**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
WESTERN ZONE BENCH, PUNE**

**ORIGINAL APPLICATION NO. 73/2025 (WZ)
[Earlier Original Application No. 297/2025 (PB)]**

In Re: News Item Titled "Futala Lakes Charm Fades Amid Neglect and Poor Maintenance", appearing in The Times of India dated 25.05.2025

Versus

Central Pollution Control Board, through its Member Secretary & Ors.

...Respondents

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Date:10.04.2026 **Adv. Kabir Jhamb**

Counsel on behalf of Respondent No.5

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REPLY AFFIDAVIT BY RESPONDENT NO.5-MAHA-METRO

The Respondent No.5 most respectfully begs to submit as under;

1. It is submitted that the answering respondent is filing the present affidavit in compliance to the order dated 12.03.2025 passed by this Hon'ble Tribunal.
2. It is submitted that at the very outset, this respondent denies all averments made in the present original

Mrs. S R MATTA NOTARY NAGPUR DIST. (M.S.) INDIA Regn. No. 6776 My Term Expiree on 21-9-2028 GOVT. OF INDIA

application which are contrary to and inconsistent with the averments made in the present reply.

3. It is submitted that the present case pertains to the issue of declining condition of Futala Lake in Nagpur which appeared in the news item titled *"Futala Lakes Charm Fades Amid Neglect and Poor Maintenance"*, in The Times of India dated 25.05.2025.

4. It is submitted that Futala Lake, Nagpur is a man-made waterbody owned by Respondent No.6- Maharashtra State Public Works Department (PWD) and the answering respondent has been entrusted with the work of *"Futala Lake Nagpur Viewing Gallery with Tunnel"* by Respondent No.6-PWD on deposit work basis vide job no. CRF-MAH-2018-19-269 dated 19.07.2018. The answering respondent is an executing agency for the said project. Construction of viewing gallery, parking plaza and cement concrete road near Futala lake are the main components of the said project.

5. It is submitted that the entire project was under challenge alleging it to be on a 'Wet Land' in Public Interest Litigation No. 4 of 2023 filed by Swachh Association on 20.12.2022 before the Hon'ble Bombay High Court, Nagpur and the same was decided on 30.11.2023 setting aside all the grievances raised in respect to the said constructions and recreational activities. It is further submitted that thereafter the same was challenged before the Hon'ble Supreme Court in Special Leave to Appeal (SLP) No. 1420 of 2024 on 03.01.2024 and interim order in the nature of status quo was granted on 25.01.2024. It is further submitted that thereafter the said matter was heard finally and the final judgment was passed on 07.10.2025 by the Hon'ble Supreme Court and upheld the order of Hon'ble Bombay High Court. Therefore, it is pertinent to note that no fountain shows had been conducted and thus there was no waste generated between 25.01.2024-07.10.2025 and till date. In fact, even today the project is ongoing and there are no activities pertaining to

fountain shows are being conducted. The copy of Judgment dated 30.11.2023 passed by Hon'ble Bombay High Court in PIL 4 of 2023 is hereto annexed and marked as **ANNEXURE-R5/1.** The copy of Judgment dated 07.10.2025 passed by Hon'ble Supreme Court in SLP No. 1420 of 2024 is hereto annexed and marked as **ANNEXURE-R5/2.**

6. It is submitted that the ongoing construction activities carried out by the answering respondent near the Futala Lake are not damaging the waterbody and that the entire waterbed along with the recreational and beautification structures are kept clean and properly maintained.

7. The photograph in the said article dated 25.05.2025 depicts the discharge point of a non-gated spillway associated with the tank. The spillway functions as an overflow structure, permitting the release of water only when the water level exceeds the designated High Flood Level (HFL). Due to its hydraulic characteristics and role as the terminal outlet, this location is highly

susceptible to the accumulation of silt, suspended solids, and floating debris. During periods of elevated water levels, accumulated water, along with entrained debris, overtops the spillway and flows downstream. However, when water levels recede, substantial deposits of silt, organic matter, and solid waste remain in the vicinity of the spillway, necessitating periodic removal. Although this area does not fall under the jurisdiction of Maha Metro, it is submitted that due to the continuous inflow of waste and recurring accumulation at this critical location, regular desilting and removal of debris are essential. Such maintenance activities are required to be undertaken by the concerned authorities particularly during low water level periods, when access for cleaning is more feasible. The Respondent No.2 has undertaken cleaning and desilting operations in March, 2026 and photographs evidencing the same are annexed. The copy of photographs are hereto annexed and marked as **ANNEXURE-R5/3.**

8. It is further submitted that vide order dated 04.09.2025, this Hon'ble Tribunal also constituted a Joint Committee for site inspection and directed to submit a report. That pursuant to the said direction a joint committee report dated 17.11.2025 was filed before this Hon'ble Tribunal and several recommendations were made in compliance to that. That in line with that, the answering respondent has already installed 72 CCTV Cameras in the vicinity of viewing gallery and has prepared the environmental Plan (EMP) in march 2022 including Anticipated Environmental impacts and Mitigation Measures through PECS Environmental Engineers and consultants, Nagpur which was also submitted to the competent authority i.e. Respondent No.2-Nagpur Municipal Corporation (NMC). The copy of photographs showing CCTV Cameras are hereto annexed and marked as **ANNEXURE-R5/4A.** The copy of EMP Plan along with documents relating to CCTV are hereto annexed and marked as **ANNEXURE-R5/4B.**

9. It is submitted that during the entire construction process undertaken by the answering respondent, the EMP was followed and it was made sure that all the mitigation measures suggested in the EMP are followed. Some of the measures taken by Maha Metro are as follows:

A. Maha Metro accommodated two public toilets in the viewing gallery to maintain the cleanliness and prevent the area from becoming filthy. The said public toilets has separate sewer line, which has been laid along the road and connected to a newly constructed septic tank on the other side of the road, adjacent to the existing septic tank for the sulabh shauchalay constructed by Nagpur Municipal Corporation. The newly constructed septic tank is of 66 Cum Capacity. Further, separate provisions has been made for the treatment of sewage waste, generated in parking plaza. The Photograph showing sewage treatment plant for parking plaza, Drawing related to location of sewage treatment plant and

Photograph of Septic Tank for viewing Gallery and Drawing related to Septic Plant are hereto annexed and marked as **ANNEXURE R5/5 (Collectively).**

B. During the construction of Viewing gallery and Parking Plaza, Maha Metro utilized almost all the excavated soil/materials for backfilling and for the purpose mentioned in the EMP.

C. During the fountain trial show session from 24th August 2020 to 17th February 2023, Maha Metro took the responsibility of waste management process effectively by engaging a contractor namely M/s D.P. Jain & Co. by forming a special sqad/team.

10. It is specifically submitted that the water body near fountain and banyan tree, proposed floating Deck cum stage (which is under construction and will remain in south bank and will move near fountain when there will be show) has been kept clean and maintained properly by taking all necessary precautions by the answering respondent. However, it is submitted that at present the revamping of fountain and its

accessories/equipment is underway. After completion of the said work the nodal/SPV authority shall be nominated/formed and through that the operator for this project shall be appointed. The effective waste management shall be done and ensured through the operator thereafter. The latest photographs showing present status of cleanliness of water body near Musical Fountain, Banyan Tree, Proposed floating banquet hall and floating restaurant at Futala Lake are hereto annexed and marked as **ANNEXURE R5/6 (Collectively).**

11. The boundary wall which was collapsed previously, was then repaired by the answering respondent as per the direction of Heritage Committee. The copies of before and after Photos of Heritage Wall restoration are hereto annexed and marked as **ANNEXURE-R5/7.**

12. It is submitted that in respect to the walls which are now collapsed on the North and South/South-East, the responsibility of that lies with the owner of the Lake.

i.e. Respondent No.6- PWD. Property Card of the Lake is hereto annexed and marked as **ANNEXURE-R5/8.**

13. It is further submitted that responsibility of Maha Metro lies for the construction phase only and afterwards the same will be handed over back to Respondent No.6-PWD after completion of construction activities. Till that time MAHA Metro undertakes the responsibility to keep clean the areas adjacent to or in the vicinity to the construction work which is under the responsibility of answering Respondent.

