Private Limited, Khasra No. 328,329, 330, Upper Ganga Canal Rd. Ravali, Uttar Pradesh-201015	Operational	Plastic Processing	Mfg. of HDPE Cloths -100 MT/Month	Domestic-1.8KLD	Septic tank	-	31.07.2029	Industrial effluent is not generated.
12	28	Sukh Steel Private Limited, Plot No. D.N. 50 m 90, Phase-III UPSIDC Industrial Area, Masorie-Gulawathi Road, Hapur, Uttar Pradesh-201015	Operational	Industrial Packaging	Expanded polyethylene foam (EPF 500)	Domestic-1.6 KLD	Septic tank	-	31.07.2029	Industrial effluent is not generated.
13	29	KJS Concrete Pvt. Ltd. 1-1, Phase-1 HL UPSIOC Industrial Area. Masaorio-Culawathi Road, Hapur, Uttar Pradesh-201015	Operational	RMC	Cement Brick & Block 1800 Metric Tones/Day	Domestic-1.2 KLD	Septic tank	-	31.07.2027	Industrial effluent is not generated.
14	30	ASHTECH BUILDPRO INDIA PRIVATE LIMITED (MOD Crete Blocs AAC), Khasra No. 48-49, MG Road Industrial Area, Village Dehra, Tehsil Dhaulana NTPC Road, Hapur, Uttar Pradesh-243301	Operational	Flyash Bolck	AAC BLOCKS-15000 MT/month BLOCK JOINTINGADHESIVE600MT/month	Domestic-0.6 KLD	Septic tank	-	31.07.2025	Industrial effluent is not generated.
15	31	Ashtech Industries Pvt. Ltd. Khasra No. 233, Village Lakhan, NH-24, Near Jindal Nagar, Hapur-245101, Uttar Pradesh.	Operational	RMC	RMC-450 m ³ /day	Domestic-0.6 KLD	Septic tank	-	31.07.2025	Industrial effluent is not generated.
16	32	Hello Aromatics Private Limited, Khasra no 19, Gulawati Road, Masuri, Hapur-201015, Uttar Pradesh.	Operational	Aromatic Chemicals	L-CARVONE 12.75 MT/Month 2 CARVACAROL 9.60 MT/Month 3 Menthol 10.50 MT/Month 4 Menthone 10.50 MT/Month 5 Carvone 30.60	Domestic-0.4 KLD	Septic tank	-	31.07.2028	Industrial effluent is not generated.

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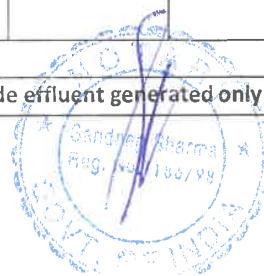
17	33	Shiv Shankar Industries, Khasra No. 293m, Hasanpur Road, Dinanathpur Puthi, Ghaziabad-201015, Uttar Pradesh	Operational	Casting	Aluminum Casting - 500 KG/DAY, Copper Casting-350 KG/Day, Zinc Casting - 200 KG/day, Brass-350 KG/Day, Plastic Granule-2.5 MT/Day & C.I. Mould/C.I. Casting - 400 KG/Day	Domestic-1.5 KLD	Septic tank	-	31.07.2028	Industrial effluent is not generated.
18	34	Moon Beverages Private Limited, 5th Km milestone. Masuri Gulanthi Road, Dasna, Tehsil Dhaulana, Hapur-201015	Operational	Beverages	Juice 27358.6 MT/Month 2 Carbonated Soft Drink 78179 MT/Month 3 Packaging Drinking Water 20987 MT/Month 4 BIB(Synthetic Syrup) 558 MT/Month 5 Pet Preform 300	Domestic - 0.5 KLD Industrial - 1 KLD	ETP Installed	pH-7.59 BOD-18 COD-156 TSS-72	31.12.2026	ETP was found functional.
19	35	Golden Feeds Industries, -278-279, Massorie-Gulawathi Road Industrial Area, Hapur, Uttar Pradesh-201015	Operational	POULTRY FEED	POULTRY FEED (MIXING & GRINDING PROCESS) 9.5 MT/Day 2 OMASSUM (COLD STORAGE) 26	Domestic - 0.8	Septic tank	-	31.07.2028	Industrial effluent is not generated.
20	36	Vision Resins and Resol Pvt. Ltd. F-273-274, UPSIDC Industrial Ar Massorie-Gulawathi Road, Hapur, Uttar Pradesh-245101	Operational	Blending & Mixing	Phenolic Resins 180 MT/Month	Domestic 0.6 KLD Septic Tank Industrial 0.5 KLD	Septic tank	-	31.07.2025	Industrial effluent is not generated.
21	37	Shri Krishna Chemicals F-451-452, Matsorie-Gulawathi Road Industrial Aena, Hapur, Uttar Pradesh-245101	Operational	Blending & Mixing	CARVONE 30 MT/Month 2 META CRESOL 100 MT/Month 3 BUTYLATED HYDROXY TOLUENE 250 MT/Month 4 RESIDUE 60 MT/Month 5 CARVACROL 30 MT/Month CRESOL 30	Domestic-2 Industrial-1	ETP Installed	-	31.07.2029	-
22	38	VDH Chemtech Private Limited, H-127-144, Masserie-Gulawathi Road Industrial Area, Hapur, Uttar Pradesh-245101	Operational	Blending & Mixing	Meta Cresol 30 MT/Month 2 Para Cresol 30 MT/Month 3 Butylated Hydroxy Toluene 30 MT/Month 4 Residue 30	Domestic - 0.5 Industrial-1	ETP Installed	-	31.7.2025	-

Total Industrial Discharge 33.5 KLD

As per above table it is clear that, industries mentioned in OA as respondent No. 17 to 38, trade effluent generated only 33.5 KLD.

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12. Joint committee also observed that in proximity to the Hasanpur Lake the developers/builders has constructed the boundary wall. However, no construction activities were found being carried out.

5- Conclusion

1. The Hasanpur Lodha wetland (herein after referred to as Hasanpur Lake), is surrounded by District Ghaziabad, Hapur and Gautam buddh Nagar.
2. The measurement and demarcation of the Hasanpur Lake falling area in District Hapur had been carried out by revenue department and a report in this regard also has been received. However the report in respect to measurement and demarcation of the entire Hasanpur Lake has not received.
3. The joint team observed that the existing storm water drain network in industrial area is inadequate, therefore a complete replacement of existing drains with a new storm water drainage network is required.
4. The joint team observed that no industrial waste water, C&D waste, solid waste etc. were found being disposed of in Hasanpur Lake.

6- Recommendation

Considering the above facts, the joint committee is of the view the following recommendations:

1. The concerned authority, District Administration, GautamBudh Nagar may be directed to complete the measurement and demarcation of the Hasanpur Lake so that original record indicating the area of wetland and existing area to the extent to the encroachment could be ascertained.
2. UPSIDA may be directed to ensure the complete replacement of existing drains network with a new storm water drainage network show that no water logging takes place in the said area and drainage can flow normally.
3. Ministry of Environment, Forest and Climate Change (Wetland division), New Delhi has issued office memorandum dated 08.03.2022 for the protection of wetlands as per rule 4 of the wetlands (Conservation and Management) Rules, 2017. In view of above the said area of Hasanpur Lake should be notified so that the prohibited activities under rule 4(2) of wetland rules 2017 can regulated.
4. Untreated domestic waste water coming from nearby villages should be diverted.
5. Photographs taken during visit as below:-



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The above report of joint committee in the said matter may kindly be taken on record.





Inspection team:-

Sr. No.	Name & Designation of officials	Signature
1-	Shri Pramod Kumar, Divisional Forest Officer, Hapur.	
2-	Shri Chandresh Kumar, Deputy collector Ghaziabad.	
3-	Smt. Lavi Tripathi, Sub Divisional Magistrate, Dhaulana, Hapur.	

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4-	Shri Ankur Tiwary, Scientist-E, Project office, CPCB, Agra.	
5-	Dr. A.K Gupta, Additional Director/ scientist-E, MOEF & CC Lucknow.	
6-	Shri Pankaj Verma, Scientist-E (wetland Division), MOEF & CC, New Delhi.	
7-	Shri Vipul Kumar, A.E.E., U.P. Pollution Control Ghaziabad.	

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Report on
**Hydraulic & Structural Design of RCC Storm
Drain Work in the Industrial Area, MG Road,
District Hapur**

submitted to

DGM (Civil) Construction Division I, UPSIDA, Ghaziabad

by

Prof B R Chahar

Prof K N Jha



**Department of Civil Engineering
Indian Institute of Technology Delhi
Hauz Khas, New Delhi 110 016**

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Background & Status of the Existing Drain Network

UPSIDA has developed an industrial area at Masuri Gulawathi Road, District Hapur (UP). The total area of this industrial area is about 935 Acres in three phases. Masuri Gulawathi Road divides the area into two parts, one side Phase 2 and other side Phase 1 and Phase 3 as shown in Fig 1 (Google Earth Image).

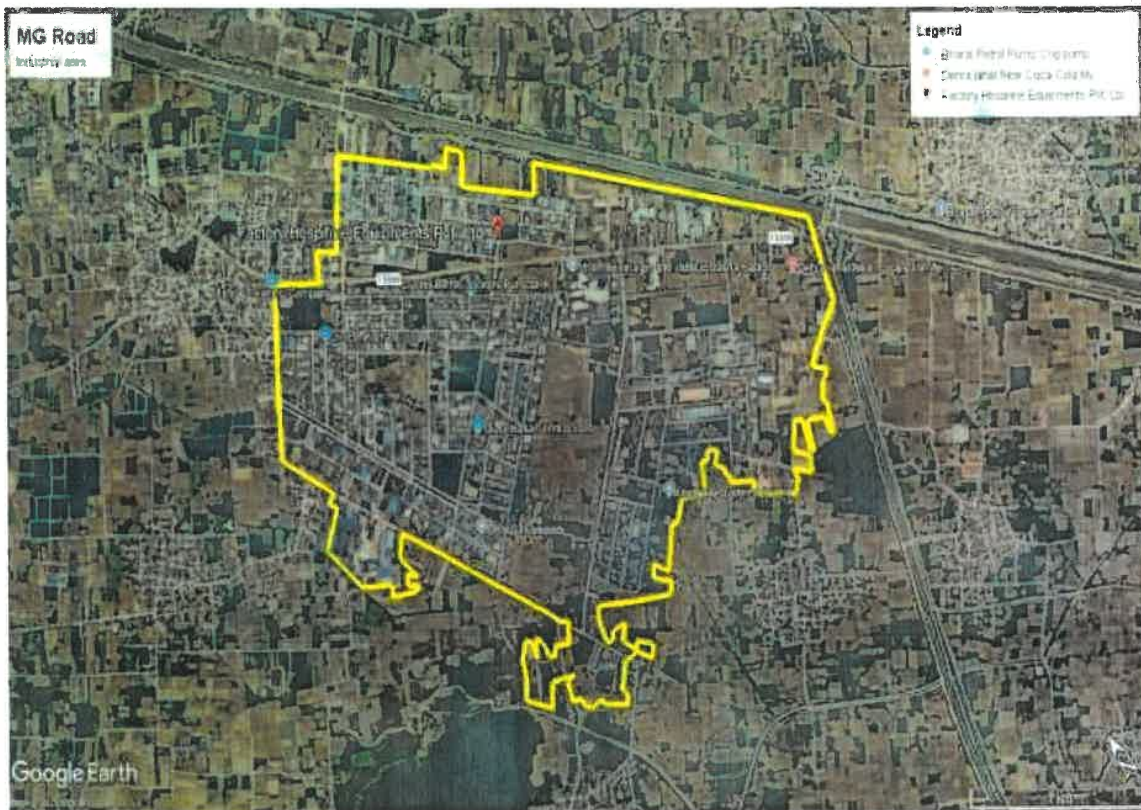


Fig 1: Google Earth Image of Industrial Area, MG Road

Majority of plots have been occupied by well-developed industries as shown in Fig. 2 a & b (Google Earth Image).

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Fig. 2: Google Earth Image of the current development status of industrial plots

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UPSIDA had provisioned storm drain network at the time of development of this industrial area. The old storm network is of brick work that deteriorated/damaged with time, so UPSIDA constructed RCC drains at selected stretches. To assess the status of the existing storm drain network, detailed surveying and photography along with site visits have been carried out. Selected photos showing the current status are included as Appendix 1. The following table summarizes the details.

Table 1: Summary of drain conditions on various roads

S. No.	Road Mark	Location Mark	Remarks
Phase 2			
1	Road 11	P2	The side drain is covered with vegetation at this location.
2	Road 12	P3	The drain is flowing but blocked at the culvert point and at the junctions.
3	Road 13	P4	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
4	Road 14	P21	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
5	Road 15	P19	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
6	Road 16	P18, P14	The drains at this road are one side of the drains is covered with vegetation, and the other side is a brick lane but damaged. At P18, one side of the culvert is blocked with vegetation.
7	Road 17	P13, P10	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
8	Road 18	P5	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).

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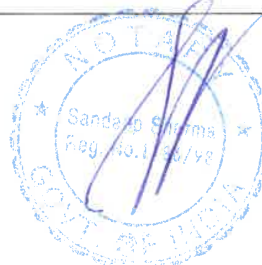


9	Road 1	P1-P5	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
10	Road 2	P23, P10, P9	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
11	Road 3	P11	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
12	Road 4	P12, P19, P20, P21, P22	The sides of the drains are covered with vegetation. At few locations the sides are totally damaged. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
13	Road 5	P17, P18	The sides of the drains are covered with vegetation. The flow of drainage is blocked at one side of the culvert due to over-vegetation.
14	Road 6	P13-P16	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
Phase 3			
15	Road 1	P24, P25, P26, P29, P44, P45, P46, P52, P56	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste)..
16	Road 2	P47	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
17	Road 3	P48, P51	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
18	Road 4	P49, P50, P35, P31, P32, P33, P34	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
19	Road 8	P30, P39	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.

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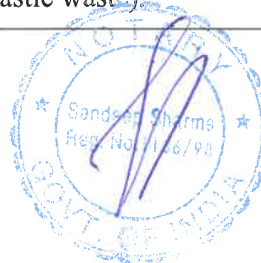


20	Road 11	P41, P42, P43	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
21	Road 13	P34, P36, P37	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
22	Road 14	P33	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
23	Road 16	P29, P30	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
24	Road 17	P26, P28	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
25	Road 18	P25, P27	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
Phase 1			
26	Road 4	P54-P64	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
27	Road 5	P92, P93, P96, P97, P98	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
28	Road 6	P87, P86, P88, P89, P108, P109, P110, P111, P105, P104, P103, P65, P66, P112	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
29	Road 7	P85, P67	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
30	Road 1	P56, P57, P89, P90, P84, P83, P77, P75	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
31	Road 2	P76, P77, P70, P69, P102, P104	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).

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32	Road 11	P74, P72, P69, P101, P68, P100	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.
33	Road 10	P76, P75	The sides of the drains are covered with vegetation. The flow of drainage is blocked due to the accumulation of waste (plastic waste).
34	Road 29	P80, P79	The sides of the drain are damaged and covered with vegetation. And it is blocked at the culvert.
35	Road 26	P106, P107	The sides of the drains are totally damaged and covered with plant vegetation. And the culverts are blocked.

The surveying, photography and site visits established that

- The existing storm drain network is in dilapidated state.
- Culverts and drains are damaged at many places.
- Many drains look like kachha drains, choked, full of trashes and stagnated water.
- Water logging is present at some places including behind site office and central verge of main road along HTL.
- Connectivity of drains are missing at several places.
- MG road divides the area into two parts and the runoff is to be carried into a nallah near the upper Ganga canal, so the storm runoff generated from the area located one side of the MG road is to be carried through culvert under the road to the outfall on other side of the road.

Overall, the existing storm drain network is non-functional so the industrial area is facing problems of frequent water logging and flooding, which is resulting into inconvenience and unhealthy surrounding environment as well as affecting the functioning and productivity of industries leading to huge losses. Therefore, a complete replacement of the existing drains with a new storm water drainage network is required.

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Scope of Work

Office of DGM (Civil), Construction Div – I, UPSIDA, Ghaziabad, henceforth referred to as the Client, approached IIT Delhi for the design of a storm drain network in the Industrial area of MG road, District Hapur, UP. A team of experts in Water Resources Engineering and Structural Engineering comprising Prof. B R Chahar and Prof K N Jha, Department of Civil Engineering, IIT Delhi, carried out this design work. Since, at present the existing drainage system is not functional in the scheme area, this work aimed to design a RCC storm drainage system of the MG road industrial area. The agreed scope of the work was limited to

1. Surveying of the Area
2. Layout plan of storm drains
3. Hydraulic design of storm drain system
4. Structural design of drains and culverts
5. Cost estimate of the work

For ease of construction (in situ as well as precast) and maintenance, all drains have to be taken as rectangular shape. Rectangular drain sections having minimum width as 45 cm and the minimum depth as 30 cm have to be adopted for the drains. Also a plot of about 51 hectares between Phase 1 and Phase 3 is under litigation, so the main drain cannot pass through it and to be routed along its periphery. All drains and culverts have to be adopted of precast RCC for better performance, quality, and durability. There are a number of options available in precast construction of drains. One of the possible option is attached in Appendix 2.