Hence this Affidavit.

Respondent No.5

H. L. KAWRE
Chief Project Manager - CRF
Maharashtra Metro Rail Corporation Ltd.

Advocate for Respondent No.5

KABIR JHAMB

PLACE: NAGPUR

DATE: 09.04.2026

M/S. S. R. MAT NOTARY NAGPUR DIS

VERIFICATION AND AFFIDAVIT

I, Hiralal Kawre, Aged about-61 years, Chief Project Manager/CRF of Respondent No.5-Maharashtra Metro Rail Corporation, do hereby solemnly go on oath and state that I am conversant with the facts and circumstances of the case and as such competent to swear the present affidavit. That the contents of the Paras **1** to **13** of the present reply/submissions are facts true to my knowledge and nothing has been concealed there from.

Respondent No.5
H. L. KAWRE
Chief Project Manager - CRF
Maharashtra Metro Rail Corporation Ltd.

Date: 10.04.2026
Place: NAGPUR

SWORN BEFORE ME ON THIS 10 TH DAY OF April 2026 AT NAGPUR BY SHRI / SMT./ KU. Hiralal Kawre RESIDENT OF NAGPUR WHO HAS BEEN IDENTIFIED BY SHRI / SMT. Kabir Thumb ADVOCATE, NAGPUR

Mrs. S. R. MATTA
ADVOCATE & NOTARY
S-R, Clarke Town, Nagpur

NOTARIAL REG. 657
DATE 10/4/2026

NOTARY MRS. S. R. MATTA DIST. NAGPUR (M.S) INDIA REGD. No. 6776 GOVT. OF INDIA

Mrs. S. R. MATTA NOTARY NAGPUR DIST. (M.S.) INDIA Regn. No.6776 My Term Expires on 21-9-2028 GOVT. OF INDIA

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ANNEXURE-R5/1

2023:BHC-NAG:16604-DB

IN THE HIGH COURT OF JUDICATURE AT BOMBAY
NAGPUR BENCH, NAGPUR

Public Interest Litigation No.4 of 2023

Swacch Association, Nagpur ... Petitioner

Versus

The State of Maharashtra and others ... Respondents

Shri S.A. Rajeshirke with Shri Amogh Parlikar and Shri K.S. Narwade, Counsel for Petitioner.

Shri S.K. Mishra, Senior Advocate, assisted by Shri A.S. Fulzele, Additional Government Pleader for Respondent Nos.1, 2 and 9.

Shri S.K. Mishra, Senior Advocate, assisted by Shri J.B. Kasat, Counsel for Respondent No.3.

Shri Anand Parchure, Counsel for Respondent No.4.

Shri S.M. Puranik, Counsel for Respondent No.5.

Shri A.R. Patil, Counsel for Respondent Nos.6 and 7.

Shri N.S. Deshpande, Deputy Solicitor General of India for Respondent No.8.

CORAM : A.S. CHANDURKAR & MRS. VRUSHALI V. JOSHI, JJ.

Date when arguments were heard : 11th October, 2023.

Date when the judgment was pronounced : 30th November, 2023.

JUDGMENT (PER A.S. CHANDURKAR, J.) :

1. The present proceedings have been filed in public interest by Swacch Association, a Society registered under the Societies Registration Act, 1860 as well as under the Maharashtra Public Trusts Act, 1950. It seeks to raise the issue with regard to impermissibility of installation of musical fountain and associated machinery inside the body of Futala Tank. It also seeks to object to the construction of the viewer's gallery on the bank of Futala Tank and prays that the Tank be

restored to its original state after demolishing the viewer's gallery. The prayer for interim relief was made by the petitioner during the pendency of the present proceedings and by the order dated 5-7-2023, the interim relief as prayed for was not granted. However, directions were issued to the respondents to ensure that the spirit behind imposing restrictions under Rule 4 of the Wetlands (Conservation and Management) Rules, 2017 ('the Rules of 2017') is strictly observed and no construction of a permanent nature within Futala Lake is undertaken. In the aforesaid backdrop, the present proceedings are being considered.

2. According to the respondents, the order dated 5-7-2023 takes into consideration all the apprehensions expressed by the petitioner. They submit that as Futala Lake is not a 'wetland' as defined under Rule 2(1)(g) of the Rules of 2017, the interim order dated 5-7-2023 be made absolute and the parties be directed to act in accordance with the directions issued therein. The petitioner however contends otherwise to urge that the prohibition, as contemplated by Rule 4 of the Rules of 2017 to undertake any activity of a permanent nature in a wetland be implemented insofar as Futala Lake is concerned.

3. Shri S.A. Rajeshirke, learned counsel for the petitioner, submitted that Futala Lake, though not declared as a 'wetland' in terms of Rule 2(1)(g) of the Rules of 2017, was an identified wetland and the same found mention in the National Wetland Inventory and Assessment (NWIA). The said inventory having been taken in the year

2006-07 and Futala Lake having been identified as a wetland, the provisions of the Rules of 2017 ought to be applied with full rigor. Referring to the very same decisions that were pressed into service when the prayer for interim relief was considered, the learned counsel submitted that no construction of any nature whatsoever was permissible in such water body. Referring to Rule 4(2) of the Rules of 2017, it was urged that the activities undertaken by the respondents were prohibited for being so undertaken at a wetland. Such activities amounted to committing an encroachment on a water body. Referring to the provisions of the Unified Development Control and Promotion Regulations for the State of Maharashtra, it was submitted that even for a construction of a temporary nature, permission of the Planning Authority was necessary. Such permission was not taken, thus resulting in breach of the said Regulations as well as violation of Rule 4 of the Rules of 2017. A similar contention was raised insofar as construction of viewer's gallery on the bank of Futala Lake was concerned. Though the said area fell within the green zone, commercial activities were sought to be undertaken therein. This construction was within 50 metres of the water body and there was no power whatsoever with the Planning Authority to relax such criteria. The parking plaza being constructed across the road also fell within the green zone wherein construction was not permissible. Giving a go by to the Regulations and without changing the user of such land, the construction had been undertaken which required interference at

the hands of the Court. The learned counsel then referred to the Environment Status Report of the City of Nagpur that was prepared by the National Environmental Engineering Research Institute, Nagpur to submit that the quality of the Lake water would deteriorate with the user of the Lake for such activities. Huge amounts were likely to be spent on the said venture which was highly arbitrary. Commercial interests of the respondents could not be given precedence over environmental concerns of the general public. Reference was made to the provisions of Section 63 of the Maharashtra Municipal Corporations Act, 1949 to indicate the nature of duties and responsibilities of the Municipal Corporation in that regard.

4. To substantiate the stand of the petitioner, the learned counsel referred to the Public Trust Doctrine as envisaged in the decisions in ***M.C. Mehta Versus Kamal Nath and others [(1997) 1 SCC 388]***, and ***Hinch Lal Tiwari Versus Kamala Devi and others [(2001) 6 SCC 496]*** that had been referred to in ***Navi Mumbai Environment Preservation Society and another Versus Ministry of Environment through its Secretary, Department of Environment and others [2018 SCC OnLine Bom 4074]***. The learned counsel also referred to the decision in ***Jitendra Singh Versus Ministry of Environment and others [(2020) 20 SCC 581]*** in that regard. Attention was also invited to the Precautionary Principle that stands accepted by the Hon'ble Supreme Court in its decisions and it was submitted that the activities undertaken by the respondents ought to

be discontinued. The said venture itself could be shifted to a place otherwise than a green belt so as to protect Futala Lake. On this premise, it was prayed that this Court may pass appropriate directions in public interest.

5. Shri S.K. Mishra, learned Senior Advocate for the respondent Nos.1, 2 and 9 which included the State Wetland Authority, opposed aforesaid submissions. He reiterated the stand taken by the said respondents while opposing the prayer for interim relief. He submitted that though the activities in question had commenced in 2019, the present proceedings had been filed in December 2022 and thereafter by amending the prayers in June 2023, the petitioner had sought to raise a belated challenge to such activities. There was no explanation whatsoever furnished by the petitioner for the delay in approaching the Court in the present proceedings. The construction activities that had commenced after obtaining due sanction were on the verge of completion. Reference was made to the sanction orders dated 18-10-2019 and 1-9-2022 issued by the Competent Authorities. It was pointed out that these orders of sanction had not been challenged by the petitioner nor was a prayer made that the sanctions granted were illegal. As long as the orders of sanction operated, there was no question of demolishing the construction that was undertaken on that basis.

It was submitted that as a Wetland Authority constituted by the Ministry of Environment of the State Government, it had taken a

specific stand that Futala Lake was not a 'wetland' under Rule 2(1)(g) of the Rules of 2017. The contents of the affidavit filed on behalf of the Wetland Authority were neither disputed nor controverted. Since Futala Lake was a man-made water body, it did not answer the definition of a 'wetland' under Rule 2(1)(g) of the Rules of 2017. While the petitioner sought to support its stand by contending that Futala Lake was an identified wetland, the Wetland Authority had specifically asserted that it was not a declared 'wetland' under the Rules of 2017. There was no reason whatsoever to disregard the opinion of the Competent Authority that was placed on record. It was then submitted that after obtaining all due permissions and without disturbing the ecology, the activities in question had been undertaken. Due permission of the Heritage Committee had also been obtained which had not been challenged by the petitioner. The requisite plans were sanctioned by the Planning Authority under the relevant regulations which again were not subjected to challenge. Since all activities were being undertaken in accordance with the sanctioned plans, there was no illegality in the same. The learned Senior Advocate submitted that the State was conscious of the responsibilities envisaged by Articles 48-A and 51-A of the Constitution of India. Since it was clear that the provisions of Rule 4(2) had not been violated, no relief whatsoever be granted to the petitioner. The directions issued in the interim order dated 5-7-2023 were being complied with by the respondents.

6. Shri Anand Parchure, learned counsel appearing for the respondent No.4- Maharashtra Metro Rail Corporation Limited (MMRCL), submitted that the said respondent was merely an executing agency of the plans that had been duly sanctioned by the Competent Authority. He referred to the affidavits filed on behalf of the said respondent dated 14-6-2023 and 25-8-2023. It was reiterated that no permanent structure was being constructed in the water body. The artificial banyan tree was in fact a projection on a screen and the same was not to be constructed. The plans as well as the drawings undertaken under the guidance of Visvesvaraya National Institute of Technology, Nagpur were also referred to. It was further submitted that various activities had been undertaken to restore the precincts of the Futala Lake at the instance of the Heritage Committee. The activities in the Lake would result in agitating the surface of the water which would ultimately result in maintaining its quality. There was no threat to aqua life in that regard. The respondent No.4-MMRCL would ensure that none of the activities undertaken would result in causing any damage to the Tank. It was reiterated that the directions issued in the interim order would be obeyed by the said respondent. Since no permanent structure was being constructed, the apprehensions expressed by the petitioner were misconceived.

7. Shri S.M. Puranik, learned counsel appearing for the respondent No.5- Nagpur Metropolitan Regional Development Authority reiterated the stand that was taken earlier. He too

questioned the delay on the part of the petitioner in approaching the Court and submitted that after obtaining all due permissions, the work in question had been undertaken.

Shri A.R. Patil, learned counsel for the respondent No.6-Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Nagpur referred to the resolution dated 9-6-2020 that was passed by the respondent No.6 permitting use of the land for construction of the parking plaza. Since the said land was not of much use to the respondent No.6, the same was permitted to be used as parking plaza. The ownership of the said land continued with the respondent No.6 while permitting such user. Reference was also made to the sanction granted in that regard along with the permission for change of user dated 6-2-2023 issued by the Urban Development Department of the State of Maharashtra. It was thus submitted that no further directions ought to be issued in the present proceedings.

8. We have given due consideration to the respective submissions and we have also perused the documentary material on record. At the outset, we may state that most of the contentions now urged were also urged when the prayer for interim relief was considered. The said contentions find mention in the order dated 5-7-2023 and hence with a view to avoid repetition, a separate reference to the same is not being made herein. Suffice it to observe that the order dated 5-7-2023 was not subjected to any further challenge and the same continues to operate. On the basis of the material on record, a finding has been

recorded based on the affidavit filed by the Director, Environment and Climate Change Department of the State Government/Principal Secretary to the State Wetland Authority that Futalaka Lake being a man-made water body, it does not fall within the definition of the term 'wetland' under Rule 2(1)(g) of the Rules of 2017. There is no additional material placed on record thereafter for this Court to re-consider the said issue afresh. It may be noted that the learned counsel for the petitioner reiterated that the petitioner was relying on the fact that Futala Lake was an identified wetland as per the NWIA 2006-07 while the respondents urged that the said Lake being a man-made water body is not a declared wetland. Since the field is covered by the Rules of 2017 and Futala Lake does not answer the definition of the term 'wetland', we hold that being a man-made water body, Futala Lake is not a 'wetland' under Rule 2(1)(g) of the Rules of 2017.

9. Notwithstanding the aforesaid position on record, we may refer to the Office Memorandum dated 8-3-2022 issued by the Ministry of Environment, Forests and Climate Change of the Government of India. In the light of the order passed by the Hon'ble Supreme Court on 4-10-2017 in Writ Petition (Civil) No.230 of 2001 ***[M.K. Balakrishnan and others Versus Union of India and others]***, it was clarified/reiterated by the said Office Memorandum that the wetlands identified as per NWIA 2011 should be protected as per Rule 4 of the Rules of 2017.

Thus even if Futala Lake is not a declared wetland by the State Wetland Authority, the restrictions imposed vide Office Memorandum dated 8-3-2022 ought to apply to the said Lake. It is in this backdrop that the respondents had been directed to ensure that the spirit behind enacting the Rules of 2017 is not violated by undertaking any construction of a permanent nature within Futala Lake. We are inclined to continue this direction with a view to protect and preserve Futala Lake from any construction of permanent nature being undertaken therein. At this stage, we may refer to the affidavit dated 25-8-2023 filed on behalf of the respondent No.4-MMRCL. In Paragraph 13 of the said affidavit, it has been stated as under :

> *"13. ... It is submitted that the Respondent No.4 assures this Hon'ble Court that none of the above activities would be carried out without appropriate sanctions and permission of which are already obtained and it would be ensured that not only the guiding provisions and rules are adhered to but even the cleanliness, hygiene and associated items as contemplated under the Swacch Bharat Mission would be implemented. It is further ensured that any of the activities undertaken would not result in causing any damage to the tank. It is further ensured that during the construction by this Respondent, the water body where the floating banquet hall, floating restaurant as well as Artificial Banyan Tree are proposed is kept clean and is properly maintained by taking all necessary precautions/steps in this regard."*

10. Notwithstanding the fact that Futala Lake is not a declared wetland, we cannot be oblivious of the expectations envisaged in Part IV and Part IV-A of the Constitution of India. Article 48-A requires the State to protect and improve the environment and to safeguard the forest and wildlife of the country. Article 51-A(g) recognizes the duty of every citizen of India to protect and improve the natural environment including lakes. Thus even if Futala Lake is not a declared wetland, the duties and responsibilities imposed by the aforesaid provisions would have to be adhered to in true letter and spirit. The learned counsel for the petitioner is justified in invoking the Public Trust Doctrine that has been recognized by the Hon'ble Supreme Court in its various decisions including the decision in ***Animal and Environment Legal Defence Fund Versus Union of India and others [(1997) 3 SCC 549]***. In ***M.C. Mehta*** (supra), it has been observed that the Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to everyone irrespective of one's status in life. The said doctrine enjoins upon the Government to protect the resources for the enjoyment of the general public rather than to permit their use for private ownership or commercial purposes.