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Surveying of Area

To carry out a detailed survey of the area services of M/s Habib Survey & Design Pvt Ltd was hired. They conducted detailed surveying using DGPS and captured various information to prepare different layers in AutoCAD drawings. They have submitted the following

1. Scheme layout plan (A0 size print out submitted separately with the report)
2. AutoCAD files with different information in various layers (softcopy - mailed)

Basic Inputs for Hydraulic Design

1. Scheme layout plan prepared by Habib Survey & Design Pvt Ltd after detailed surveying of the project area.
2. Site visits and meetings on several occasions.
3. Approximate road patri levels, Section of Nala, culvert section & IL etc. captured from the surveying done by Habib Survey & Design Pvt Ltd using DGPS.
4. Rainfall intensity $i = 13$ mm/hr as recommended by the Client according to their master plan.
5. Runoff coefficient $C = 0.65$.
6. Manning's $n = 0.012$ for cement plaster/RCC finish.
7. Minor head losses at bends and junctions are neglected.
8. Runoff contributing area of the plot under litigation and few plots on the periphery of scheme are considered.
9. Outfall into the Udairampur drain, maintained by UP Irrigation Department. The client confirmed the RLs of bed level and HFL of Udairampur drain as 208.75 m and 209.40 m, respectively at the location of the industrial area drain outfall.

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Hydraulic Design of Storm Drain Network

Layout of Drains

The storm water drains are to be aligned both sides along the main roads. MG Road divides the area into two parts, so the storm runoff generated from the area located one side of the road is to be carried through a culvert under the road to the outfall on other side of the road. Also the main drain cannot pass through the plot under litigation between Phase 1 and Phase 3, so it has to be routed along its periphery. Using trial and error method, drain slopes and starting IL have been adopted to ensure that (1) velocities in drains are maximum, (2) excavation for drains are minimum, and (3) raising of road patri levels are minimum. The final proposed layout plan of proposed drain network is as per the drawing annexed with this report.

Hydraulic design of drains

Runoff computation by rational formula ($Q = CiA$) has been done considering rainfall intensity $i = 13$ mm/hr as recommended the Client according to their master plan. Hence, actual estimation of time of concentration for the catchment and analysis of rainfall for critical return period of rainfall intensity of time of concentration has not been warranted. There may be requirement of rainwater harvesting adaptation by the developers, but runoff coefficient $C = 0.65$ has been adopted so as to be on safer side due to efficacy of the implementation and subsequent performance of such rainwater harvesting measures. Runoff contributing area (A) for the each drain has been computed using AutoCAD layout plan of the scheme. The total discharge for the peak runoff generated from the entire scheme came out as $8.878 \text{ m}^3/\text{s} = 313.516$ cusec.

Manning's formula ($Q = \frac{1}{n} a^{5/3} p^{-2/3} S^{1/2}$) has been adopted for hydraulic calculations and arriving at drain sizing. Where n is Manning's roughness coefficient; a is flow area of drain; p is wetted perimeter of drain; and S is bed slope of drain. For ease of construction (in situ as well as precast) and maintenance all drains have been taken as rectangular shape. Rectangular drain

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sections having Manning's $n = 0.012$ (cement plaster/RCC finish) and the minimum width as 45 cm and the minimum depth as 30 cm have been adopted for the drain.

Excel sheet calculations have been undertaken for various calculations. Steady state flow depths in different drains based on Manning's equation have been computed using "Goal Seek/Solver Function", and then actual flow area and velocity have been computed. Then the invert level at head and tail of each drain has been computed. A suitable free board has been added over the flow depth to get the total depth hence size of the drain. Finally, the minimum patri level is invert level plus total depth of the drain. Using trial and error method, drain slopes and starting IL have been adopted to have velocities in drains maximum, excavation for drains minimum, and raising of road patri levels minimum.

Table 2 lists the start and end of drain node, drain length, adopted bed slope, drain sizing, drain type, and flow velocity. Table 2 also tabulates the IL as well as full supply level (FSL) at head and tail of each drain and approximate road patri levels. Junction between two drains and transition between two drain sections should be carefully implemented. **The final drain network flow diagram is as per the A0 size drawing sheet submitted with this report.**

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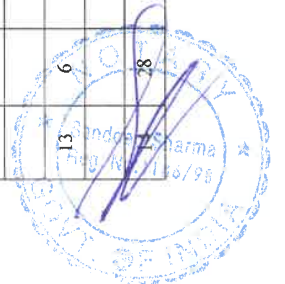
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Table 2: Hydraulic calculations for drain sizing, flow velocity and FSL & IL at head and tail of each drain

Drain No	Drain		Drain/cutvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
1	9	8	D1	85	6637.20	0.015579	500	0.144	0.45	0.065	0.240	212.900	212.730	213.044	212.874	15.55	0.30	213.352	213.801
2	8	12	D1	375	18573.00	0.043595	750	0.184	0.45	0.083	0.527	212.691	212.191	212.874	212.374	11.61	0.30	213.801	213.570
3	9	11	D1	375	11935.80	0.028016	750	0.161	0.45	0.072	0.388	212.900	212.400	213.061	212.561	13.94	0.30	213.352	213.524
4	11	12	D1	81	18541.00	0.043520	750	0.184	0.45	0.083	0.526	212.377	212.269	212.561	212.453	11.62	0.30	213.524	213.570
5	6	7	D1	84	6726.80	0.015789	500	0.135	0.45	0.061	0.261	213.250	213.082	213.385	213.217	16.54	0.30	213.811	213.753
6	7	13	D1	375	18809.00	0.044149	500	0.169	0.45	0.076	0.581	213.048	212.298	213.217	212.467	13.13	0.30	213.753	213.732
7	29	18	D1	198	5161.20	0.012114	500	0.122	0.45	0.055	0.221	213.250	212.854	213.372	212.976	17.82	0.30	213.753	213.723
8	29	30	D1	63	2888.80	0.006781	500	0.098	0.45	0.044	0.154	213.250	213.124	213.348	213.222	20.20	0.30	213.753	213.693
9	30	17	D1	198	8050.00	0.018895	500	0.144	0.45	0.065	0.292	213.078	212.682	213.222	212.826	15.61	0.30	213.693	213.815
10	31	16	D1	198	5140.20	0.012065	500	0.122	0.45	0.055	0.220	213.300	212.904	213.422	213.026	17.83	0.30	213.791	213.792
11	31	32	D1	63	2874.80	0.006748	500	0.098	0.45	0.044	0.153	213.300	213.174	213.398	213.272	20.22	0.30	213.791	213.714
12	32	15	D1	198	8015.00	0.018813	500	0.144	0.45	0.065	0.291	213.128	212.732	213.272	212.876	15.63	0.30	213.714	213.626
13	6	14	D1	375	12082.20	0.028360	500	0.149	0.45	0.067	0.422	213.300	212.550	213.449	212.699	15.08	0.30	213.811	213.722
14	18	27	D1	63	2900.20	0.006807	750	0.098	0.45	0.044	0.154	213.300	213.216	213.398	213.314	20.18	0.30	213.726	213.625

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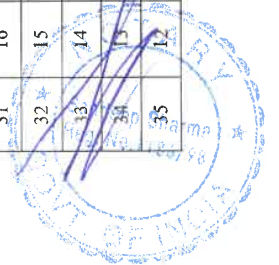
(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chandabadi (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
15	27	20	D1	199	8086.50	0.018981	750	0.144	0.45	0.065	0.293	213.170	212.905	213.314	213.049	15.58	0.30	213.625	213.628
16	28	19	D1	199	5186.30	0.012173	500	0.122	0.45	0.055	0.222	213.350	212.952	213.472	213.074	17.79	0.30	213.768	213.726
17	25	22	D1	198	5143.50	0.012073	750	0.122	0.45	0.055	0.220	213.400	213.136	213.522	213.258	17.83	0.30	213.835	213.647
18	25	26	D1	61	2861.00	0.006715	1000	0.098	0.45	0.044	0.153	213.300	213.239	213.398	213.337	20.23	0.30	213.835	213.551
19	26	21	D1	198	8004.50	0.018788	1000	0.144	0.45	0.065	0.291	213.193	212.995	213.337	213.139	15.64	0.30	213.551	213.505
20	4	24	D1	63	2877.80	0.006755	1000	0.106	0.45	0.048	0.142	213.300	213.237	213.406	213.343	19.44	0.30	213.489	213.915
21	24	23	D1	198	8022.50	0.018831	1000	0.155	0.45	0.070	0.270	213.187	212.989	213.343	213.145	14.49	0.30	213.915	213.769
22	4	5	D1	196	5128.70	0.012038	750	0.122	0.45	0.055	0.220	213.350	213.089	213.472	213.210	17.84	0.30	213.899	213.799
23	5	23	D1	63	8006.50	0.018793	750	0.144	0.45	0.065	0.291	213.067	212.983	213.210	213.126	15.63	0.30	213.799	213.769
24	23	22	C1	16	16029.00	0.037624	750	0.169	0.45	0.076	0.496	212.958	212.936	213.126	213.105	13.15	0.30	213.769	213.647
25	21	21	D1	64	24057.50	0.056468	750	0.204	0.45	0.092	0.614	212.900	212.815	213.105	213.020	9.55	0.30	213.647	213.505
26	21	20	C2	16	32062.00	0.073257	750	0.243	0.45	0.109	0.688	212.777	212.755	213.020	212.998	20.71	0.45	213.505	213.628
27	20	19	D4	63	43048.70	0.101045	750	0.223	0.60	0.134	0.755	212.755	212.671	212.978	212.894	22.69	0.45	213.628	213.768
28	19	18	C4	16	48235.00	0.113218	750	0.241	0.60	0.144	0.784	212.654	212.632	212.894	212.873	20.93	0.45	213.768	213.723
29	18	17	D4	63	56285.00	0.132113	750	0.269	0.60	0.161	0.820	212.605	212.521	212.873	212.789	18.14	0.45	213.723	213.815
30	17	16	C4	16	64335.00	0.151009	750	0.293	0.60	0.176	0.859	212.496	212.475	212.789	212.768	15.71	0.45	213.815	213.792
31	16	15	D7	63	72350.00	0.169822	1000	0.289	0.75	0.217	0.784	212.475	212.412	212.764	212.701	16.12	0.45	213.792	213.626
32	15	14	C7	16	80365.00	0.188635	1000	0.311	0.75	0.234	0.807	212.389	212.373	212.701	212.685	13.85	0.45	213.626	213.722
33	14	13	D8	83	99166.00	0.232765	1000	0.363	0.75	0.272	0.855	212.322	212.239	212.685	212.602	23.69	0.60	213.722	213.732
34	13	12	C9	16	117975.00	0.276914	1000	0.347	0.90	0.312	0.888	212.239	212.223	212.585	212.569	25.34	0.60	213.732	213.570
35	12	36A	C9	16	155089.00	0.364028	1000	0.424	0.90	0.381	0.955	212.146	212.130	212.569	212.553	17.64	0.60	213.570	213.535

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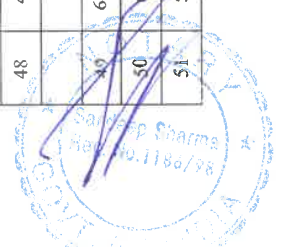
(Gandega Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
36	312	55	D1	105	5497.50	0.012904	500	0.135	0.45	0.061	0.213	212.750	212.540	212.885	212.675	16.54	0.30	213.257	213.405
37	51	52	D1	50	1447.00	0.003396	500	0.076	0.45	0.034	0.100	213.000	212.900	213.076	212.976	22.44	0.30	214.061	213.313
38	50	50a	D1	50	1447.00	0.003396	500	0.076	0.45	0.034	0.100	213.000	212.900	213.076	212.976	22.44	0.30	214.061	213.313
39	61	56A	D1	385	11903.60	0.027940	500	0.160	0.45	0.072	0.389	212.750	211.980	212.910	212.140	14.03	0.30	213.245	213.199
40	56A	55A	D4	20	69297.10	0.162656	500	0.270	0.60	0.162	1.005	211.870	211.830	212.140	212.100	18.04	0.45	213.199	213.405
41	48	59	D1	64	3807.00	0.008936	500	0.157	0.45	0.071	0.127	213.000	212.872	213.157	213.029	14.32	0.30	213.562	213.507
42	59	53	D1	273	10933.50	0.025663	500	0.161	0.45	0.072	0.355	212.868	212.322	213.029	212.483	13.92	0.30	213.507	213.399
43	58	54	D1	273	7139.70	0.016758	500	0.155	0.45	0.070	0.241	212.950	212.404	213.105	212.559	14.52	0.30	213.637	213.209
44	58	57	D2	64	3815.80	0.008957	500	0.150	0.45	0.068	0.132	212.950	212.822	213.100	212.972	29.97	0.45	213.637	213.418
45	46	65A	D1	163	4922.50	0.011554	500	0.117	0.45	0.053	0.219	212.900	212.574	213.017	212.691	18.29	0.30	213.476	213.451
46	65A	61	C1	16	4922.50	0.011554	500	0.155	0.45	0.070	0.166	212.536	212.504	212.691	212.659	14.50	0.30	213.451	213.245
47	61	62	D1	83	7792.40	0.018290	500	0.148	0.45	0.067	0.274	212.504	212.338	212.653	212.487	15.15	0.30	213.245	213.656
48	47	60	D1	145	4778.50	0.011216	500	0.117	0.45	0.053	0.213	213.250	212.960	213.367	213.077	18.28	0.30	213.789	213.475
49	65A	60	D1	103	4442.50	0.010428	500	0.155	0.45	0.070	0.149	213.000	212.794	213.155	212.949	14.49	0.30	213.451	213.475
50	60	57	C1	16	9221.00	0.021644	500	0.115	0.45	0.052	0.418	212.794	212.762	212.909	212.877	18.50	0.30	213.475	213.421
51	57	56	D1	273	20176.50	0.047359	750	0.185	0.45	0.083	0.569	212.692	212.328	212.877	212.513	11.51	0.30	213.421	213.189

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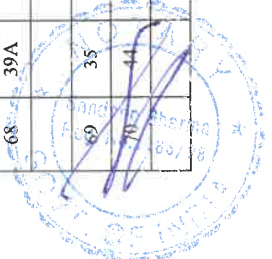
(Sanjeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chazlabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
52	46	47	D1	101	4426.50	0.010390	500	0.118	0.45	0.053	0.195	213.000	212.798	213.118	212.916	18.16	0.30	213.476	213.789
53	47	48	C1	16	4426.50	0.010390	500	0.155	0.45	0.070	0.149	212.761	212.729	212.916	212.884	14.49	0.30	213.789	213.562
54	48	49	D1	273	11553.00	0.027117	750	0.115	0.45	0.052	0.524	212.729	212.365	212.844	212.480	18.50	0.30	213.562	213.458
55	49	53	D1	62	15344.00	0.036016	750	0.163	0.45	0.074	0.490	212.317	212.234	212.480	212.398	13.65	0.30	213.458	213.428
56	53	54	C2	16	26277.50	0.061679	1000	0.234	0.45	0.105	0.585	212.246	212.230	212.480	212.464	21.56	0.45	213.428	213.209
57	54	56	D4	62	37217.00	0.087357	1000	0.223	0.60	0.134	0.652	212.174	212.112	212.398	212.336	22.67	0.45	213.209	213.189
58	56	56A	C4	16	57393.50	0.134715	1000	0.303	0.60	0.182	0.741	212.161	212.145	212.464	212.448	14.70	0.45	213.189	213.189
59	43	42	D1	84	5565.80	0.013064	750	0.125	0.45	0.056	0.232	212.950	212.838	213.075	212.963	17.47	0.30	213.414	213.459
60	42	42A	D1	151	10444.15	0.024515	750	0.159	0.45	0.071	0.343	212.805	212.603	212.963	212.762	14.13	0.30	213.459	213.261
61	42A	67	D1	151	15322.50	0.035965	1000	0.181	0.45	0.081	0.443	212.581	212.430	212.762	212.611	11.94	0.30	213.261	213.402
62	41	41A	D1	151	4006.85	0.009405	500	0.111	0.45	0.050	0.189	212.900	212.598	213.011	212.709	18.92	0.30	213.375	213.716
63	41A	66	D1	151	8013.70	0.018810	750	0.144	0.45	0.065	0.291	212.565	212.364	212.709	212.507	15.63	0.30	213.716	213.474
64	41	40	D1	62	4227.80	0.009924	500	0.113	0.45	0.051	0.195	212.900	212.776	213.013	212.889	18.69	0.30	213.375	213.646
65	40	40A	D1	151	8234.65	0.019329	750	0.145	0.45	0.065	0.296	212.744	212.543	212.889	212.688	15.48	0.30	213.646	213.717
66	40A	65	D1	151	12241.50	0.028734	750	0.167	0.45	0.075	0.383	212.521	212.320	212.688	212.486	13.32	0.30	213.717	213.475
67	39	39A	D1	149	3877.00	0.009100	500	0.109	0.45	0.049	0.185	213.000	212.702	213.109	212.811	19.06	0.30	213.418	213.775
68	39A	64	D1	149	7754.00	0.018200	500	0.142	0.45	0.064	0.285	212.670	212.372	212.811	212.513	15.81	0.30	213.775	213.110
69	35	44	D1	118	6244.60	0.014657	500	0.131	0.45	0.059	0.249	213.250	213.014	213.381	213.145	16.91	0.30	213.802	213.524
70	41	37	D1	240	15980.50	0.037510	750	0.168	0.45	0.076	0.495	212.977	212.657	213.145	212.825	13.17	0.30	213.524	213.457