The Precautionary Principle has also been recognized by the Hon'ble Supreme Court in its various decisions including the decision in ***A.P. Pollution Control Board Versus M.V. Nayudu [(1999) 2 SCC 718].*** According to the said principle, it is better to err on the side of caution and prevent environmental harm that could be irreversible in future. It would be better to anticipate environmental harm and take measures to avoid it or to choose the least environmentally harmful activity. The said principle has been thereafter consistently applied by the Courts in larger public interest. A Co-ordinate Bench in ***Navi Mumbai Environment Preservation Society*** (supra) has applied both the aforesaid principles while considering measures to be taken to safeguard lakes and water bodies in Navi Mumbai. We are of the view that an approach based on a fusion of the Public Trust Doctrine as well as the Precautionary Principle would be required to be adopted in the present case so as to preserve Futala Lake which is a man-made water body.

11. We may state that the efforts taken by the petitioner in highlighting the present issue deserve to be recognized as the present proceedings have been initiated in public interest and they are not adversarial in nature. Preservation of Futala Late is of paramount importance and the respondents are duty bound to act responsibly in a manner consistent with Articles 48-A and 51-A(g) of the Constitution of India. It is for this reason that the aspect of unexplained delay and laches on the part of the petitioner, as urged by the respondents, is not

considered a formidable reason for not entertaining the present proceedings in public interest.

12. It is not in dispute that the activities of construction of the viewer's gallery and parking plaza are preceded by various requisite permissions and sanctions granted by the concerned authorities. The documents on record indicating the same supported by affidavits of the concerned authorities have not been specifically challenged by the petitioner. In effect, therefore, the sanctions granted including the sanctions dated 18-10-2019 and 1-9-2022 continue to operate. Similarly, the permissions granted by the Heritage Committee on 30-6-2022 as well as 6-2-2023 granted by the Urban Development Department permitting change of user continue to operate. In absence of any challenge to the same, a total prohibition on such activities as sought by the petitioner cannot be imposed. At the same time, it would be necessary to ensure that in accordance with the spirit of the Rules of 2017, no permanent construction would be undertaken at the man-made water body- Futala Lake.

13. Thus, by applying the Public Trust Doctrine as well as the Precautionary Principle, it is directed that the respondents shall ensure that the spirit behind the Rules of 2017 and especially Rule 4(2)(vi) thereof is not violated by undertaking any construction of a permanent nature within Futala Lake. The respondent No.4-MMRCL alongwith the respondent No.3- Nagpur Municipal Corporation are directed to ensure that the activities undertaken by them do not result in causing

any damage to the Lake. They shall also ensure that the water body where the floating banquet hall, floating restaurant as well as the artificial banyan tree are proposed is kept clean and is properly maintained by taking all necessary precautions/steps in that regard. In addition, the statements made in the affidavit dated 25-8-2023 filed on behalf of MMRCL that have been reproduced hereinabove would also be binding on the said respondent.

It is expected that the respondents would also be alive to the need for preserving the man-made water body- Futala Lake to enable the future generations also to be able to witness the Lake in its present form. It would therefore be necessary for the respective respondents to ensure that their activities do not result in causing any ecological damage to the water body and that the quality of aqua life is not adversely affected. Though the present proceedings are being disposed of with a hope that the respondents would abide by the expectations referred to hereinabove, it is made clear that it would be open for any public-spirited citizen to bring to the notice of the Court any acts that could result in causing damage to the water body in future.

14. The Public Interest Litigation is disposed of in aforesaid terms leaving the parties to bear their own costs.

(MRS. VRUSHALI V. JOSHI, J.) **(A.S. CHANDURKAR, J.)**

LANJEWAR

ANNEXURE-R5/2

2025 INSC 1199

Reportable

IN THE SUPREME COURT OF INDIA
CIVIL APPELLATE JURISDICTION

CIVIL APPEAL NO._____OF 2025
(@Special Leave Petition (C) No.1420 OF 2024)

SWACCH ASSOCIATION, NAGPUR

...APPELLANT(S)

VERSUS

THE STATE OF MAHARASHTRA & ORS.

...RESPONDENT(S)

J U D G M E N T

N.V. ANJARIA, J.

Leave granted.

1.1 Heard learned Senor Advocate Mr. Gopal Sankaranarayanan for the appellant, learned Solicitor General Mr. Tushar Mehta for respondent Nos.1, 2 and 8, learned Additional Solicitor General Ms. Aishwarya Bhati for

respondent Nos.8 and 9, learned Senior Advocate Mr. Shekhar Naphade for respondent No.3, learned Senior Advocate Mr. S.K. Mishra for respondent No.4, learned Senior Advocate Mr. Dama Seshadri Naidu for respondent No.5, learned Senior Advocate Mr. Rohit Anil Rathi for respondent No.6, learned Senior Advocate Mr. Neeraj Kishan Kaul for the intervenor, along with the respective assisting learned advocates, at length.

2. The appellant-original petitioner addresses challenge to the judgement and order dated 30.11.2023 passed by the Division Bench of the High Court of Bombay[1], whereby the High Court disposed of the Public Interest Litigation No.4 of 2023 with certain observations and directions, declining to grant prayers made in the petition.

2.1 The petition before the High Court was filed by the appellant-Swacch Association-an organisation registered under the Societies Registration Act, 1860 as also under the Bombay Public Trusts Act, 1950, claiming to be a body engaged in the green practices and for promoting a healthy environment, in which a grievance was raised in respect of certain constructions and recreational activities set up in and around the Futala Lake[2] in Nagpur City, Maharashtra. The case put forward by the appellant was that the said Futala

1 Hereinafter, "High Court".
2 Hereinafter, "Futala Tank"

Lake was a 'wetland' and it ought to be protected for its environmental value and that the constructions which were made thereat were of permanent nature.

2.2 What was prayed was to declare that the installation of Musical Fountain and machinery thereof inside the body of the Futala Lake was illegal and against the public trust principle. It was further prayed to declare that the construction of the Viewer's Gallery on the bank of the Futala Tank was also illegal. The third prayer was for issuance of direction against respondent No.5-Nagpur Metropolitan Regional Development Authority to remove the Musical Fountain and the related set-up installed inside the body of the Futala Tank and to restore the Tank to its original state.

2.3 The fourth prayer was advanced for directing respondent No.3-Municipal Corporation Nagpur and respondent No.4- Maharashtra Metro Rail Corporation to demolish the viewer's gallery. Yet another prayer was made to declare that the construction of the Parking Plaza on the land bearing *Khasra* No.13/3 at *Mauje Futala* was contrary to the zone shown in the sanctioned development plan for Nagpur. Also, a direction was sought against respondent Nos.3 and 4 to demolish the building which was under construction on the said land.

2.4 Interim prayers were made seeking a restraint order against respondent No.4 from carrying out further construction of the Parking Plaza as also against respondent No.5 from holding of Musical Fountain Show, Laser Show and Multimedia Show at the Futala Tank.

3. The case of the appellant before the High Court and further emphasised before this Court was *inter alia* that in the guise of beautification and in the name of recreational activities for the people, the respondent authorities had proceeded to construct and erect the Viewer's Gallery on the bank of the Futala Tank and had installed Musical Fountain in the body of the Tank. It was the grievance of the appellant that the construction of nine storeyed building near the Futala Tank was proposed for parking, food court, *etc.* and that erected there was a Floating Restaurant, artificial Banyan Tree and a Musical Fountain inside the body of the lake.

3.1 It was contended that the Futala Lake was identified as 'wetland' in the map of Wetland Atlas of Maharashtra which was part of National Wetland Atlas. It was further claimed that the Lake is a 'wetland' within the meaning of Rule 2(1)(g) of the Wetlands (Conservation & Management) Rules, 2017[3], therefore the restrictions contained in Rule 4(2)(vi) of the 2017 Rules would apply, more particularly in the

3 Hereinafter, "2017 Rules".

present case the prohibition contained in Rule 4(1)(iv) would operate.

3.2 It was stated that in the National Wetland Inventory as carried out by Space Application Centre, Ahmedabad under the project "National Wetland Inventory and Assessment ("NWIA)" funded by the Ministry of Environment, Forest and Climate Change, Government of India, the Futala Tank was mentioned amongst 2,01,503 wetlands in the inventory list. The definition of wetland provided in Rule 2(1)(g) of the 2017 Rules has been wrongly construed by the High Court.

3.3 It was the case of the appellant that not only those prohibitions were given a go-by in creating recreational and beautification projects at the lake site, but the Construction Rules and the norm of minimum Fifteen meters' distance for any construction from a waterbody were also violated. It was further contended that in the sanctioned development project of Nagpur City, the proposed construction between the Futala Tank and eighteen metres road was permissible, however the construction was found to be on the *Pali* (boundary wall) of the Futala Tank.

3.4 It was next contended that the setting up of artificial Banyan Tree was a permanent construction inside the waterbody which was not only in breach of the prohibitory

rules, but also it has a damaging effect to the Lake. It was the case that a waterbody of Futala Tank- a 'wetland', was exploited for commercial purposes without caring for adverse ecological effect.

3.5 It was pleaded that under Article 21 of the Constitution, right to life has been given an expanded interpretation by this Court to include the right to clean air, clear water, clean environment, hygienic atmosphere and ecological balance. Article 48-A of the Constitution lays down the duty of the State to protect, safeguard and improve the environment and safeguard forest and wildlife, in addition to Article 51-A (g) of the Constitution which casts a duty on every citizen to protect the natural environment including lakes and rivers.

3.6 The appellant then referred to the principle of public trust enunciated by this Court in **M.C. Mehta vs. Kamal Nath & Ors.**[4] It was submitted that the construction of Viewer's Gallery on the Futala Tank would change the nature of the waterbody as well as its use, to take away its environmental value. It was submitted that the activities permitted in and around the tank run contrary to the doctrine of public trust.

4 (1997) 1 SCC 388

3.7 It may be mentioned that the High Court by a reasoned order dated 05.07.2023 refused to grant any interim relief to the appellant. The *prima facie* finding was recorded in the interim order that the Futala Lake does not fall within the purview of Rule 2(1)(g) of the 2017 Rules. However, the High Court observed that since the lake was mentioned as 'wetland' in the National Wetland Inventory and Assessment (NWIA), prohibition in Rule 4(2)(vi) of 2017 Rules deserves to be treated as relevant to protect the lake.

4. Respondent No.3-Municipal Corporation Nagpur, respondent No.4-Maharashtra Metro Rail Corporation and respondent No.5- Nagpur Metropolitan Regional Development Authority filed their replies and placed materials before this Court also in the present proceedings to refute the case and allegations of the appellant.

5. The following facts which are not disputed, go to show that the competent authorities granted various permissions for the projects and recreational facilities at Futala Lake, which were in accordance with the Rules and the norms.

(a) For Viewer's Gallery, plans were submitted on 29.08.2019 which were sanctioned by the Municipal Corporation Nagpur on 18.10.2019. The Heritage Committee granted sanction on 29.09.2018 and the

revised plan was sanctioned on 15.06.2021, in accordance with which the work was executed.

(b) The Parking Plaza plan was sanctioned by the Town Planning Department, Nagpur Municipal Corporation on 01.09.2022. The Heritage Committee also approved the parking plaza construction. It was thereafter that the Environmental Management Plan and the Dam Stability reports were submitted. The Heritage Committee again sanctioned the proposal on 30.06.2022.

(c) The Floating Stage-cum-Floating Banquet was permitted as per the No Objection Certificate (NOC) received on the different occasions on 07.03.2022, 21.03.2022 and 08.04.2022 from the Public Works Department. Similarly, NOCs were received from Group Captain, Commanding Officer, HQ Maintenance Command (Unit) on 22.09.2022, from District Deputy Commissioner of Animal Husbandry, Nagpur on 28.04.2022, from Assistant Commissioner, Fisheries Department, Nagpur on 23.05.2022, from the authority of the Heritage Conservation Committee, Nagpur on 20.07.2022, from Nagpur Municipal Commissioner, Nagpur on 10.05.2022 and also from the City Police Commissioner, Nagpur on 03.12.2022. Thus, the competent authorities have sanctioned the project.

(d) The artificial Banyan Tree is a part of Multimedia Show for which also admittedly, NOC was obtained from the authorities mentioned above, including the local authority.

(e) In respect of alleged utilization of land bearing Number 13/3 Mauje Futala, the Forest Department through Office of the Deputy Conservation Officer, Nagpur by communication dated 01.03.2024, stated that the said land was not a forest land. It was occupied by Dr. Panjabrao Deshmukh Agricultural University which used to grow saplings thereon.

(f) The Parking Plaza is not set up in the agricultural zone. It was given out that as per the applicable Regulation, the development of parking plaza upto 0.2 FSI of the gross plot area is permissible and that the competent authority has sanctioned the building plan accordingly in compliance with the norm.

(g) By Notification dated 15.10.2003, the State Government sanctioned the 'Regulations for conservation of building, artefacts, structures, areas and precincts of historic and cultural significance'. The Futala Tank is mentioned at serial number 132 in the Schedule of these Regulations which is treated as Grade I heritage structure.

In that view, the necessary sanction of the Heritage Conservation Committee was obtained before securing the permission for development of Futala Tank and Parking Plaza etc. which was granted by the Heritage Committee after obtaining a compliance report.

5.1 It is to be stated that the abovementioned permissions and No Objection Certificates granted by the competent authorities concerned, for the recreational facilities and beautification project set up at the place of the Lake, have not been challenged by the public interest litigant-appellant at any stage of the proceedings.

5.1.1 The respondents, including respondent No.4 have stated that in order to ensure the protection of ecological balance, compensatory afforestation was carried out in respect of the trees which were required to be removed for executing the directions at certain places. The trees which were removed were compensated by planting other trees at the location given by the Municipal Corporation. It was claimed that the Floating Musical Fountain Show resulted into improvement of quality of water in the Futala Tank and its aquatic life is enhanced. It was further stated that the Viewer's Gallery and the Parking Plaza are in the dry zone. The Viewer's Gallery has worked as protection against dumping of waste and encroachment.

5.2 Now, before proceeding further, it is warranting for the court to conclude on the kind and nature of the constructions in and around the Futala Tank, which are subject matter of grievance. The work of Viewer's Gallery has been executed as per the approved plan and that it was shown that the same is constructed on the Bund road adjacent to the precinct of the Futala Tank, which does not disturb the existing precinct. It is at a height of 4 metres above the dam level, which is permissible under the guidelines. The Gallery does not touch the embarkment structure. It could not be demonstrated that the Viewer's Galley in its existence has any adverse ecological effect.

5.2.1 No constructions are carried out in the catchment area of the Lake. The construction of the floating restaurant, banquet and the platform could not be categorized as permanent construction. It was given out that platform design was reviewed and vetted by IIT, Mumbai.

5.2.2 What was harped in particular on behalf of the appellant is that the Banyan Tree artificially created for recreational purpose is put up inside the Futala Lake and that it is a permanent structure causing serious harm to the waterbody. It was also claimed that 7000 tonnes of concrete stones were dumped inside the tank for constructing the screen of the Banyan Tree.

5.2.3 As per the factual details placed by the respondents, the said allegation was erroneous and exaggerated, merely based on the newspaper clipping. It was stated that since the Banyan Tree is to be used as the screen for the 3D show, it is accordingly erected using the Kerb stones weighing 350 tonnes in the total area placed inside the structure so that there is no lateral movement and the wind load is countered.

5.2.4 The Banyan Tree size is 25m x 10=250 square meters which is just 0.51% of the total area of the tank. Importantly, the structure of Banyan Tree is not secured by any permanent foundation. Nor it is affixed on the bed of the tank. Therefore, the structure of banyan tree cannot be termed as permanent structure. The working of the said Banyan Tree structure was executed as per the design proof-checked by Visvesvaraya National Institute of Technology, Nagpur.