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(Sanjeev Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			FB (cm)	d = y+FB
71	39	38	D1	64	4092.00	0.009605	500	0.112	0.45	0.050	0.191	212.900	212.772	213.012	212.884	18.83	0.30	213.418	213.658
72	43	43A	D1	151	4878.35	0.011451	500	0.119	0.45	0.054	0.213	212.900	212.598	213.019	212.717	18.07	0.30	213.414	213.618
73	43A	45	D1	151	9756.70	0.022901	500	0.155	0.45	0.070	0.329	212.563	212.261	212.717	212.415	14.53	0.30	213.792	213.716
74	45	67	D1	84	15322.50	0.035965	750	0.169	0.45	0.076	0.474	212.247	212.135	212.415	212.303	13.15	0.30	213.716	213.402
75	67	66	C1	16	30645.00	0.071931	750	0.214	0.45	0.096	0.748	212.090	212.068	212.303	212.282	8.63	0.30	213.402	213.474
76	66	65	D4	62	42886.50	0.100664	750	0.223	0.60	0.134	0.754	212.059	211.977	212.282	212.199	22.75	0.45	213.474	213.475
77	65	64	C4	16	55128.00	0.129398	750	0.260	0.60	0.156	0.829	211.939	211.918	212.199	212.178	18.98	0.45	213.475	213.110
78	64	63	D4	64	66974.00	0.157203	1000	0.338	0.60	0.203	0.776	211.840	211.776	212.178	212.114	11.22	0.45	213.110	213.408
79	63	63A	C8	16	111402.00	0.261485	1000	0.396	0.75	0.297	0.880	211.718	211.702	212.114	212.098	20.38	0.60	213.408	213.408
80	9B	9A	D1	67	4395.80	0.010318	1500	0.124	0.45	0.056	0.185	212.800	212.755	212.924	212.879	17.62	0.30	213.339	213.412
81	10A	10	D1	50	1725.00	0.004049	1500	0.087	0.45	0.039	0.103	212.900	212.867	212.987	212.954	21.28	0.30	214.023	213.487
82	10	10B	D1	67	3725.00	0.008743	1500	0.116	0.45	0.052	0.167	212.837	212.793	212.954	212.909	18.37	0.30	213.487	213.487
83	2	3	D1	60	2799.40	0.006571	750	0.097	0.45	0.044	0.151	213.250	213.170	213.347	213.267	20.31	0.30	213.737	213.928
84	3	3A	D1	236	16033.40	0.037634	750	0.169	0.45	0.076	0.496	213.098	212.784	213.267	212.952	13.15	0.30	213.928	213.735
85	3A	33	D1	157	26818.40	0.062949	1000	0.226	0.45	0.102	0.619	212.726	212.569	212.952	212.795	7.40	0.30	213.735	213.759
86	33	34	D3	60	36827.40	0.086442	1000	0.222	0.60	0.133	0.650	212.569	212.509	212.791	212.731	7.85	0.30	213.759	214.080
87	34	34A	D4	283	50309.40	0.118087	1000	0.275	0.60	0.165	0.716	212.456	212.173	212.731	212.448	17.51	0.45	214.040	214.080
88	34A	46A	D4	170	55584.40	0.130469	1000	0.293	0.60	0.176	0.742	212.155	211.985	212.448	212.278	15.71	0.45	214.080	213.833
89	46A	50A	D4	116	60427.40	0.141837	1000	0.312	0.60	0.187	0.758	211.966	211.850	212.278	212.162	13.82	0.45	213.833	213.794
90	50A	50a	D7	283	79577.40	0.186786	1000	0.308	0.75	0.231	0.808	211.850	211.567	212.158	211.875	14.18	0.45	213.794	214.726
91	50a	52	C7	16	81024.40	0.190182	1000	0.313	0.75	0.235	0.809	211.562	211.546	211.875	211.859	13.66	0.45	214.726	213.313
92	52	55	D7	157	89431.90	0.209917	1000	0.336	0.75	0.252	0.833	211.523	211.366	211.859	211.702	11.39	0.45	213.313	213.405

09 JAN 2025

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
93	35	36	D2	322	10526.90	0.024709	500	0.151	0.45	0.068	0.365	213.200	212.556	213.351	212.707	29.94	0.45	213.802	213.640
94	36	37	D2	108	16601.50	0.038967	750	0.175	0.45	0.079	0.495	212.532	212.388	212.707	212.563	27.52	0.45	213.640	213.457
95	37	38	C2	16	32582.00	0.070477	750	0.224	0.45	0.101	0.760	212.339	212.318	212.563	212.541	22.64	0.45	213.457	213.658
96	38	38A	D4	149	40551.00	0.095182	1000	0.236	0.60	0.142	0.673	212.305	212.156	212.541	212.392	21.42	0.45	213.658	213.611
97	38A	63	D5	149	44428.00	0.104282	1000	0.252	0.60	0.151	0.690	212.140	211.991	212.392	212.243	34.81	0.60	213.611	213.408
98	1	10B	D4	475	35058.00	0.082289	1000	0.214	0.60	0.128	0.642	213.100	212.625	213.314	212.839	23.62	0.45	213.751	213.487
99	10B	9A	C4	21	38951.00	0.091427	1000	0.229	0.60	0.137	0.665	212.610	212.589	212.839	212.818	22.09	0.45	213.487	213.339
100	9A	11B	D4	267	57062.20	0.133938	1000	0.301	0.60	0.181	0.741	212.516	212.249	212.818	212.551	14.87	0.45	213.412	213.215
101	11B	36B	D4	92	61418.00	0.144162	1000	0.316	0.60	0.190	0.761	212.235	212.143	212.551	212.459	13.41	0.45	213.215	213.473
102	36B	36A	D7	114	67293.80	0.157954	1500	0.317	0.75	0.238	0.664	212.141	212.065	212.459	212.383	13.27	0.45	213.559	213.535
103	36A	38B	D12	138	227209.65	0.533312	1500	0.494	1.20	0.592	0.901	211.889	211.797	212.383	212.291	25.65	0.75	213.535	213.473
104	38B	63A	D12	284	235686.40	0.553208	1500	0.507	1.20	0.608	0.909	211.784	211.595	212.291	212.101	24.31	0.75	213.611	213.408
105	63A	62	C14	16	347088.40	0.814694	1500	0.545	1.50	0.817	0.997	211.557	211.546	212.101	212.091	20.53	0.75	213.408	213.656
106	62	55A	D15	385	366784.40	0.860924	1500	0.567	1.50	0.850	1.013	211.524	211.267	212.091	211.834	33.32	0.90	213.377	213.433
107	55A	55	C15	16	436081.50	1.023580	1500	0.643	1.50	0.965	1.061	211.191	211.180	211.834	211.823	25.68	0.90	213.408	213.541
108	55/C3	C4	C15	30	531010.90	1.246401	1500	0.626	1.80	1.126	1.107	211.180	211.160	211.806	211.786	27.45	0.90	213.541	213.451
109	84a	84	D1	77	8102.50	0.019018	1500	0.156	0.45	0.070	0.271	213.100	213.049	213.256	213.204	14.43	0.30	213.339	213.181
110	84	81	D1	203	27078.00	0.063558	1500	0.261	0.45	0.118	0.540	212.943	212.808	213.204	213.069	3.86	0.30	213.181	213.172
111	85	80	D1	281	8666.80	0.020343	1500	0.160	0.45	0.072	0.283	213.000	212.813	213.160	212.972	14.03	0.30	213.139	213.209

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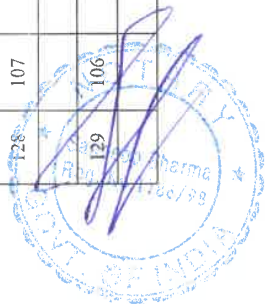
(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
112	82	81	D1	181	18799.50	0.044127	1500	0.213	0.45	0.096	0.459	213.000	212.879	213.213	213.093	8.65	0.30	213.324	213.172
113	81	80	C4	16	46005.50	0.107985	1500	0.299	0.60	0.179	0.603	212.794	212.784	213.093	213.082	15.14	0.45	213.172	213.209
114	80	79	D7	58	58345.70	0.136950	1500	0.286	0.75	0.215	0.638	212.784	212.745	213.070	213.031	16.38	0.45	213.209	213.286
115	79	78	C7	16	58473.70	0.137251	1500	0.287	0.75	0.215	0.638	212.744	212.734	213.031	213.020	16.33	0.45	213.286	213.090
116	78	77	D7	89	66779.10	0.156745	1500	0.316	0.75	0.237	0.662	212.705	212.646	213.020	212.961	13.45	0.45	213.090	213.328
117	83	76	D4	360	38548.00	0.090481	1500	0.263	0.60	0.158	0.573	213.050	212.810	213.313	213.073	18.69	0.45	213.368	213.225
118	68	76	D1	199	24518.00	0.057549	1500	0.238	0.45	0.107	0.537	212.980	212.847	213.218	213.086	6.18	0.30	213.273	213.225
119	76	77	C7	16	63194.00	0.148330	1500	0.303	0.75	0.227	0.653	212.782	212.772	213.086	213.075	14.70	0.45	213.225	213.328
120	77	88	D9	464	148871.90	0.349435	1500	0.478	0.90	0.430	0.812	212.597	212.287	213.075	212.766	12.18	0.60	213.328	213.104
121	79	86	D1	412	24117.30	0.056609	1500	0.234	0.45	0.105	0.537	212.800	212.525	213.034	212.760	6.56	0.30	213.286	212.908
122	78	87	D1	423	18570.80	0.043590	1500	0.212	0.45	0.096	0.456	212.750	212.468	212.962	212.680	8.75	0.30	213.090	213.027
123	86	86	D1	263	16791.50	0.039413	1500	0.205	0.45	0.092	0.428	212.750	212.575	212.955	212.779	9.54	0.30	213.184	212.908
124	86	87	C4	16	41036.80	0.096322	1500	0.274	0.60	0.165	0.585	212.505	212.494	212.779	212.769	17.55	0.45	212.908	213.027
125	87	88	D7	97	64260.60	0.150834	1500	0.307	0.75	0.230	0.656	212.462	212.397	212.769	212.704	14.32	0.45	213.027	213.104
126	88	89	C10	16	213260.50	0.500570	1500	0.471	1.20	0.565	0.885	212.233	212.222	212.704	212.693	12.88	0.60	213.104	212.924
127	108	107	D1	57	2712.50	0.006367	500	0.103	0.45	0.046	0.137	212.850	212.736	212.953	212.839	19.67	0.30	213.316	213.222
128	107	90	D1	403	14962.50	0.035120	750	0.174	0.45	0.078	0.448	212.665	212.128	212.839	212.302	12.59	0.30	213.152	213.186
129	106	91	D1	410	14660.00	0.034410	750	0.173	0.45	0.078	0.442	212.800	212.253	212.973	212.426	12.70	0.30	213.356	212.950

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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
130	105	92	D1	260	8480.00	0.019904	500	0.158	0.45	0.071	0.279	212.530	212.010	212.688	212.168	14.16	0.30	213.050	213.055
131	104	93	D1	168	12177.53	0.028583	500	0.161	0.45	0.073	0.393	212.500	212.164	212.661	212.325	13.86	0.30	213.050	212.990
132	103	94	D1	258	10184.22	0.023905	750	0.151	0.45	0.068	0.352	212.350	212.006	212.501	212.157	14.90	0.30	212.786	212.922
133	102	95	D1	262	12804.50	0.030055	500	0.163	0.45	0.073	0.410	212.430	211.906	212.593	212.069	13.71	0.30	212.822	212.910
134	101	96	D1	208	8089.10	0.018987	500	0.156	0.45	0.070	0.271	212.900	212.484	213.056	212.640	14.44	0.30	213.390	212.978
135	100	97	D1	222	9568.00	0.022458	500	0.147	0.45	0.066	0.338	212.750	212.306	212.897	212.453	15.25	0.30	213.249	212.966
136	70	120A	D1	448	12315.00	0.028906	1000	0.164	0.45	0.074	0.390	213.000	212.552	213.164	212.716	13.55	0.30	213.350	213.370
137	120A	120	C1	16	12443.00	0.029206	1000	0.164	0.45	0.074	0.396	212.552	212.536	212.716	212.700	13.62	0.30	213.370	213.302
138	120A	163	D1	392	12315.00	0.028906	1000	0.164	0.45	0.074	0.390	213.030	212.638	213.194	212.802	13.55	0.30	213.370	213.350
139	112	117	D1	304	8912.40	0.020919	1500	0.161	0.45	0.073	0.288	213.150	212.947	213.311	213.109	13.86	0.30	213.304	213.480
140	73	116	D1	304	8812.40	0.020685	1000	0.161	0.45	0.072	0.286	213.170	212.866	213.331	213.027	13.93	0.30	213.474	213.413
141	118	117	D1	62	3736.20	0.008770	500	0.116	0.45	0.052	0.167	213.050	212.926	213.166	213.042	18.35	0.30	213.399	213.480
142	117	116	C1	16	12776.60	0.029990	750	0.164	0.45	0.074	0.407	212.879	212.858	213.042	213.021	13.64	0.30	213.480	213.413
143	116	115	D1	71	26410.60	0.061992	750	0.182	0.45	0.082	0.758	212.839	212.745	213.021	212.926	11.83	0.30	213.413	213.462
144	74	115	D1	304	8812.40	0.020685	1500	0.161	0.45	0.072	0.286	212.800	212.597	212.961	212.758	13.93	0.30	213.186	213.462

Gandesh Sharma
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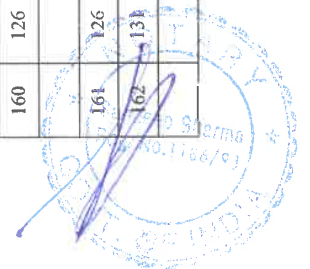


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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
145	115	114	C4	16	33351.00	0.082977	1500	0.247	0.60	0.148	0.560	212.511	212.500	212.758	212.747	20.30	0.45	213.462	213.245
146	114	113	D4	251	48542.50	0.113940	1500	0.311	0.60	0.186	0.611	212.437	212.269	212.747	212.580	13.93	0.45	213.245	213.009
147	75	112	D1	448	16233.60	0.038104	750	0.173	0.45	0.078	0.490	212.800	212.203	212.973	212.376	12.71	0.30	213.211	213.426
148	109	111	D1	448	16233.60	0.038104	750	0.173	0.45	0.078	0.490	212.700	212.103	212.873	212.276	12.71	0.30	213.232	213.187
149	106	110	D4	375	49326.00	0.115779	500	0.213	0.60	0.128	0.907	212.800	212.050	213.013	212.263	23.73	0.45	213.356	213.244
150	119	114	D1	145	6171.75	0.014486	750	0.141	0.45	0.063	0.229	212.900	212.707	213.041	212.847	15.94	0.30	213.344	213.245
151	71	118	D1	300	8880.40	0.020844	1000	0.161	0.45	0.073	0.287	212.900	212.600	213.061	212.761	13.89	0.30	213.244	213.399
152	118	119	C1	16	9008.40	0.021145	1000	0.162	0.45	0.073	0.290	212.599	212.583	212.761	212.745	13.80	0.30	213.399	213.344
153	119	120	D1	138	15124.15	0.035500	1500	0.193	0.45	0.087	0.408	212.552	212.460	212.745	212.653	10.67	0.30	213.344	213.302
154	120	113	D4	145	33738.90	0.079193	1500	0.239	0.60	0.143	0.552	212.414	212.317	212.653	212.556	21.09	0.45	213.302	213.245
155	113	112	C8	16	82409.40	0.193433	1500	0.369	0.75	0.276	0.700	212.188	212.177	212.556	212.546	23.15	0.60	213.245	213.426
156	112	111	D9	82	104259.00	0.244719	1500	0.367	0.90	0.330	0.741	212.177	212.123	212.544	212.490	23.29	0.60	213.426	213.187
157	111	110	C9	16	120620.60	0.283123	1500	0.409	0.90	0.368	0.770	212.081	212.070	212.490	212.479	19.14	0.60	213.187	213.244
158	110	99	D12	343	219016.60	0.514081	1500	0.480	1.20	0.577	0.892	211.999	211.770	212.479	212.250	26.96	0.75	213.244	212.820
159	99	98	D12	257	228864.60	0.537196	1500	0.496	1.20	0.595	0.902	211.754	211.583	212.250	212.079	25.39	0.75	212.820	212.843
160	126	125	D1	81	4143.30	0.009725	500	0.112	0.45	0.050	0.193	212.750	212.588	212.862	212.700	18.78	0.30	213.247	213.514
161	126	131	D1	274	10347.70	0.024288	500	0.158	0.45	0.071	0.341	212.800	212.252	212.958	212.410	14.18	0.30	213.247	212.923
162	131	132	D1	86	14531.00	0.034107	750	0.163	0.45	0.073	0.465	212.247	212.133	212.410	212.295	13.71	0.30	212.923	212.582

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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
163	134	133	D1	83	3958.60	0.009292	500	0.110	0.45	0.050	0.187	212.400	212.234	212.510	212.344	18.97	0.30	212.820	212.896
164	134	141	D1	335	10367.40	0.024335	750	0.152	0.45	0.068	0.356	212.400	211.953	212.552	212.105	14.80	0.30	212.820	213.146
165	141	136	D1	86	14350.00	0.033683	750	0.172	0.45	0.077	0.436	211.934	211.819	212.105	211.991	12.85	0.30	213.146	212.776
166	121	122	D1	58	3232.25	0.007587	1000	0.110	0.45	0.050	0.153	212.650	212.592	212.760	212.702	18.97	0.30	213.011	213.461
167	122	123	C1	16	3360.25	0.007887	1000	0.112	0.45	0.050	0.157	212.590	212.574	212.702	212.686	18.81	0.30	213.461	213.219
168	123	124	D1	72	7231.90	0.016975	1000	0.149	0.45	0.067	0.253	212.537	212.465	212.686	212.614	15.08	0.30	213.219	213.238
169	124	125	D1	16	7359.90	0.017275	1000	0.159	0.45	0.071	0.242	212.456	212.440	212.614	212.598	14.15	0.30	213.238	213.514
170	125	132	D2	273	21842.90	0.051270	1000	0.211	0.45	0.095	0.541	212.388	212.115	212.598	212.325	23.94	0.45	213.514	212.794
171	132	133	C4	16	36501.90	0.085678	1000	0.220	0.60	0.132	0.650	212.106	212.090	212.325	212.309	23.02	0.45	212.794	212.896
172	133	136	D4	333	50811.90	0.119267	1000	0.274	0.60	0.164	0.727	212.036	211.703	212.309	211.976	17.65	0.45	212.896	212.776
173	136	137	C4	16	65289.90	0.153250	1000	0.331	0.60	0.198	0.772	211.645	211.629	211.976	211.960	11.92	0.45	212.776	212.963
174	137	138	D8	141	73405.90	0.172300	1000	0.292	0.75	0.219	0.788	211.629	211.488	211.921	211.780	30.84	0.60	212.963	212.876
175	121	162	D1	396	9627.25	0.022597	1000	0.164	0.45	0.074	0.305	212.950	212.554	213.114	212.718	13.56	0.30	213.011	213.521
176	122	161	D1	325	9059.25	0.021264	750	0.150	0.45	0.068	0.314	213.000	212.567	213.150	212.717	14.95	0.30	213.461	213.628
177	123	160	D1	318	10233.85	0.024021	750	0.158	0.45	0.071	0.339	212.870	212.446	213.028	212.604	14.25	0.30	213.219	213.494
178	124	159	D1	303	10113.85	0.023739	750	0.157	0.45	0.071	0.336	212.800	212.396	212.957	212.553	14.32	0.30	213.238	213.164
179	127	158	D1	201	5702.30	0.013385	500	0.126	0.45	0.057	0.235	212.750	212.348	212.876	212.474	17.35	0.30	213.252	213.280
180	127	128	D1	62	2250.70	0.005283	500	0.089	0.45	0.040	0.132	212.800	212.676	212.889	212.765	21.07	0.30	213.252	213.203

(Ganesh Sharma)
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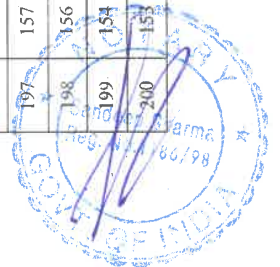
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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
181	128	157	D1	285	8625.00	0.020245	750	0.148	0.45	0.066	0.305	212.618	212.238	212.765	212.385	15.23	0.30	213.900	213.234
182	129	156	D1	186	9502.50	0.022304	500	0.153	0.45	0.069	0.324	212.600	212.228	212.753	212.381	14.68	0.30	213.178	213.228
183	129	130	D1	197	9590.50	0.022511	500	0.154	0.45	0.069	0.325	212.600	212.206	212.754	212.360	14.63	0.30	213.178	212.842
184	130	154	D1	146	18773.00	0.044064	750	0.185	0.45	0.083	0.530	212.175	211.980	212.360	212.165	11.51	0.30	212.856	212.950
185	135	153	D1	140	6874.80	0.016137	500	0.136	0.45	0.061	0.264	212.450	212.170	212.586	212.306	16.43	0.30	212.897	212.977
186	135	142	D1	259	10704.20	0.025125	500	0.160	0.45	0.072	0.349	212.450	211.932	212.610	212.092	13.98	0.30	212.897	212.757
187	142	143	D1	88	17163.00	0.040285	500	0.170	0.45	0.076	0.527	211.922	211.746	212.092	211.916	13.02	0.30	213.044	212.876
188	137	140	D1	183	8452.00	0.019839	500	0.147	0.45	0.066	0.301	212.450	212.084	212.597	212.231	15.34	0.30	212.963	212.989
189	69A	164	D1	550	22749.20	0.053397	1000	0.217	0.45	0.097	0.548	213.250	212.700	213.467	212.917	8.33	0.30	213.722	213.684
190	164	163	D2	101	30743.80	0.072163	1000	0.243	0.45	0.109	0.659	212.673	212.572	212.917	212.816	20.67	0.45	213.684	213.329
191	163	162	C4	16	43186.80	0.101369	1000	0.247	0.60	0.148	0.684	212.569	212.553	212.816	212.800	20.31	0.45	213.329	213.521
192	162	161	D4	59	56054.30	0.131572	1000	0.297	0.60	0.178	0.738	212.502	212.443	212.800	212.741	15.27	0.45	213.521	213.628
193	161	160	C4	16	65241.55	0.153136	1000	0.331	0.60	0.198	0.772	212.410	212.394	212.741	212.725	11.94	0.45	213.628	213.494
194	160	159	D7	74	79363.05	0.186283	1000	0.309	0.75	0.231	0.805	212.394	212.320	212.703	212.629	14.14	0.45	213.494	213.348
195	159	158	C7	16	89604.90	0.210323	1000	0.337	0.75	0.252	0.833	212.292	212.276	212.629	212.613	11.34	0.45	213.348	213.280
196	158	157	D8	63	97565.90	0.229009	1000	0.359	0.75	0.269	0.852	212.254	212.191	212.613	212.550	24.15	0.60	213.280	213.234
197	157	156	C8	16	106318.90	0.249554	1000	0.383	0.75	0.287	0.870	212.167	212.151	212.550	212.534	21.75	0.60	213.234	213.228
198	156	154	D9	206	125483.90	0.294539	1000	0.362	0.90	0.326	0.903	212.151	211.945	212.514	212.308	23.76	0.60	213.228	212.950
199	154	153	C9	16	144384.90	0.338903	1000	0.402	0.90	0.362	0.937	211.906	211.890	212.308	212.292	19.83	0.60	212.950	212.977
200	153	143	D10	263	159112.50	0.373472	1500	0.503	0.90	0.453	0.825	211.789	211.613	212.292	212.116	24.70	0.75	212.977	212.971

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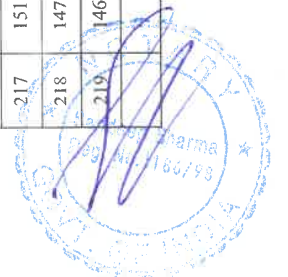
(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
201	143	140	C10	16	176403.50	0.414058	1500	0.544	0.90	0.490	0.845	211.572	211.561	212.116	212.106	20.58	0.75	212.971	212.989
202	140	139	D12	215	193563.50	0.454337	1500	0.439	1.20	0.527	0.862	211.561	211.418	212.001	211.857	31.08	0.75	212.989	212.802
203	175	166	D1	336	16380.90	0.038450	750	0.170	0.45	0.077	0.502	213.100	212.652	213.270	212.822	12.99	0.30	213.499	213.275
204	165	166	D1	126	10136.60	0.023793	500	0.151	0.45	0.068	0.351	212.900	212.648	213.051	212.799	14.93	0.30	213.377	213.409
205	166	167	C2	16	26645.50	0.062543	750	0.219	0.45	0.098	0.636	212.580	212.559	212.799	212.777	23.15	0.45	213.409	213.368
206	167	155	D4	449	51936.80	0.121907	750	0.254	0.60	0.152	0.800	212.523	211.925	212.777	212.179	19.59	0.45	213.368	212.909
207	155	152	C4	16	52064.80	0.122208	750	0.255	0.60	0.153	0.800	211.924	211.903	212.179	212.157	19.55	0.45	212.909	212.508
208	152	144	D4	262	60860.10	0.142852	1000	0.314	0.60	0.188	0.759	211.844	211.582	212.157	211.895	13.63	0.45	212.508	212.963
209	144	145	C4	16	60988.10	0.143153	1000	0.314	0.60	0.189	0.759	211.581	211.565	211.895	211.879	13.58	0.45	212.963	212.888
210	145	219	D7	222	69731.30	0.163675	1000	0.281	0.75	0.211	0.776	211.565	211.343	211.846	211.624	16.88	0.45	212.888	212.963
211	152	151	D1	100	52666.20	0.012361	500	0.123	0.45	0.055	0.224	212.500	212.300	212.623	212.423	17.72	0.30	212.933	212.810
212	144	147	D1	98	5250.20	0.012323	500	0.123	0.45	0.055	0.223	212.450	212.254	212.573	212.377	17.74	0.30	212.916	212.935
213	145	146	D1	100	5444.80	0.012780	500	0.124	0.45	0.056	0.228	212.400	212.200	212.524	212.324	17.57	0.30	212.888	212.930
214	167	168	D1	97	10075.70	0.023650	500	0.157	0.45	0.070	0.336	212.950	212.756	213.107	212.913	14.34	0.30	213.368	213.275
215	168	186	D1	505	35815.00	0.084066	750	0.245	0.45	0.110	0.763	212.668	211.994	212.913	212.239	5.50	0.30	213.344	212.915
216	186	151	C4	16	46098.70	0.108204	750	0.233	0.60	0.140	0.774	211.994	211.973	212.227	212.206	21.69	0.45	212.915	212.888
217	151	147	D4	207	59720.20	0.140177	750	0.277	0.60	0.166	0.843	211.929	211.653	212.206	211.930	17.29	0.45	212.888	212.935
218	147	146	C4	16	65098.40	0.152800	1000	0.330	0.60	0.198	0.772	211.600	211.584	211.930	211.914	11.99	0.45	212.935	212.900
219	146	220	D7	342	80246.40	0.188356	1000	0.311	0.75	0.233	0.807	211.584	211.242	211.895	211.553	13.88	0.45	212.900	212.802

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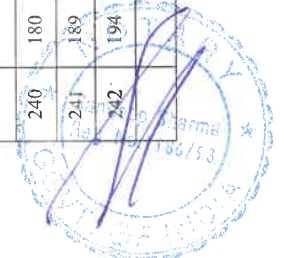
(Sandeep Sharma)
Reg. No. 1236/98
NOTARY PUBLIC
Ghaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (FB) (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
220	170	169	D1	71	3105.55	0.007289	500	0.101	0.45	0.045	0.161	213.050	212.908	213.151	213.009	19.93	0.30	213.483	213.418
221	169	185	D1	245	10986.50	0.025788	500	0.162	0.45	0.073	0.354	212.847	212.357	213.009	212.519	13.82	0.30	213.418	213.242
222	185	184	C1	16	22757.00	0.053416	750	0.199	0.45	0.090	0.596	212.320	212.298	212.519	10.09	0.30	213.242	213.158	
223	184	183	D1	35	23709.60	0.055652	750	0.203	0.45	0.091	0.609	212.294	212.248	212.497	9.70	0.30	213.158	213.095	
224	183	182	C1	16	23837.60	0.055952	750	0.204	0.45	0.092	0.611	212.247	212.226	212.451	9.65	0.30	213.095	213.069	
225	182	187	D2	211	32161.25	0.075490	750	0.243	0.45	0.110	0.689	212.186	211.905	212.429	20.66	0.45	213.069	213.094	
226	187	150	C2	16	32289.25	0.075790	750	0.222	0.45	0.100	0.758	211.905	211.883	212.127	22.79	0.45	213.094	212.810	
227	150	149	D4	209	38905.00	0.091319	750	0.208	0.60	0.125	0.733	211.883	211.605	212.091	24.24	0.45	212.810	212.701	
228	149	148	C4	16	39033.00	0.091619	750	0.208	0.60	0.125	0.734	211.604	211.583	211.812	24.20	0.45	212.701	212.677	
229	148	225	D4	82	41752.00	0.098001	750	0.218	0.60	0.131	0.748	211.573	211.463	211.791	23.17	0.45	212.677	212.951	
230	225	224	C4	16	41880.00	0.098302	750	0.219	0.60	0.131	0.749	211.463	211.441	211.682	23.12	0.45	212.951	213.015	
231	224	223	D4	53	43862.20	0.102954	1000	0.250	0.60	0.150	0.687	211.410	211.357	211.660	20.03	0.45	213.015	212.821	
232	223	222	C4	16	43990.20	0.103255	1000	0.250	0.60	0.150	0.688	211.357	211.341	211.607	20.00	0.45	212.821	212.827	
233	222	221	D4	52	45967.80	0.107897	1000	0.258	0.60	0.155	0.696	211.333	211.281	211.591	19.18	0.45	212.827	212.658	
234	221	221A	C4	16	46095.80	0.108197	1000	0.259	0.60	0.155	0.697	211.280	211.264	211.539	19.13	0.45	212.658	212.835	
235	221A	220A	D4	32	48364.60	0.113522	1000	0.267	0.60	0.160	0.709	211.256	211.224	211.523	18.30	0.45	212.835	212.384	
236	182	181	D1	70	3403.85	0.007990	1000	0.112	0.45	0.051	0.158	212.650	212.580	212.762	18.75	0.30	213.069	212.118	
237	181	188	D1	244	11991.50	0.028147	1000	0.169	0.45	0.076	0.370	212.523	212.279	212.692	13.10	0.30	213.063	212.961	
238	188	195	C1	16	15563.35	0.036531	1000	0.181	0.45	0.082	0.448	212.267	212.251	212.448	11.89	0.30	212.961	212.890	
239	195	196	D2	197	25516.10	0.059892	1000	0.208	0.45	0.093	0.641	212.225	212.028	212.432	24.24	0.45	212.890	212.955	
240	180	189	D1	252	8386.35	0.019685	750	0.158	0.45	0.071	0.277	212.500	212.164	212.658	14.23	0.30	213.100	212.590	
241	189	194	C1	16	8514.35	0.019985	1000	0.159	0.45	0.071	0.280	212.163	212.147	212.322	14.14	0.30	212.590	212.908	
242	194	197	D1	195	14420.65	0.033848	1000	0.175	0.45	0.079	0.430	212.131	211.936	212.306	12.51	0.30	212.908	212.940	

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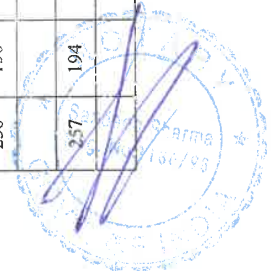
(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
243	174	173	D1	42	636.00	0.001493	500	0.056	0.45	0.025	0.060	213.100	213.016	213.156	213.072	24.44	0.30	213.627	213.555
244	173	192	D1	634	33463.00	0.078545	750	0.233	0.45	0.105	0.750	212.839	211.993	213.072	212.226	6.72	0.30	213.555	212.963
245	192	205A	D4	467	60937.00	0.143033	750	0.285	0.60	0.171	0.837	211.941	211.319	212.226	211.604	16.52	0.45	212.963	213.006
246	170	170A	D1	327	8536.95	0.020038	750	0.147	0.45	0.066	0.303	213.100	212.664	213.247	212.811	15.28	0.30	213.662	213.314
247	170A	185	D1	71	11642.50	0.027328	750	0.165	0.45	0.074	0.367	212.646	212.551	212.811	212.716	13.47	0.30	213.385	212.689
248	171	171A	D1	328	8726.25	0.020482	750	0.148	0.45	0.067	0.307	213.000	212.563	213.148	212.711	15.16	0.30	213.642	213.176
249	171A	176	D1	70	11901.50	0.027935	1000	0.167	0.45	0.075	0.372	212.544	212.474	212.711	212.641	13.33	0.30	213.176	213.322
250	184	177	D1	157	2825.40	0.006632	500	0.097	0.45	0.044	0.152	212.700	212.386	212.797	212.483	20.28	0.30	213.158	213.115
251	183	178	D1	157	2825.40	0.006632	500	0.097	0.45	0.044	0.152	212.700	212.386	212.797	212.483	20.28	0.30	213.152	213.077
252	180	179	D1	70	3290.15	0.007723	500	0.103	0.45	0.046	0.167	212.550	212.410	212.653	212.513	19.71	0.30	212.964	213.095
253	155	186	D1	107	10155.70	0.023838	500	0.157	0.45	0.071	0.337	212.600	212.386	212.757	212.543	14.29	0.30	212.941	212.951
254	187	188	D1	75	3443.85	0.008083	1000	0.105	0.45	0.047	0.172	212.500	212.425	212.605	212.550	19.53	0.30	212.887	212.961
255	189	190	D1	75	3330.15	0.007817	500	0.103	0.45	0.047	0.168	212.400	212.250	212.503	212.353	19.66	0.30	212.910	212.950
256	150	195	D1	76	3433.00	0.008058	1000	0.105	0.45	0.047	0.171	212.400	212.324	212.505	212.429	19.54	0.30	212.786	212.890
257	194	193	D1	74	3075.60	0.007219	500	0.100	0.45	0.045	0.160	212.500	212.352	212.600	212.452	19.97	0.30	212.908	212.963