5.2.5 When the Banyan Tree is not embedded on the bed of the lake and when there is no foundational support laid for it inside the tank and when it is removable at any time, this Court is inclined to accept and hold that the erection of Banyan Tree could not be regarded as a permanent structure. The structure possesses all the characteristics of a temporary structure on account of its very nature of built and removability, the existence thereof cannot be viewed as perpetual.

5.3 Next examining the central issue as to whether the Futala Tank classifies within the meaning and definition of Section 2(1)(g) of the 2017 Rules, the Futala Tank, also known as Telangkhedi Tank, a waterbody situated on the Western side of Nagpur City, was constructed in the year 1799 by Shri Gyanoji Bhosale. The lake covers, along with its catchment to be about 200 hectares. It was not a natural water reservoir, but constructed by the then Ruler, to cater to the irrigational needs. Undoubtedly, the lake is a man-made lake for the city of Nagpur.

5.3.1 When the definition of 'wetland' in Rule 2(1)(g) of the 2017 Rules is looked at, the Futala Lake is not classifiable within the statutory definition. The 2017 Rules are framed by the Parliament in exercise of powers conferred by Section 25 read with Sub-Section (1) and clause (v) of Sub-Section (2) and Sub-Section (3) of Section 3 and Section 23 of the Environment (Protection) Act, 1986, in supersession of Wetlands (Conservation and Management) Rules, 2010.

5.3.2 Rule 2 (1)(g) of the Rules contained the definition of 'Wetland' which is as under,

" 2(1) ...

(g) 'wetland' means an area of marsh, fen peatland, or water; whether natural or artificial, permanent or

temporary, with water that is static or flowing, fresh, brackish or last, including areas of marine water the depth of which at low tide does not exceed six meters, but does not include river channels, paddy fields, human-made water bodies/tanks specifically constructed for drinking water purposes and structures specifically constructed for aquaculture, salt production, recreation and irrigation purposes."

5.3.3 It could be seen from the aforesaid definition of 'wetland' that the statutory concept of wetland does not include river channels, water body and tanks which are specifically constructed for drinking water purposes and the structural construction is for aquaculture, salt production, recreation and irrigation purposes. Such exclusions stand outside the corners of the definition. Section 2(1)(i) is the definition of "wise use of wetlands" to mean the maintenance of the ecological character, achieved through implementation of eco-system approach within the context of sustainable development.

5.3.4 The historical facts given out in the reply of respondent No.4 filed in the present proceedings, goes to show clearly that the lake is a man-made waterbody constructed for drinking water and for irrigation purpose. It is

stated that as per the available record of Futala Tank at the Nagpur Museum of Archaeological Department of Nagpur popularly known as Ajab bungalow, *'Originally the reservoir was constructed to create a source of water in the Telankhedi precinct, which was recreational garden for the bhonsale's and site for their prestigious guest house fordignitaries. This catchment lake was formed by dammning the Futala stream which collects water from the slope of seminary hills and starky hillock. Retaining wall forms the eastern edge of the lake, and it was a broad low parapet and circular bastions. Futala stream which is one of the important tributaries of Nag River in the City, became significant due to holding of water in the Futala Tank.'*

5.3.5 The Futala Tank is thus an arrangement in the lower promenade in the centre. There is a well in which water is collected through weep holes inside the stone masonry. The water is supplied by gravity force through pipes. It was stated that there is a valve for operation. These aspects go to show that the Futala Lake was made for irrigational purpose. It was stated that the area of the Punjabrao Deshmukh Krishi Vidyapeeth which is for agricultural and research purpose falls on the Eastern side, that is, on other side of the road.

5.4 In view of this Court, the Futala Lake is a man-made waterbody and it does not fall within the meaning of the

statutory definition and is not a 'wetland' as defined in Rule 2(1)(g) of the 2017 Rules. The definition excludes human-made waterbodies and those constructed *inter alia* for irrigation purposes. The High Court was justified in recording finding in the interim order dated 05.07.2023 and confirming the same while passing the impugned final judgment and order.

5.5 It is to be noted that Rule 4 of the 2017 Rules which provides for the restrictions of activity in the 'wetland' would not apply *stricto sensu* to Futala Tank as the Lake falls outside the statutory definition. The said Rule is extracted hereinbelow,

> "**4. Restrictions of activities in wetlands.**—(1) The wetlands shall be conserved and managed in accordance with the principle of 'wise use' as determined by the Wetlands Authority.
>
> (2) The following activities shall be prohibited within the wetlands, namely,-
>
> (i) conversion for non-wetland uses including encroachment of any kind;
>
> (ii) setting up of any industry and expansion of existing industries;
>
> (iii) manufacture or handling or storage or disposal of construction and demolition waste covered under the

Construction and Demolition Waste Management Rules, 2016; hazardous substances covered under the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 or the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms Genetically engineered organisms or cells, 1989 or the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008; electronic waste covered under the E-Waste (Management) Rules, 2016;

(iv) solid waste dumping;

(v) discharge of untreated wastes and effluents from industries, cities, towns, villages and other human settlements;

(vi) any construction of a permanent nature except for boat jetties within fifty metres from the mean high flood level observed in the past ten years calculated from the date of commencement of these rules; and,

(vii) poaching." (Emphasis supplied)

5.6 It is to be noticed however, that one of the prohibited activities in Rule 4 (2)(vi) of the 2017 Rules is construction of permanent nature. In **M.K. Balakrishnan vs. Union of India** which was Writ Petition (Civil) No.230 of 2001 by order dated 08.02.2017, this Court dealt with the subject matter of 'wetland' identification and directed as under,

"We direct the application of the principles of Rule 4 of the Wetlands (Conservation and Management) Rules, 2010 to these 2,01,503 wetlands that have been mapped by the Union of India. The Union of India will identify and inventorize all these 2,01,503 wetlands with the assistance of the State Governments and will also communicate our order to the State Governments which will also bind the State Governments to the effect that these identified 2,01,503 wetlands are subject to the principles of Rule 4 of the Wetlands (Conservation and Management) Rules, 2010"

5.6.1 In the subsequent order dated 04.10.2017, the aforesaid direction was reiterated stating that in terms of the previous orders dated 08.02.2017, a total of 2,01,503 wetlands that have been mapped by the Union of India should continue to remain protected on the same principle as were formulated in Rule 4 of the Wetlands (Conservation and Management) Rules, 2010.

5.6.2 In view of above, the High Court in its impugned judgment correctly observed in paragraph 9,

"Notwithstanding the aforesaid position on record, we may refer to the Office Memorandum dated 8-3-2022 issued by the Ministry of Environment, Forests and Climate Change of the Government of India. In the light of the order passed by the Hon'ble Supreme Court on 4-10-2017 in Writ Petition

(Civil) No.230 of 2001 [M.K. Balakrishnan and others Versus Union of India and others], it was clarified/reiterated by the said Office Memorandum that the wetlands identified as per NWIA 2011 should be protected as per Rule 4 of the Rules of 2017."

5.6.3 The following further pertinent observations made by the High Court in the same paragraph,

"……even if Futala Lake is not a declared wetland by the State Wetland Authority, the restrictions imposed vide Office Memorandum dated 8-3-2022 ought to apply to the said Lake. It is in this backdrop that the respondents had been directed to ensure that the spirit behind enacting the Rules of 2017 is not violated by undertaking any construction of a permanent nature within Futala Lake. We are inclined to continue this direction with a view to protect and preserve Futala Lake from any construction of permanent nature being undertaken therein."

5.7 It is to be appreciated that the High Court gave certain directions including that the respondent shall ensure that the spirit of Rule 4(2)(vi) of the 2017 Rules will be respected and structure of any permanent nature within the lake would not be undertaken. The High Court further directed the respondents including the Municipal Corporation Nagpur to ensure that the activities nearby the Futala Lake does not lead to any damage to the Lake and further that the entire

waterbed along with its recreational and beautification structures are kept clean and properly maintained.