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(Sandeep Sharma)
Reg. No. 1136/98
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Chaziabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
258	149	196	D1	75	3425.00	0.008039	500	0.104	0.45	0.047	0.171	212.200	212.050	212.304	212.154	19.55	0.30	212.701	212.955
259	196	197	C2	16	29069.10	0.068232	500	0.200	0.45	0.090	0.757	211.954	211.922	212.154	212.122	24.98	0.45	212.955	212.973
260	197	198	D4	70	46533.35	0.109224	750	0.235	0.60	0.141	0.775	211.888	211.794	212.122	212.029	21.51	0.45	212.973	212.009
261	148	199	D1	156	4342.50	0.010193	500	0.114	0.45	0.051	0.198	212.500	212.188	212.614	212.302	18.58	0.30	212.892	212.887
262	225	200	D1	153	4318.50	0.010136	500	0.114	0.45	0.051	0.198	212.500	212.194	212.614	212.308	18.60	0.30	213.017	212.920
263	224	201	D1	153	3561.30	0.008359	500	0.106	0.45	0.048	0.175	212.500	212.194	212.606	212.300	19.40	0.30	213.015	212.950
264	223	202	D1	153	3561.30	0.008359	500	0.106	0.45	0.048	0.175	212.300	211.994	212.406	212.100	19.40	0.30	212.821	213.041
265	222	203	D1	155	3582.10	0.008408	500	0.106	0.45	0.048	0.176	212.300	211.990	212.406	212.096	19.38	0.30	212.803	213.006
266	221	204	D1	155	3582.10	0.008408	500	0.106	0.45	0.048	0.176	212.100	211.790	212.206	211.896	19.38	0.30	212.658	212.867
267	221A	204A	D1	155	4259.20	0.009997	500	0.113	0.45	0.051	0.196	212.300	211.990	212.413	212.103	18.66	0.30	212.835	212.888
268	171	172	D1	70	3175.25	0.007453	750	0.102	0.45	0.046	0.163	212.900	212.807	213.002	212.908	19.84	0.30	213.512	213.392
269	172	176	D1	257	11333.50	0.026602	750	0.164	0.45	0.074	0.361	212.745	212.402	212.908	212.566	13.64	0.30	213.392	213.322
270	176	177	C1	16	23363.00	0.054838	750	0.202	0.45	0.091	0.605	212.364	212.343	212.566	212.544	9.84	0.30	213.322	212.989
271	177	178	D1	29	27093.00	0.063593	750	0.217	0.45	0.098	0.652	212.327	212.289	212.544	212.506	8.32	0.30	212.989	213.030
272	178	179	C1	16	30046.40	0.070526	750	0.230	0.45	0.104	0.681	212.275	212.254	212.506	212.484	6.99	0.30	213.030	213.095
273	179	190	D4	357	42562.90	0.099905	1000	0.244	0.60	0.147	0.682	212.240	211.883	212.484	212.127	20.57	0.45	213.095	212.950
274	190	193	C4	16	46021.05	0.108022	1000	0.258	0.60	0.155	0.699	211.870	211.854	212.127	212.111	19.24	0.45	212.950	212.393
275	193	198	D4	183	54906.95	0.128879	1000	0.295	0.60	0.176	0.732	211.818	211.635	212.111	211.928	15.65	0.45	212.393	212.807

(Gandeep Sharma)
 Reg. No. 1136/98
 NOTARY PUBLIC
 Chaziabad (U.P.)



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Drain No	Drain		Drain/ culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patti	
	Start	End										Head	Tail	Head	Tail			Head	Tail
276	198	199	C7	16	101568.30	0.238403	1000	0.370	0.75	0.277	0.860	211.559	211.543	211.928	211.912	8.04	0.45	212.807	212.887
277	199	200	D8	53	108397.80	0.254434	1000	0.388	0.75	0.291	0.874	211.524	211.471	211.912	211.859	21.19	0.60	212.887	212.902
278	200	201	C8	16	112844.30	0.264871	1000	0.400	0.75	0.300	0.883	211.459	211.443	211.859	211.843	19.99	0.60	212.902	212.950
279	201	202	D8	50	118363.80	0.277826	1000	0.415	0.75	0.311	0.893	211.428	211.378	211.843	211.793	18.50	0.60	212.950	212.941
280	202	203	C8	16	122053.10	0.286486	1000	0.425	0.75	0.319	0.899	211.368	211.352	211.793	211.777	17.52	0.60	212.941	212.978
281	203	204	D9	52	127612.80	0.299536	1000	0.367	0.90	0.330	0.907	211.352	211.300	211.719	211.667	23.31	0.60	212.978	212.913
282	204	204A	C9	16	131322.90	0.308244	1000	0.375	0.90	0.337	0.914	211.293	211.277	211.667	211.651	22.53	0.60	212.913	212.936
283	204A	205	D9	73	138178.90	0.324337	1000	0.389	0.90	0.350	0.927	211.262	211.189	211.651	211.578	21.10	0.60	212.936	212.993
284	217	218	D1	74	3548.50	0.008329	500	0.106	0.45	0.048	0.175	212.500	212.352	212.606	212.458	19.41	0.30	212.956	213.591
285	216	215	D1	73	3607.70	0.008468	500	0.107	0.45	0.048	0.177	212.500	212.354	212.607	212.461	19.35	0.30	212.971	213.361
286	227	226	D1	73	3607.70	0.008468	500	0.107	0.45	0.048	0.177	212.350	212.204	212.457	212.311	19.35	0.30	212.788	212.772
287	226	215	D1	281	12911.00	0.030305	750	0.155	0.45	0.070	0.434	212.155	211.781	212.311	211.936	14.50	0.30	212.783	213.361
288	215	218	C1	16	16518.70	0.038773	750	0.174	0.45	0.078	0.494	211.762	211.740	211.936	211.915	12.57	0.30	212.956	213.591
289	218	207	D1	277	29181.70	0.068496	750	0.206	0.45	0.093	0.738	211.708	211.339	211.915	211.545	9.38	0.30	213.495	213.144
290	215	214	D1	125	6900.10	0.016196	500	0.136	0.45	0.061	0.265	213.150	212.900	213.286	213.036	16.41	0.30	213.757	213.440
291	212	211	D1	122	3283.40	0.007707	500	0.103	0.45	0.046	0.167	213.150	212.906	213.253	213.009	19.72	0.30	213.834	213.624
292	226A	214	D2	311	30670.90	0.071991	750	0.236	0.45	0.106	0.678	212.250	211.835	212.486	212.071	21.41	0.45	212.876	213.492
293	214	211	C2	16	37571.00	0.088187	750	0.238	0.45	0.116	0.761	211.814	211.792	212.071	212.050	19.24	0.45	213.492	213.834
294	211	208	D4	279	51162.30	0.120089	750	0.252	0.60	0.151	0.796	211.792	211.420	212.044	211.672	19.84	0.45	213.834	213.351

09 JAN 2025

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chazliabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
295	234A	234	D1	64	5098.00	0.01966	1000	0.121	0.45	0.055	0.219	212.600	212.536	212.721	212.657	17.87	0.30	213.111	212.957
296	233	232	D1	83	4355.10	0.010222	1000	0.114	0.45	0.051	0.199	212.550	212.467	212.664	212.581	18.57	0.30	213.050	212.957
297	233	231	D1	459	18436.40	0.043274	1000	0.196	0.45	0.088	0.490	212.550	212.091	212.746	212.287	10.39	0.30	213.093	212.051
298	231	230	D1	83	22791.50	0.053497	1000	0.217	0.45	0.098	0.548	212.070	211.987	212.287	212.204	8.31	0.30	213.093	213.101
299	233A	231A	D4	458	46657.00	0.109514	750	0.235	0.60	0.141	0.776	212.550	211.939	212.785	212.175	21.47	0.45	213.076	213.191
300	231A	230A	D4	80	52486.10	0.123197	1000	0.283	0.60	0.170	0.725	211.891	211.811	212.175	212.095	16.67	0.45	213.191	212.887
301	228A	228	D1	78	5071.80	0.011905	500	0.121	0.45	0.054	0.219	212.200	212.044	212.321	212.165	17.90	0.30	212.732	212.841
302	235	234	D1	159	8151.00	0.019132	750	0.156	0.45	0.070	0.272	212.750	212.538	212.906	212.694	14.40	0.30	213.221	212.957
303	234	232	D1	16	13377.00	0.031399	750	0.167	0.45	0.075	0.419	212.527	212.506	212.694	212.673	13.33	0.30	212.957	213.190
304	232	230	D4	450	36096.50	0.084727	1000	0.218	0.60	0.131	0.647	212.454	212.004	212.673	212.223	23.17	0.45	213.190	213.077
305	230	230A	C4	16	59016.00	0.138524	1000	0.307	0.60	0.184	0.753	211.916	211.900	212.223	212.207	14.35	0.45	213.077	212.887
306	230A	228	D8	113	117595.20	0.276022	1000	0.413	0.75	0.310	0.891	211.794	211.681	212.207	212.094	18.71	0.60	212.887	212.864
307	228	227	C9	16	122795.00	0.288227	1000	0.357	0.90	0.321	0.898	211.681	211.665	212.038	212.022	24.33	0.60	212.864	212.786
308	234	216	D9	281	132098.30	0.310064	1000	0.376	0.90	0.339	0.916	211.645	211.364	212.022	211.741	22.37	0.60	212.786	212.971
309	216	217	C9	16	132226.30	0.310365	1000	0.377	0.90	0.339	0.916	211.364	211.348	211.741	211.725	22.34	0.60	212.971	212.943
310	217	206	D9	280	141364.80	0.331815	1500	0.460	0.90	0.414	0.802	211.265	211.078	211.725	211.538	14.01	0.60	212.943	212.993
311	206	207	D9	80	144961.30	0.340256	1500	0.469	0.90	0.422	0.807	211.069	211.016	211.538	211.485	13.13	0.60	212.925	213.144
312	207	208	C10	16	174271.00	0.409053	1500	0.539	0.90	0.485	0.843	210.945	210.935	211.485	211.474	21.09	0.75	213.144	213.351
313	208	209	D12	110	227467.00	0.533916	1500	0.494	1.20	0.593	0.901	210.935	210.861	211.429	211.355	25.61	0.75	213.351	213.949
314	209	210	C12	16	227595.00	0.534216	1500	0.494	1.20	0.593	0.901	210.861	210.851	211.355	211.345	25.59	0.75	213.949	213.833

09 JAN 2023

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chazabud (J.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
315	69A	69	D1	269	6128.00	0.014384	1000	0.140	0.45	0.063	0.228	213.200	212.931	213.340	213.071	15.98	0.30	213.722	213.186
316	69	70	D1	38	8420.00	0.019764	1000	0.158	0.45	0.071	0.278	212.913	212.875	213.071	213.033	14.20	0.30	213.186	213.256
317	70	71	C1	16	8548.00	0.020064	1000	0.159	0.45	0.071	0.281	212.874	212.858	213.033	213.017	14.11	0.30	213.256	213.244
318	71	72	D1	62	12284.20	0.028834	1500	0.182	0.45	0.082	0.352	212.835	212.794	213.017	212.976	11.80	0.30	213.244	213.401
319	72	73	C1	16	12412.20	0.029134	1500	0.181	0.45	0.081	0.358	212.794	212.783	212.975	212.964	11.91	0.30	213.401	213.474
320	73	74	D1	71	17233.80	0.040452	1500	0.206	0.45	0.093	0.437	212.758	212.711	212.964	212.917	9.43	0.30	213.474	213.186
321	74	75	C1	16	17361.80	0.040752	1500	0.206	0.45	0.093	0.439	212.710	212.700	212.917	212.906	9.35	0.30	213.186	213.428
322	75	109	D2	83	24350.60	0.057156	1500	0.238	0.45	0.107	0.534	212.668	212.613	212.906	212.851	21.21	0.45	213.428	213.212
323	109	108	C2	16	24478.60	0.057457	1500	0.239	0.45	0.107	0.535	212.612	212.601	212.851	212.840	21.12	0.45	213.212	213.264
324	108	89	D4	374	36496.60	0.085666	1500	0.253	0.60	0.152	0.564	212.587	212.338	212.840	212.591	19.68	0.45	213.264	212.924
325	89	90	D12	70	252573.60	0.592846	1500	0.533	1.20	0.640	0.926	212.057	212.011	212.544	212.544	21.65	0.75	212.924	213.186
326	90	91	C12	16	267664.10	0.628267	1500	0.557	1.20	0.668	0.940	211.987	211.977	212.544	212.533	19.31	0.75	213.186	212.950
327	91	92	D12	82	286180.10	0.671728	1500	0.585	1.20	0.702	0.956	211.948	211.893	212.533	212.479	16.46	0.75	212.950	213.055
328	92	93	C12	16	294788.10	0.691933	1500	0.599	1.20	0.718	0.963	211.880	211.870	212.479	212.468	15.15	0.75	213.055	212.865
329	93	94	D12	94	313059.88	0.734821	1500	0.626	1.20	0.751	0.978	211.842	211.779	212.468	212.405	12.38	0.75	212.865	212.922
330	94	95	C12	16	323372.10	0.759026	1500	0.642	1.20	0.770	0.986	211.764	211.753	212.405	212.395	10.83	0.75	212.922	212.910
331	95	96	D14	109	341332.00	0.801182	2000	0.597	1.50	0.896	0.894	211.753	211.699	212.350	212.296	15.28	0.75	212.910	212.978
332	96	97	C14	16	349549.10	0.820469	2000	0.608	1.50	0.912	0.900	211.688	211.680	212.296	212.288	14.23	0.75	212.978	213.040
333	97	98	D14	95	363773.10	0.853856	2000	0.626	1.50	0.939	0.910	211.662	211.615	212.288	212.240	12.43	0.75	213.040	212.843
334	98	138	C16	16	592765.70	1.391353	2000	0.752	1.80	1.354	1.028	211.488	211.480	212.240	212.232	14.80	0.90	212.843	212.635
335	138	139	D17	153	674383.60	1.582928	2000	0.827	1.80	1.489	1.063	211.405	211.329	212.232	212.156	22.29	1.05	212.635	212.863
336	139	219	C18	16	868075.10	2.037565	2000	0.859	2.10	1.803	1.130	211.297	211.289	212.156	212.148	19.15	1.05	212.863	212.963
337	219	220	D19	102	943267.20	2.214058	2000	0.913	2.10	1.916	1.155	211.235	211.184	212.148	212.097	28.75	1.20	212.963	212.802
338	220	220A	C19	16	1023641.60	2.402714	2000	0.969	2.10	2.036	1.180	211.127	211.119	212.097	212.089	23.06	1.20	212.802	212.814
339	220A	205	D19	158	1077295.80	2.528653	2000	1.007	2.10	2.115	1.196	211.082	211.003	212.089	212.010	19.30	1.20	212.814	212.993
340	205	205A	C19	16	1215474.70	2.852989	2000	1.102	2.10	2.315	1.232	210.907	210.899	212.010	212.002	9.75	1.20	212.993	212.993

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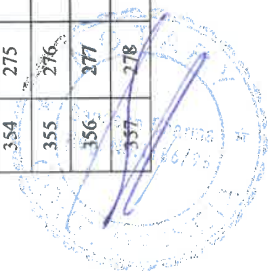
(Ganesh Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chazabad (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Pairs	
	Start	End										Head	Tail	Head	Tail			Head	Tail
341	205A	210	D19	240	1282411.70	3.010105	2000	1.148	2.10	2.411	1.248	210.854	210.734	212.002	211.882	5.19	1.20	213.006	213.833
342	210	237	D21	489	1513918.70	3.553504	2000	1.137	2.40	2.730	1.302	210.734	210.489	211.871	211.627	21.26	1.35	213.833	212.825
343	310	283	D7	393	62896.00	0.147631	1500	0.302	0.75	0.226	0.652	212.350	212.088	212.652	212.390	14.80	0.45	213.037	212.799
344	283	283A	C7	16	63024.00	0.147931	1500	0.302	0.75	0.227	0.652	212.088	212.077	212.390	212.379	14.76	0.45	212.799	212.799
345	283A	278	D9	591	135278.00	0.317528	1500	0.445	0.90	0.400	0.793	211.934	211.540	212.379	211.985	15.50	0.60	212.799	213.654
346	282	281	D1	182	22379.20	0.052529	1500	0.219	0.45	0.098	0.533	212.680	212.559	212.899	212.778	8.12	0.30	212.924	212.561
347	281	275	D8	568	89692.80	0.210529	1500	0.392	0.75	0.294	0.716	212.385	212.007	212.778	212.399	20.79	0.60	212.561	212.369
348	280	276	D4	568	33060.50	0.077600	1500	0.236	0.60	0.141	0.549	212.350	211.971	212.586	212.207	21.43	0.45	212.460	213.434
349	280	279	D1	169	20363.00	0.047796	1000	0.205	0.45	0.092	0.517	212.200	212.031	212.405	212.236	9.46	0.30	212.460	212.574
350	279	277	D4	568	53423.50	0.125397	1500	0.331	0.60	0.199	0.631	211.905	211.526	212.236	211.858	11.86	0.45	212.574	213.493
351	248	248A	D1	95	6000.00	0.014083	500	0.129	0.45	0.058	0.243	212.500	212.310	212.629	212.439	17.11	0.30	213.026	212.852
352	285	286	D1	40	2588.3	0.006075	500	0.094	0.45	0.042	0.144	212.500	212.420	212.594	212.514	20.59	0.30	213.050	213.036
353	274	275	D1	186	22411.20	0.052604	500	0.183	0.45	0.082	0.640	212.500	212.128	212.683	212.311	11.73	0.30	213.473	213.365
354	275	276	C7	16	112232.00	0.263433	500	0.309	0.75	0.231	1.138	212.002	211.970	212.311	212.279	14.14	0.45	213.365	213.434
355	276	277	D8	166	165631.50	0.388774	500	0.412	0.75	0.309	1.259	211.867	211.535	212.279	211.947	18.84	0.60	213.434	213.493
356	277	278	C10	16	219183.00	0.514471	500	0.423	0.90	0.381	1.350	211.523	211.491	211.947	211.915	32.66	0.75	213.493	213.654
357	278	271	D12	245	390184.00	0.915849	500	0.490	1.20	0.589	1.556	211.424	210.934	211.915	211.425	25.96	0.75	213.654	213.231

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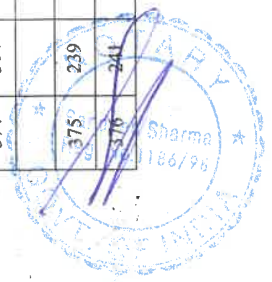
(Gandep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chandigarh (U.P.)



Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (FB) (cm)	Total Drain depth (m)	App level of Patti	
	Start	End										Head	Tail	Head	Tail			Head	Tail
358	247	246	D1	83	664.00	0.001559	500	0.056	0.45	0.025	0.061	212.400	212.234	212.456	212.290	24.35	0.30	212.912	212.933
359	238	240	D1	147	9860.40	0.023145	500	0.155	0.45	0.070	0.331	212.500	212.206	212.655	212.361	14.47	0.30	213.055	213.026
360	240	248A	D1	283	27140.00	0.063704	500	0.193	0.45	0.087	0.735	212.169	211.603	212.361	211.795	10.73	0.30	213.026	212.852
361	248A	246	C1	16	27268.00	0.064004	750	0.218	0.45	0.098	0.654	211.578	211.556	211.795	211.774	8.24	0.30	212.852	212.933
362	246	294	D8	673	107611.60	0.252588	750	0.347	0.75	0.260	0.970	211.427	210.529	211.774	210.877	25.27	0.60	212.933	213.204
363	269	267	D1	271	9894.60	0.023225	500	0.156	0.45	0.070	0.332	212.650	212.108	212.806	212.264	14.45	0.30	213.083	212.851
364	267	268	D1	83	13870.00	0.032556	500	0.157	0.45	0.071	0.460	212.106	211.940	212.264	212.098	14.27	0.30	213.083	212.870
365	288	289	D1	81	5853.30	0.013739	500	0.128	0.45	0.057	0.239	212.500	212.338	212.628	212.466	17.23	0.30	213.029	212.956
366	289	305	D1	427	21415.00	0.050266	500	0.179	0.45	0.080	0.624	212.287	211.433	212.466	211.612	12.11	0.30	212.400	212.697
367	303	304	D1	81	3529.35	0.008284	500	0.106	0.45	0.048	0.174	212.100	211.938	212.206	212.044	19.43	0.30	212.701	212.408
368	269	270	D1	83	3975.40	0.009331	500	0.110	0.45	0.050	0.188	212.500	212.334	212.610	212.444	18.95	0.30	213.032	213.114
369	270	268	D1	271	13870.00	0.032556	500	0.157	0.45	0.071	0.460	212.287	211.745	212.444	211.902	14.27	0.30	213.143	212.870
370	268	288	C1	16	27868.00	0.065412	500	0.196	0.45	0.088	0.743	211.707	211.675	211.902	211.870	10.44	0.30	212.870	212.956
371	288	287	D4	427	43429.70	0.101939	750	0.225	0.60	0.135	0.756	211.646	211.076	211.870	211.301	22.51	0.45	212.956	212.418
372	287	305	D4	81	49283.00	0.115678	750	0.245	0.60	0.147	0.788	211.056	210.948	211.301	211.193	20.52	0.45	212.418	212.697
373	305	304	C4	16	70826.00	0.166244	750	0.318	0.60	0.191	0.871	210.875	210.854	211.193	211.172	13.19	0.45	212.697	212.674
374	304	306	D4	250	83078.50	0.195004	750	0.357	0.60	0.214	0.911	210.815	210.482	211.172	210.838	9.32	0.45	212.674	212.604
375	239	241	D1	83	5069.05	0.01898	500	0.121	0.45	0.054	0.218	212.650	212.484	212.771	212.605	17.90	0.30	213.101	212.839
376	241	253	D1	378	18371.50	0.043122	500	0.175	0.45	0.079	0.549	212.430	211.674	212.605	211.849	12.53	0.30	212.839	212.784

09 JAN 2025

(Sandeep Sharma)
Reg. No. 113E/98
NOTARY PUBLIC
Chandigarh (U.P.)



Drain No	Drain		Drain/ culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patti	
	Start	End										Head	Tail	Head	Tail			Head	Tail
377	242	252	D1	378	11235.00	0.026371	500	0.161	0.45	0.073	0.363	212.350	211.594	212.511	211.755	13.85	0.30	212.753	212.899
378	242	243	D1	61	4007.00	0.009405	500	0.111	0.45	0.050	0.189	212.350	212.228	212.461	212.339	18.92	0.30	212.753	212.863
379	243	251	D1	392	15354.00	0.036039	500	0.162	0.45	0.073	0.493	212.176	211.392	212.339	211.555	13.77	0.30	212.637	212.999
380	244	250	D1	396	14230.45	0.033402	500	0.159	0.45	0.072	0.467	212.400	211.608	212.559	211.767	14.11	0.30	212.846	213.094
381	244	245	D1	82	5397.05	0.012668	500	0.124	0.45	0.056	0.227	212.400	212.236	212.524	212.360	17.61	0.30	212.846	212.691
382	245	249	D1	396	19627.50	0.046070	500	0.172	0.45	0.077	0.595	212.188	211.396	212.360	211.568	12.81	0.30	212.627	212.912
383	255	260	D1	260	9808.00	0.023022	500	0.155	0.45	0.070	0.330	212.250	211.730	212.405	211.885	14.50	0.30	212.796	212.825
384	255	256	D1	107	6008.00	0.014102	500	0.129	0.45	0.058	0.243	212.250	212.036	212.379	212.165	17.10	0.30	212.796	213.128
385	256	259	D1	260	15816.00	0.037124	500	0.164	0.45	0.074	0.502	212.001	211.481	212.165	211.645	13.57	0.30	213.128	212.930
386	239	254	D1	354	13110.45	0.030773	500	0.154	0.45	0.069	0.445	212.500	211.792	212.654	211.946	14.62	0.30	213.101	213.015
387	254	253	D1	83	18179.50	0.042671	500	0.174	0.45	0.078	0.545	211.772	211.606	211.946	211.780	12.61	0.30	212.839	212.784
388	253	252	C2	16	36679.00	0.086094	500	0.234	0.45	0.105	0.818	211.546	211.514	211.780	211.748	21.61	0.45	212.784	212.863
389	252	251	D4	61	51921.00	0.121870	500	0.221	0.60	0.132	0.920	211.514	211.392	211.735	211.613	22.93	0.45	212.863	212.999
390	251	250	C4	16	67403.00	0.158210	500	0.264	0.60	0.158	0.998	211.349	211.317	211.613	211.581	18.59	0.45	212.999	212.691
391	250	249	D4	82	87030.50	0.204280	500	0.316	0.60	0.190	1.076	211.264	211.100	211.581	211.417	13.37	0.45	212.691	212.912
392	249	260	C8	16	106786.00	0.250650	750	0.345	0.75	0.259	0.968	211.071	211.050	211.417	211.395	25.47	0.60	212.912	212.825
393	260	259	D8	107	122602.00	0.287774	750	0.383	0.75	0.287	1.003	211.013	210.870	211.395	211.253	21.73	0.60	212.825	212.930
394	259	261	C9	16	138546.00	0.325198	750	0.351	0.90	0.316	1.030	210.870	210.849	211.221	211.200	24.92	0.60	212.930	212.924

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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
395	272	257A	D13	351	512808.00	1.203674	500	0.600	1.20	0.721	1.671	212.000	211.298	212.600	211.898	44.96	1.05	213.214	212.941
396	258	265	D1	284	14812.30	0.034768	500	0.161	0.45	0.073	0.479	212.100	211.532	212.261	211.693	13.85	0.30	212.764	212.824
397	262	263	D1	322	14377.65	0.033748	500	0.160	0.45	0.072	0.470	212.250	211.606	212.410	211.766	14.05	0.30	212.816	212.746
398	292	293	D1	83	4809.70	0.011289	500	0.119	0.45	0.053	0.211	212.300	212.134	212.419	212.253	18.13	0.30	212.889	212.103
399	290	302	D1	322	9609.95	0.022557	500	0.154	0.45	0.069	0.326	212.500	211.856	212.654	212.010	14.62	0.30	213.070	212.777
400	302	301	D1	63	13128.50	0.030816	500	0.154	0.45	0.069	0.445	211.856	211.730	212.010	211.884	14.61	0.30	212.777	212.666
401	303	303A	D1	229	8555.15	0.020081	500	0.147	0.45	0.066	0.303	212.000	211.542	212.147	211.689	15.27	0.30	212.709	212.625
402	292	300	D1	339	12385.30	0.029071	1000	0.169	0.45	0.076	0.382	211.900	211.561	212.069	211.730	13.08	0.30	212.135	212.617
403	290	291	D1	63	3518.55	0.008259	500	0.106	0.45	0.047	0.174	212.400	212.274	212.506	212.380	19.45	0.30	213.070	212.736
404	291	301	D1	322	13128.50	0.030816	500	0.154	0.45	0.069	0.445	212.226	211.582	212.380	211.736	14.61	0.30	212.877	212.538
405	301	300	C1	16	26385.00	0.061931	500	0.190	0.45	0.085	0.725	211.546	211.514	211.736	211.704	11.02	0.30	212.538	212.563
406	299	299	D2	83	43580.00	0.102292	500	0.244	0.45	0.110	0.933	211.460	211.294	211.704	211.538	20.63	0.45	212.563	212.464
407	257	266	D1	284	14812.30	0.034768	500	0.161	0.45	0.073	0.479	212.200	211.632	212.361	211.793	13.85	0.30	212.967	213.085
408	266	265	D1	141	24300.50	0.057039	500	0.143	0.45	0.064	0.888	211.632	211.350	211.775	211.493	15.73	0.30	213.085	212.824
409	265	263	C2	16	39240.80	0.092107	500	0.221	0.45	0.099	0.927	211.272	211.240	211.493	211.461	22.92	0.45	212.824	212.824
410	263	264	D4	104	59508.30	0.139679	750	0.276	0.60	0.166	0.842	211.184	211.046	211.461	211.322	17.36	0.45	212.746	213.029
411	264	293A	D4	188	61012.30	0.143209	750	0.282	0.60	0.169	0.848	211.041	210.790	211.322	211.071	16.84	0.45	213.029	212.910
412	293A	293	C4	16	61140.30	0.143510	750	0.282	0.60	0.169	0.848	210.789	210.768	211.071	211.050	16.80	0.45	212.910	212.103

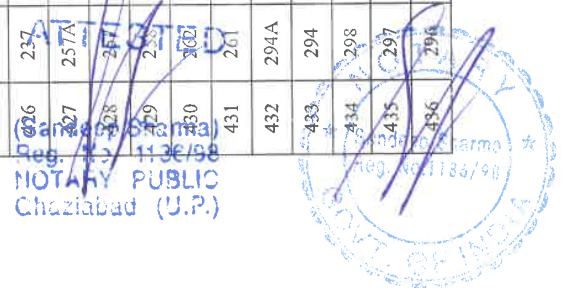
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Drain No	Drain		Drain/ culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board (cm)	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
413	293	299	D4	339	78335.30	0.183870	750	0.341	0.60	0.205	0.898	210.709	210.257	211.050	210.598	10.89	0.45	212.103	212.674
414	299	299A	C8	16	122043.30	0.286463	1000	0.425	0.75	0.319	0.899	210.173	210.157	210.598	210.582	17.53	0.60	212.674	212.516
415	299A	303A	D9	76	124895.10	0.293157	1000	0.361	0.90	0.325	0.902	210.157	210.081	210.519	210.443	23.88	0.60	212.516	212.085
416	303A	306	D9	81	136979.60	0.321522	1000	0.386	0.90	0.348	0.924	210.056	209.975	210.443	210.362	21.35	0.60	212.085	212.488
417	306	307	C10	16	220186.10	0.516826	1000	0.552	0.90	0.497	1.040	209.809	209.793	210.362	210.346	19.79	0.75	212.488	212.629
418	165A	C4	D2	395	20000.00	0.046944	500	0.178	0.45	0.080	0.585	212.400	211.610	212.578	211.788	27.15	0.45	213.377	213.433
419	C4	273	D16	265	613992.20	1.441176	1500	0.695	1.80	1.250	1.153	211.160	210.984	211.855	211.678	20.53	0.90	213.377	213.377
420	273	271A	D17	660	715272.80	1.678904	1500	0.777	1.80	1.398	1.201	210.902	210.462	211.678	211.238	27.33	1.05	213.559	213.214
421	271A	271	C17	16	715272.80	1.678904	1500	0.777	1.80	1.398	1.201	210.462	210.451	211.238	211.228	27.33	1.05	213.214	213.231
422	271	284A	D19	772	1179158.80	2.767748	1500	0.968	2.10	2.032	1.362	210.260	209.745	211.228	210.713	23.23	1.20	213.231	213.010
423	284A	286	C19	16	1185286.80	2.782132	1500	0.971	2.10	2.040	1.364	209.741	209.731	210.713	210.702	22.85	1.20	213.010	213.036
424	286	307	D19	370	1201420.50	2.820001	1500	0.981	2.10	2.061	1.369	209.721	209.474	210.702	210.456	21.87	1.20	213.036	212.629
425	307	307A	D20	40	1427130.90	3.349793	1500	1.116	2.10	2.345	1.429	209.339	209.312	210.456	210.429	23.36	1.35	212.629	212.770
426	237	257A	D21	675	1519318.70	3.566179	2500	1.240	2.40	2.976	1.198	210.489	210.219	211.729	211.459	11.02	1.35	212.924	212.941
427	257A	257	C22	16	2032254.70	4.770153	2500	1.371	2.70	3.701	1.289	210.088	210.082	211.459	211.453	12.93	1.50	212.941	212.821
428	257	258	D22	141	2041742.90	4.792424	2500	1.375	2.70	3.714	1.290	210.077	210.021	211.453	211.396	12.45	1.50	212.821	212.764
429	258	262	C22	16	2041870.90	4.792725	2500	1.376	2.70	3.714	1.290	210.021	210.014	211.396	211.390	12.45	1.50	212.764	212.735
430	262	261	D22	104	2047760.75	4.806550	2500	1.379	2.70	3.722	1.291	210.011	209.970	211.390	211.348	12.15	1.50	212.735	212.733
431	261	294A	D23	161	2193489.75	5.148608	2500	1.308	3.00	3.923	1.312	209.970	209.905	211.278	211.213	19.22	1.50	212.816	212.991
432	294A	294	C23	16	2193617.75	5.148908	2500	1.308	3.00	3.924	1.312	209.905	209.899	211.213	211.207	19.21	1.50	212.991	212.862
433	294	298	D23	365	2353679.75	5.524609	2500	1.378	3.00	4.133	1.337	209.829	209.683	211.207	211.061	12.22	1.50	212.910	212.641
434	298	297	D23	67	2354215.75	5.525868	2500	1.378	3.00	4.134	1.337	209.683	209.656	211.061	211.034	12.20	1.50	212.641	212.650
435	297	296	C23	16	2354343.75	5.526168	2500	1.378	3.00	4.134	1.337	209.656	209.649	211.034	211.028	12.19	1.50	212.650	212.689
436	296	307A	D23	98	2355127.75	5.528008	2500	1.378	3.00	4.135	1.337	209.649	209.610	211.028	210.988	12.16	1.50	212.689	212.861

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Drain No	Drain		Drain/culvert type	Drain length (m)	Runoff Contributing area (m ²)	Runoff discharge (m ³ /s)	Adopted Bed Slope	Flow Depth (m)	Width (m)	Drain flow area (m ²)	Flow velocity (m/s)	Invert Level (m)		Full Supply Level (FSL) (m)		Free-board	Total Drain depth (m)	App level of Patri	
	Start	End										Head	Tail	Head	Tail			Head	Tail
437	307A	308	D24	191	3782258.05	8.877800	3000	1.916	3.30	6.323	1.404	209.072	209.009	210.988	210.925	18.40	2.10	212.770	212.100
438	308	308A	C24	16	3782258.05	8.877800	3000	1.916	3.30	6.323	1.404	209.009	209.003	210.925	210.919	18.40	2.10	212.100	212.200
439	308A	309/Outfall	D24	489	3782258.05	8.877800	3000	1.916	3.30	6.323	1.404	209.003	208.840	210.919	210.756	18.40	2.10	212.200	212.000
440					Udairampur	drain					Outfall	208.750		209.400					

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Summary of Drains and Culverts

Table 3 summarizes the details (size, number and length) of the drains while Table 4 lists culverts of various sizes at different locations. Thus, the different sizes of drains to be adopted to drain off rain water from the scheme area are as in Table 3.