5.8 It is only proper that this pristine waterbody in the city of Nagpur continues to exist with twin objectives, namely to bring public good for the citizens of the city of Nagpur and also contribute to maintain environment friendliness without causing any ecological damage, both to the waterbody itself as well as to the quality of aqua life. This Court reiterates the directions as well as hope expressed by the High Court.

5.9 Applying the restrictions and rigours of Rule 4 of 2017 Rules and in ensuring its relevance to the waterbodies or wetlands, even if they are not covered within the statutory definition, there is a recognition of precautionary principle and doctrine of public trust, which is a judicial foresight and a salutary approach. The various directions issued by the High Court as referred to above, in the impugned judgment, are only an extension of such foresighted thought acted upon.

6. The judicial wisdom has evolved the doctrine of public trust. This doctrine has the intake of Articles 48-A and 51-A (g) of the Constitution, which in its ultimate analysis aims to preserve and conserve the natural resources like air, water, objects of nature to be applied for public good and collective societal interest and the natural bodies of various kinds on the earth. The concept is that the public has a right

to expect certain natural things including waterbodies, wetlands and natural lands like forests to retain their natural ingredients, and further that the idea of maintenance of their original characteristics finds way into the law of the land.

6.1 Propounded in **M.C. Mehta** (supra) and several subsequent decisions of this Court, the public trust doctrine is a salutary principle. The Supreme Court observed in **M.C. Mehta** (supra) that,

> "The notion that the public has a right to expect certain lands and natural areas to retain their natural characteristic is finding its way into the law of the land. The ancient Roman Empire developed a legal theory known as the "Doctrine of the Public Trust". The Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have such a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to everyone irrespective of the status in life....."
>
> (Para 23)

6.2 In the following observation, there lies a dictum that upholding of the public trust principle is the duty of the governmental authorities dealing with the natural resources,

> "25. The Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have such a great importance to the people

as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to everyone irrespective of the status in life. The doctrine enjoins upon the Government to protect the resources for the enjoyment of the general public rather than to permit their use for private ownership or commercial purposes.

(Para 25)

6.2.1 It was then stated,

"Three types of restrictions on governmental authority are often thought to be imposed by the public trust : first, the property subject to the trust must not only be used for a public purpose, but it must be held available for use by the general public; second, the property may not be sold, even for a fair cash equivalent; and third the property must be maintained for particular types of uses." (Para 25)

7. The public trust doctrine need not be limited to the natural bodies such as waterbodies, wetlands, lakes, rivers which are nature's gifts, but holds true also with respect to the man-made or artificially created waterbodies as well as the things and the objects from nature in order to promote ecology and environment. All those man-made or artificial bodies created from natural resources which contribute to the environment and are eco-friendly in their existence, have to be subject to the doctrine of public trust.

8. The human activities which are in tune with the nature and ecology or which are designed for creating healthy environment have to be guided and protected by legal measures. It calls for the responsibility not only on the part of the citizens, but the authorities also are equally enjoined to ensure that the doctrine of public trust in this sphere is applied and furthered.

9. The public trust doctrine would thus extend in respect of even man-made or artificially created natural objects, waterbodies, lakes, wetlands, etc. which are drawn and created from the nature or natural resources. It would in ultimate analysis pave way to extend to ensure the availment of right of healthy environment and ecological balance recognized for the citizens under Article 21 of the Constitution. At the same time promoting sustainable development for public good is not alien to it.

10. The judgment and order of the High Court and the directions issued therein are a balancing exercise. It is eminently proper and legal, booking no error.

11. The present appeal is hereby dismissed.

In view of the dismissal of the Appeal, all interlocutory applications, as may be pending would not survive and stand disposed of accordingly.

.....,CJI.
[B.R. GAVAI]

.....,J.
[K. VINOD CHANDRAN]

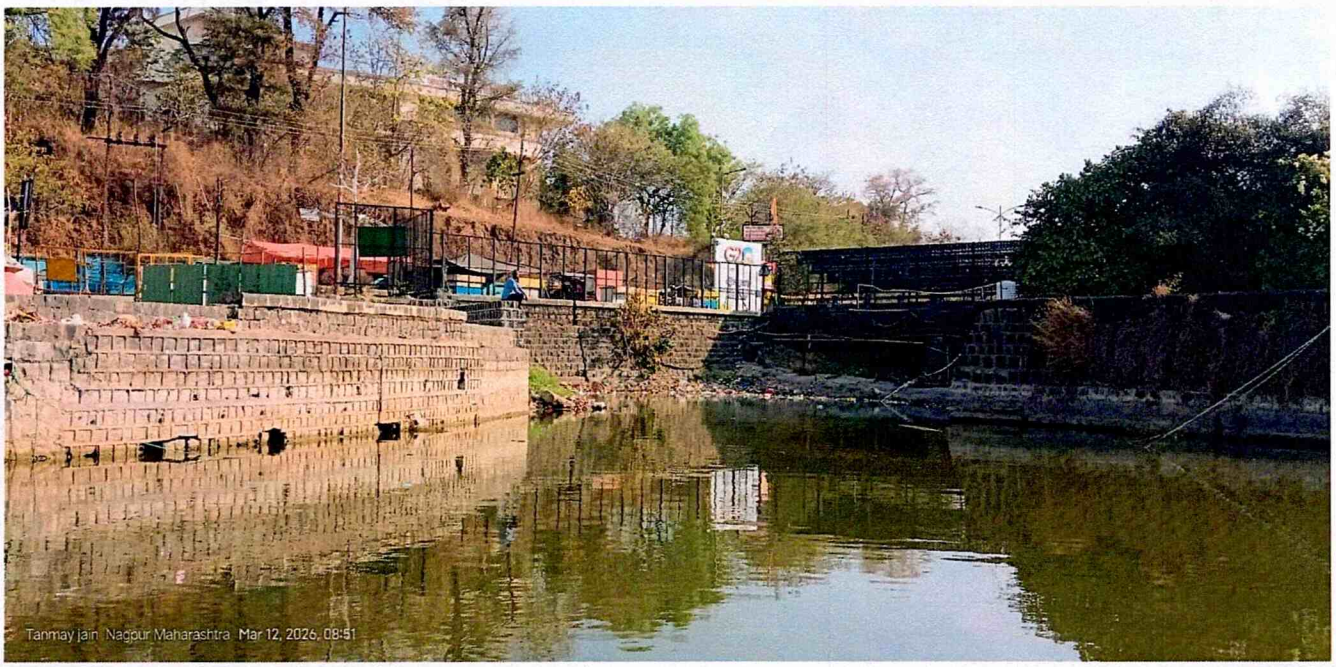
.....,J.
[N.V. ANJARIA]

NEW DELHI;
OCTOBER 07, 2025.