Table 3: Length and sizes of drains

S No	Drain Type	Width (mm)	Depth (mm)	No of drains	Length (m)
1	D1	450	300	211	39115.00
2	D2	450	450	10	1601.00
3	D3	600	300	1	60.00
4	D4	600	450	46	10141.00
5	D5	600	600	1	149.00
6	D7	750	450	11	1892.00
7	D8	750	600	10	2017.00
8	D9	900	600	11	2266.00
9	D10	900	750	1	263.00
10	D12	1200	750	10	1838.00
11	D13	1200	1050	1	351.00
12	D14	1500	750	2	204.00
13	D15	1500	900	1	385.00
14	D16	1800	900	1	265.00
15	D17	1800	1050	2	813.00
16	D19	2100	1200	5	1642.00
17	D20	2100	1350	1	40.00
18	D21	2400	1350	2	1164.00
19	D22	2700	1500	2	245.00
20	D23	3000	1500	4	691.00
21	D24	3300	2100	2	680.00
Total number and length of drains				335.00	65822.00

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Table 4: Length and sizes of box culverts

S No	Culvert Type	Width (mm)	Depth (mm)	No of Culverts	Length (m)
1	C1	450	300	22	352.00
2	C2	450	450	10	160.00
4	C4	600	450	25	405.00
7	C7	750	450	8	128.00
8	C8	750	600	7	112.00
9	C9	900	600	8	128.00
10	C10	900	750	4	64.00
11	C11	1200	600	1	16.00
12	C12	1200	750	4	64.00
14	C14	1500	750	2	32.00
15	C15	1500	900	1	16.00
16	C16	1800	900	2	46.00
17	C17	1800	1050	1	16.00
18	C18	2100	1050	1	16.00
19	C19	2100	1200	3	48.00
22	C22	2700	1500	2	32.00
23	C23	3000	1500	2	32.00
24	C24	3300	2100	1	16.00
Total number and length of culverts				104	1683

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L-Sections

Figures 3 to 9 show L-sections along the main drains.

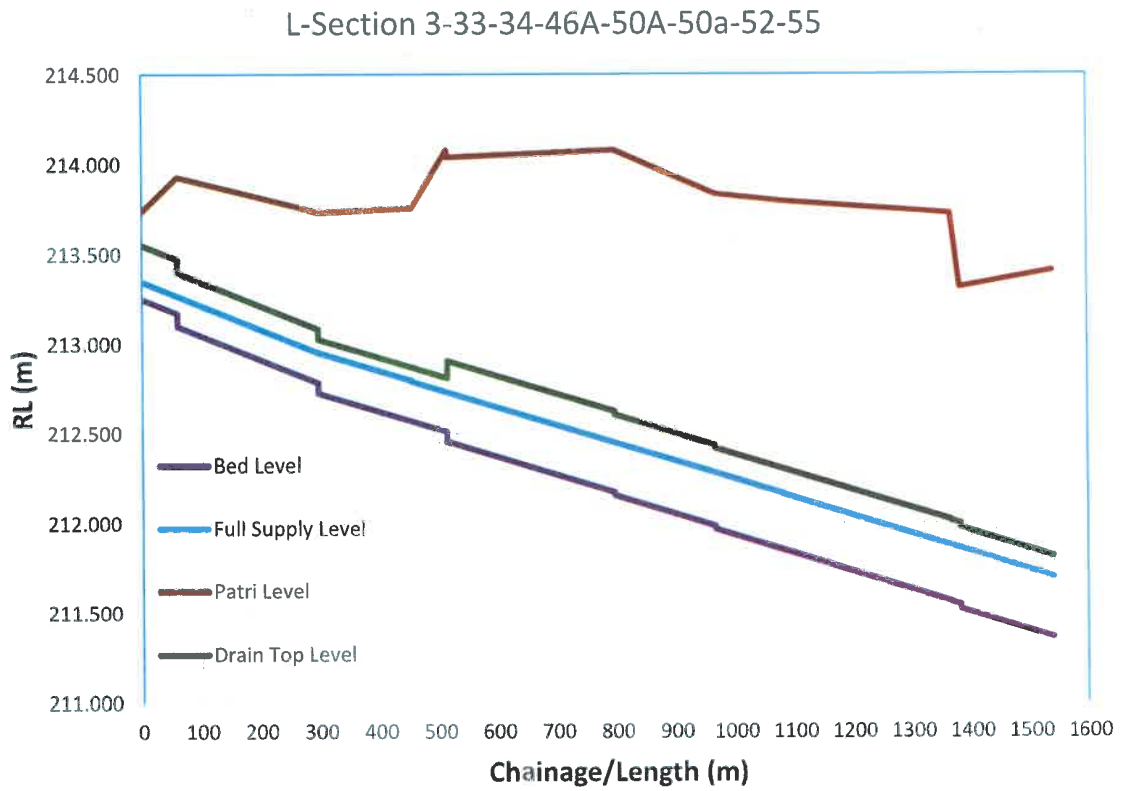


Fig 3: L-Section 3-33-34-46A-50A-50a-52-55

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L-Section 1-10B-9A-11B-36B-36A-38B-63A-62-55A-55-C3-C4

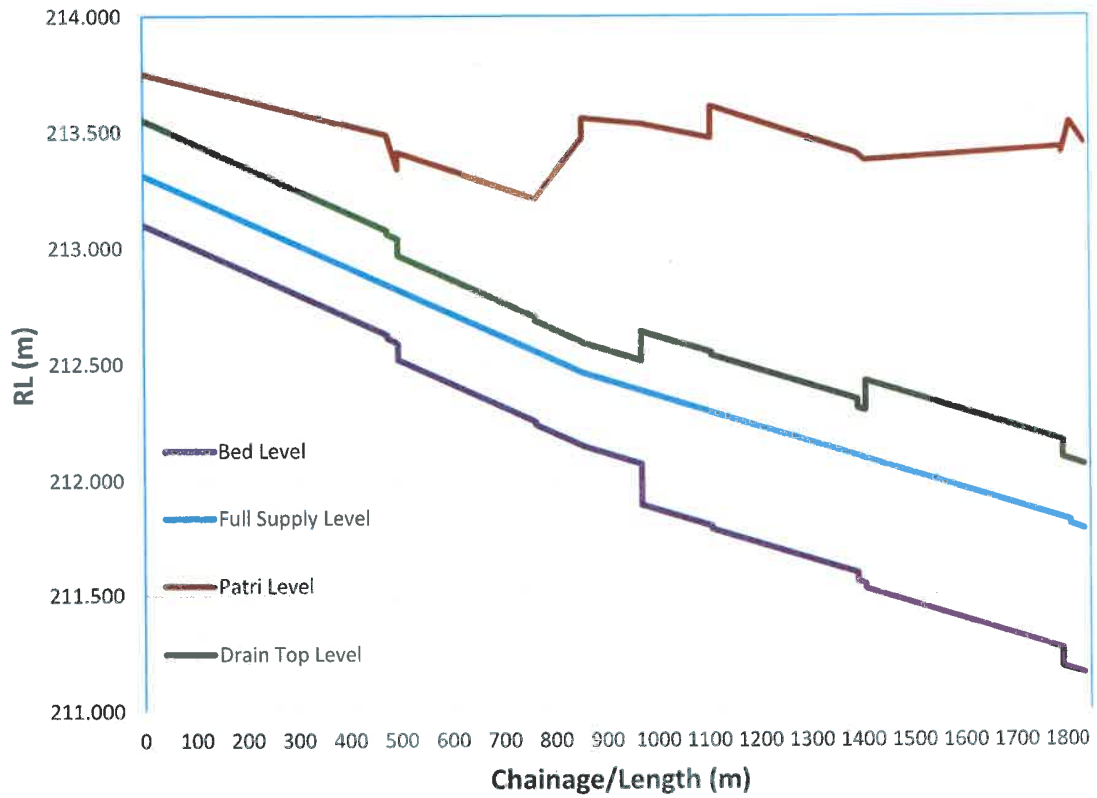


Fig 4: 1-10B-9A-11B-36B-36A-38B-63A-62-55A-55-C3-C4

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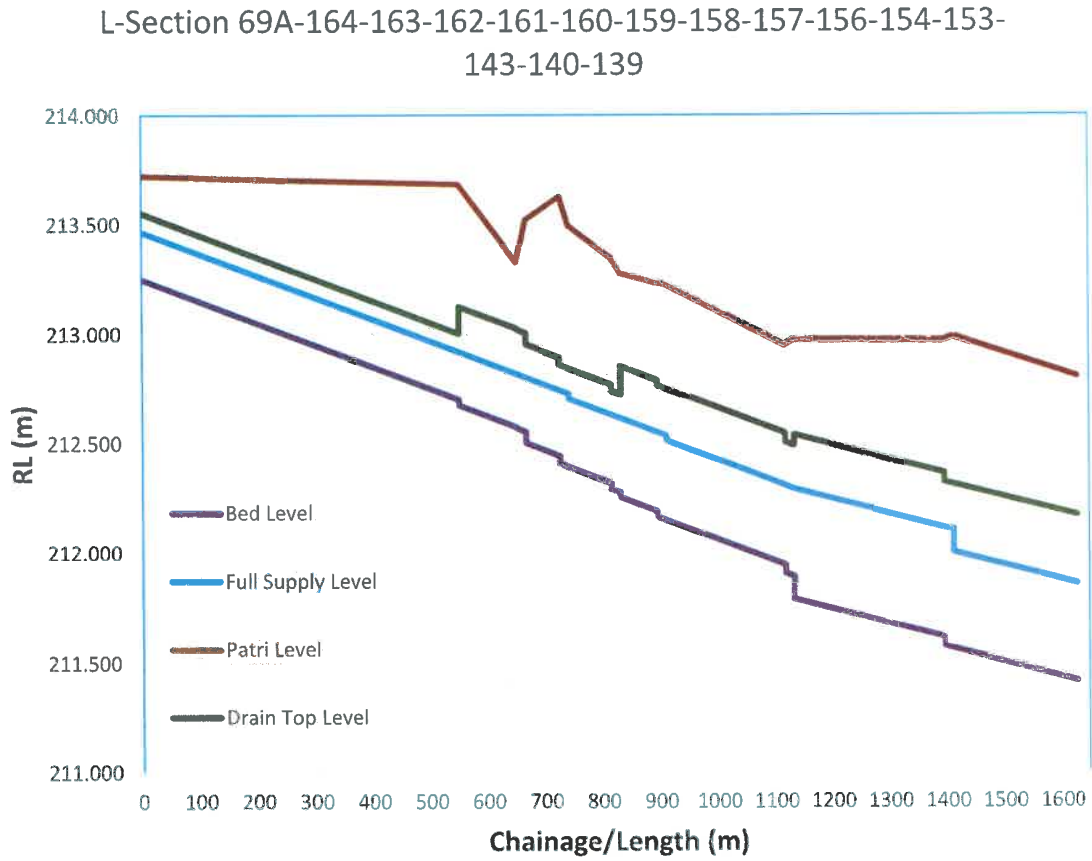


Fig 5: 69A-164-163-162-161-160-159-158-157-156-154-153-143-140-139

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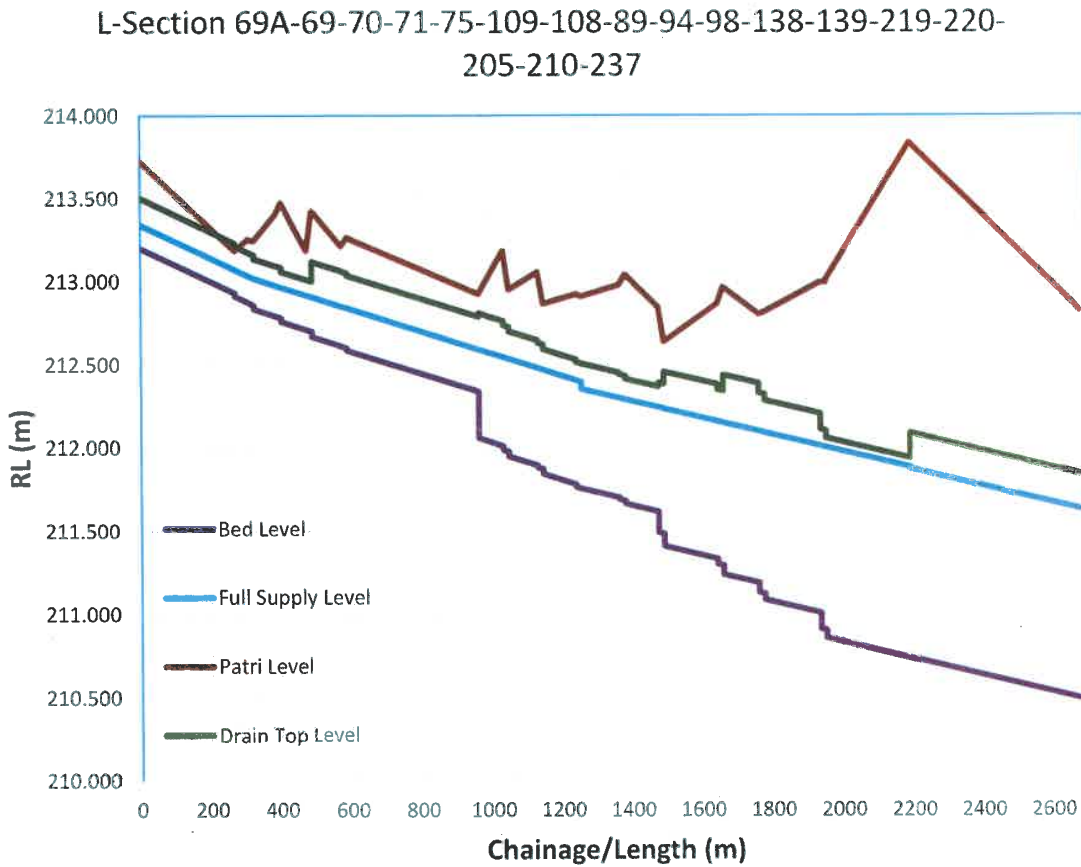


Fig 6: 69A-69-70-71-75-109-108-89-94-98-138-139-219-220-205-210-237

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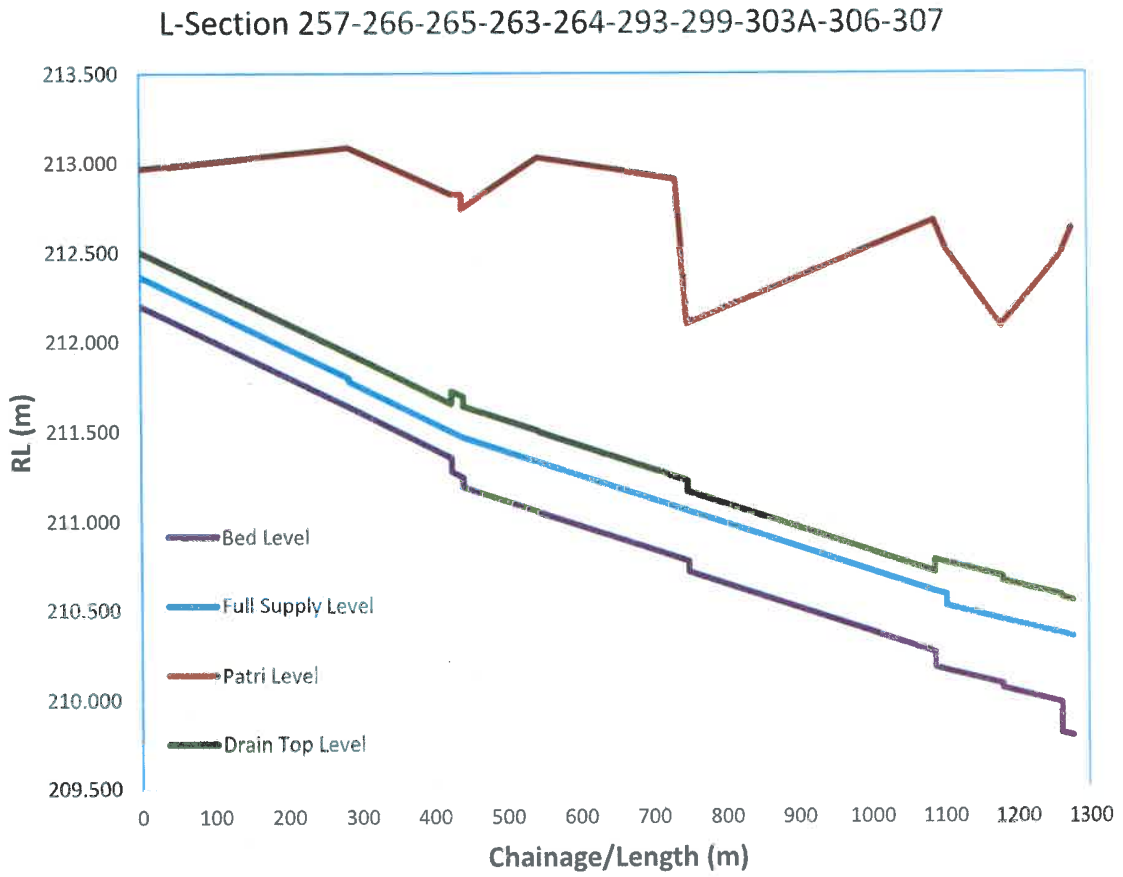


Fig 7: 257-266-265-263-264-293-299-303A-306-307

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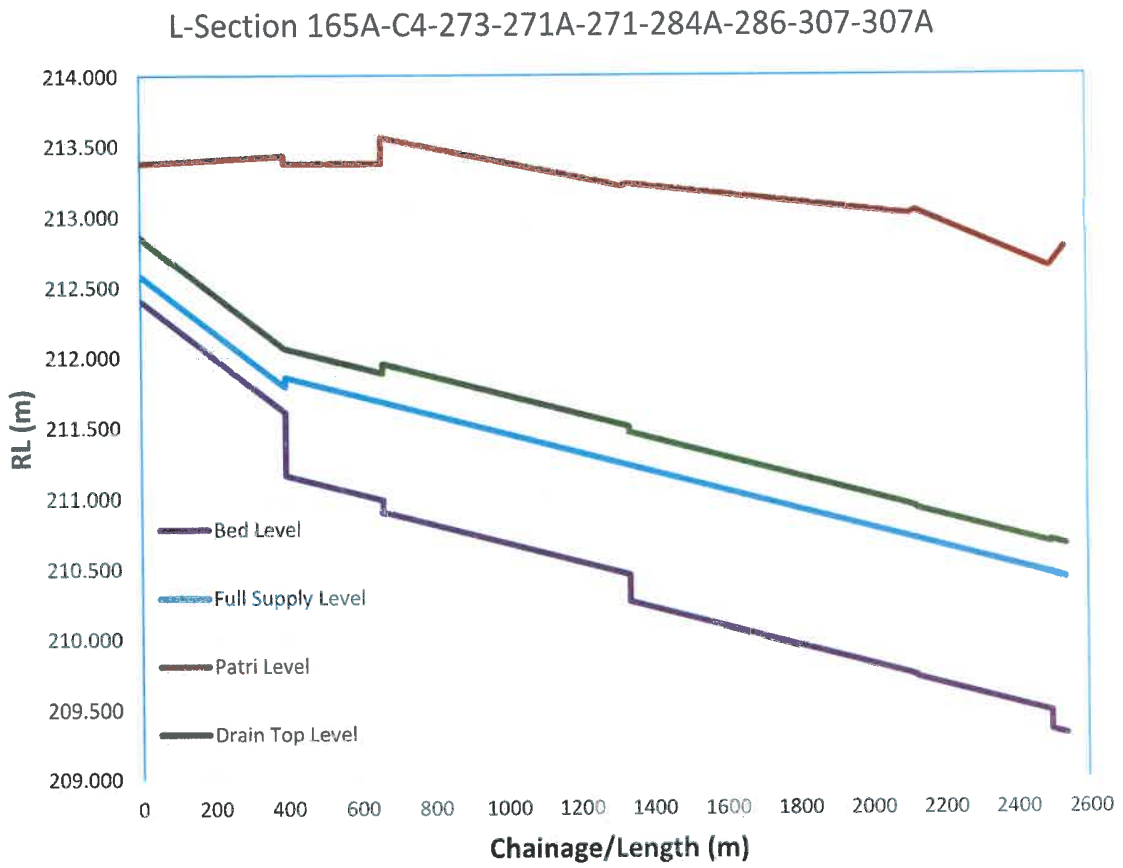


Fig 8: 165A-C4-273-271A-271-284A-286-307-307A

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L-Section 237-257A-257-262-294-298-297-296-307A-308-309-
Outfall

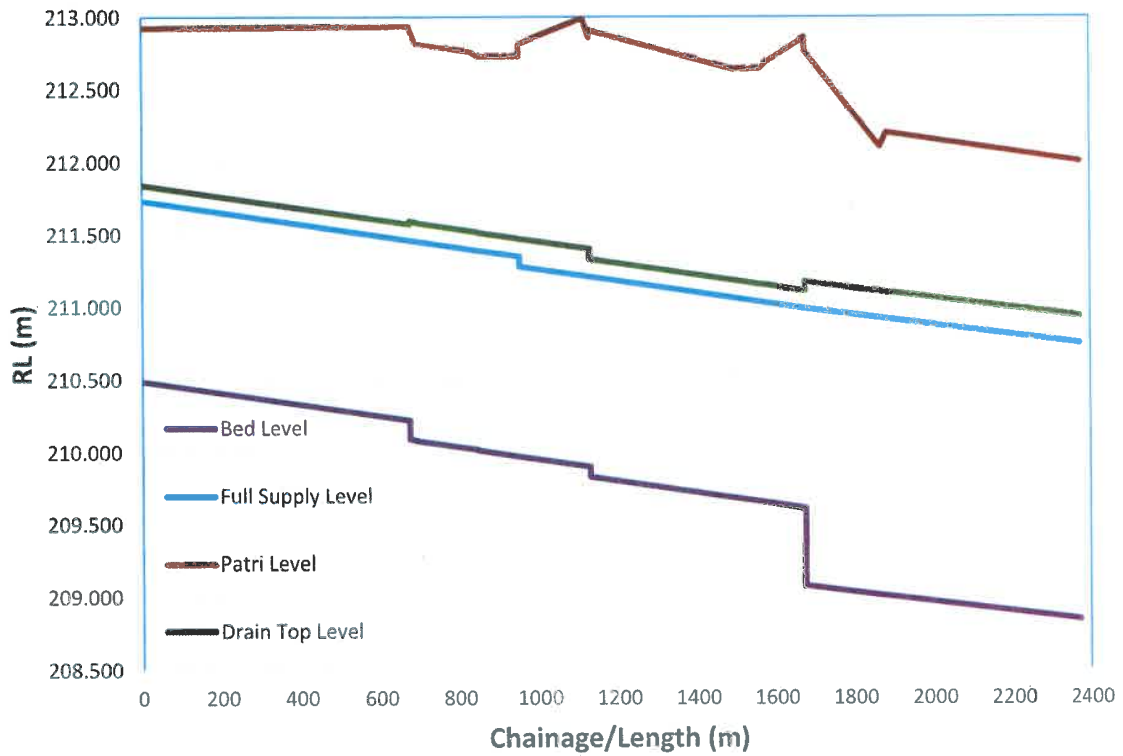


Fig 9: 237-257A-257-262-294-298-297-296-307A-308-309-Outfall

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Cross Sections

Figures 10 to 13 show cross sections at selected places.

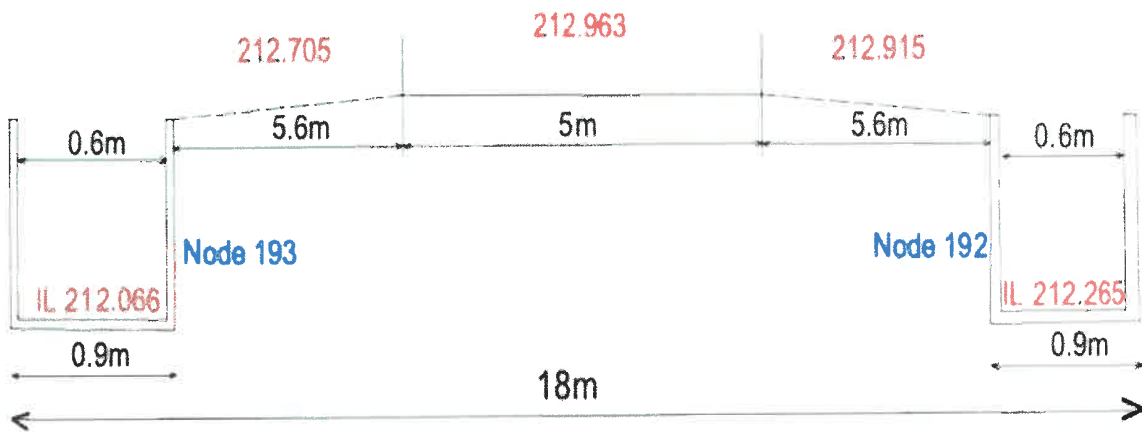


Fig 10: Cross Section at 193-192

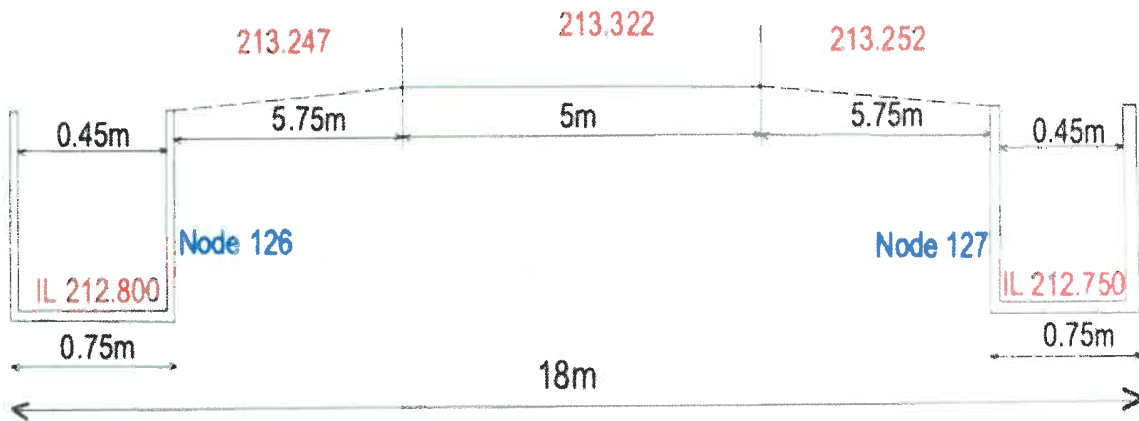


Fig 11: Cross Section at 126-127

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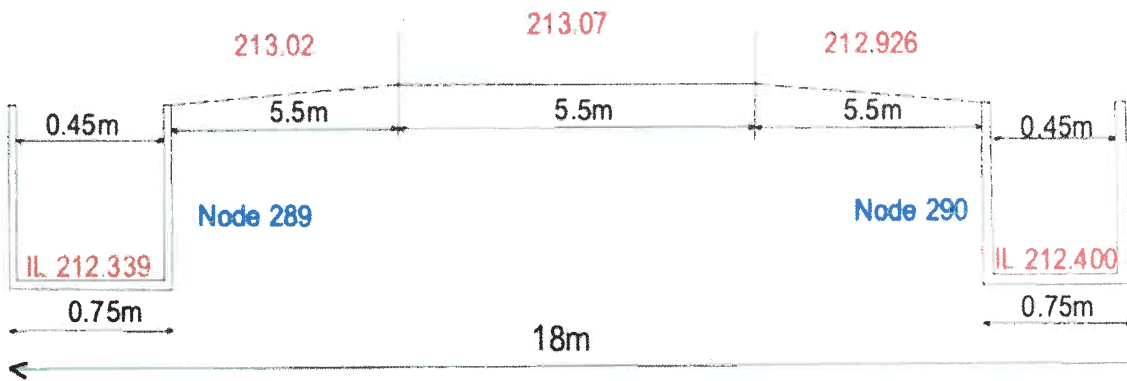


Fig 12: Cross Section at 289-290

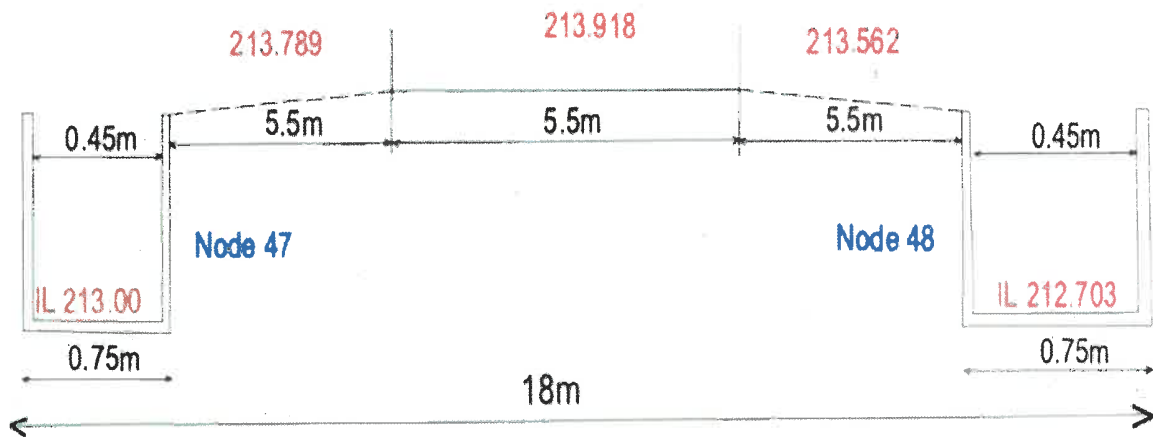


Fig 13: Cross Section at 47-48

Remarks on Hydraulic aspects

The present analysis and design are based on certain assumptions, inputs, and interpretations, so the following should be kept in mind

1. The sizing of drain and free board are based on the discharge at the tail of a drain, so throughout the drain length, the drain size will be on safer side and also the available free board will be more than the initially provided free board.

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2. On the basis of discussions according to YEIDA/GNOIDA master plan, the intensity of rainfall has been taken as 13 mm/hr for runoff computation with rational formula.
3. The storm runoff from few plots on the periphery of scheme and the plot under litigation have been considered into the network.
4. Road patri levels be raised wherever required based on the top level of drains wrt the adjoining ground level. Also if the top of drain is below the adjoining ground level then the drain side walls be raised appropriately.
5. Transition between two drain sections of different sizes should be carefully implemented adhering to the proposed invert levels and full supply levels.
6. The Udairampur drain has sufficient capacity to carry whole peak storm runoff from the scheme, thus the drains outfalling into it have been assumed discharging freely without backwater effect.
7. All drains and culverts are taken as rectangular shape (minimum width as 45 cm and the minimum depth as 30 cm) and made of RCC (precast/cast in situ) having Manning's $n = 0.012$ (cement plaster/RCC finish).
8. The minimum bed width to be adopted was 45 cm, hence the velocities in the starting drains are relatively on the lower side.
9. Four desilting chambers and ten screens/trash racks are suggested. Additional screens at culvert inlets and other places may be provided. Desilting chambers at other places may be provided but they will not result into reduction of cleaning/desilting requirements of drains.

09 JAN 2025

ATTESTED

(Sandeep Sharma)
Reg. No. 1136/98
NOTARY PUBLIC
Chaziabad (U.P.)



REGIONAL OFFICE
U.P POLLUTION CONTROL BOARD
GHAZIABAD

ANALYSIS REPORT OF PARK SAMPLE

Collected by:- Vipul Kumar (A.E.E) & Dhruv Dev Verma (L.A)
Sample Date:- 19.12.2024

Sl.N	Sampling location	pH	Colour	Odour	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	UPSIDA Park No-6	6.80	Turbid	Faint	36.0	292.0	58.0
2.	UPSIDA Park No-4	6.61	Turbid	Faint	38.0	298.0	64.0


J.R.F


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ANALYSIS REPORT OF HASANPUR LAKE

Collected by:- Vipul Kumar (A.E.E) & Dhruv Dev Verma (L.A)

Sample Date:- 19.12.2024


Sr. No	Sampling location	pH	Colour	Odour	Dissolved Oxygen (D.O) Mg/l	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	Hasanpur Lake near village Hasanpur-Lodha.	7.2	Colour less	Odour less	7.30	3.0	26.0	34.0
2.	Hasanpur Lake towards industrial area.	7.40	Colour less	Odour less	7.20	3.1	28.0	36.0


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ANALYSIS REPORT OF DRAIN SAMPLE

Collected by:- Vipul Kumar (A.E.E) & Dhruv Dev Verma (L.A)

Sample Date:- 19.12.2024

Sr. N	Sampling location	pH	Colour	Odour	B.O.D Mg/l	C.O.D Mg/l	T.S.S Mg/l
1.	Hasanpur drain near the lake village Hasanpur-Lodha (Near origin point).	7.20	Turbid	Faint	14.40	242.0	58.0
2.	Industrial drain before confluence of Hasanpur Drain.	8.50	Turbid	Faint	54.0	321.0	120.0


J.R.F


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