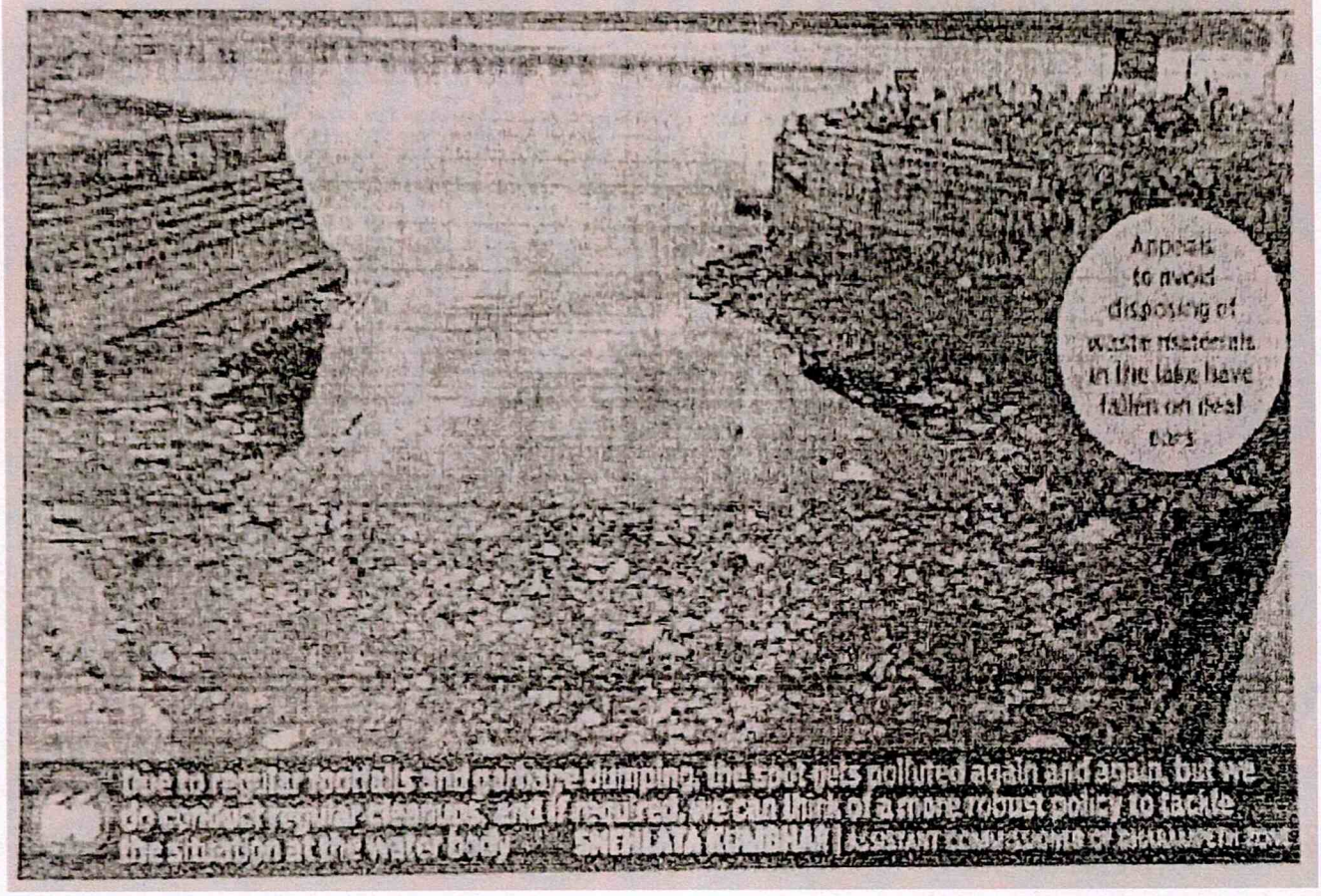
(VK)

ANNEXURE-R5/3

Present status of Futala Lake portion questioned in NGT OA-73/2025 WZ



FUTALA LAKE'S CHARM NOW AN EYESORE



ANNEXURE-R5/4A

Viewing Gallery Camera's Photos


प्रवेश द्वार
1 - 2
3
प्रवेश द्वार
4 - 7
फुटाळा फाउंटेन स्थळावर आपले स्वागत आहे
vivo T3x
Sushant Kamthikar Mar 8, 2026, 10:17


प्रवेश द्वार
1 - 3
4
प्रवेश द्वार
5 - 7
फुटाळा फाउंटेन स्थळावर आपले स्वागत आहे
vivo T3x
Sushant Kamthikar Mar 8, 2026, 10:16


← प्रवेश द्वार 1 - 4
5
फुटाळा फाउंटन स्थळावर आपले स्वागत आहे
प्रवेश द्वार → 6 - 7
5
प्रवेश →
Shreshtha Bharat
DELEGATE'S
vivo T3x 5G
Sushant Kamthikar Mar 8, 2026, 10:15


← प्रवेश द्वार 1 - 5
6
फुटाळा फाउंटन स्थळावर आपले स्वागत आहे
प्रवेश द्वार → 7
← गेट क्रमांक R, Q & P
गेट क्रमांक → S, T & U
Shreshtha Bharat
DELEGATE'S
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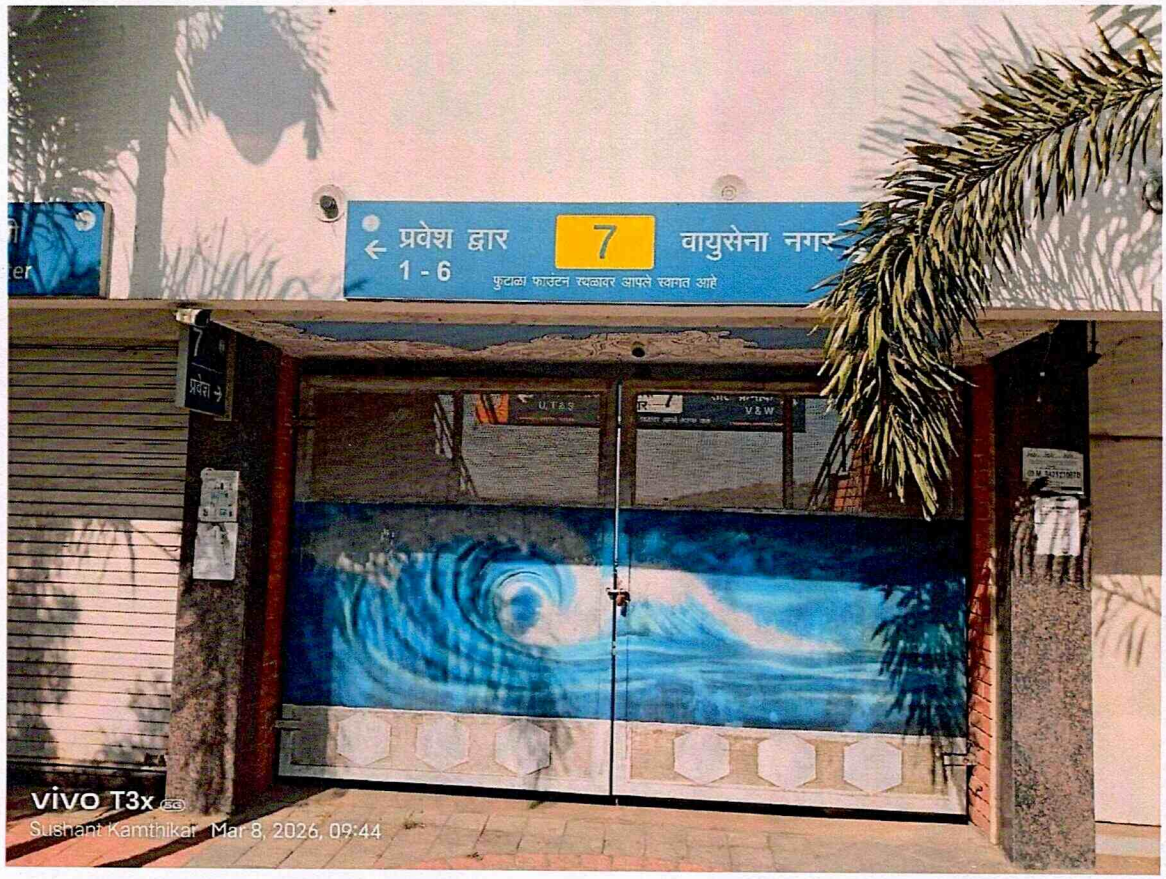
Sushant Kamthikar Mar 8, 2026, 09:46


प्रवेश द्वार
1 - 6
7
वायुसेना नगर
फुटाळा फाउंटेन स्थळावर आपले स्वागत आहे
vivo T3x 5G
Sushant Kamthikar Mar 8, 2026, 09:44


पार्किंग
निर्गमन 1
हार्दिक शुभेच्छा
वी आई पी
पार्किंग
vivo T3x 5G
Sushant Kamthikar Mar 8, 2026, 09:53


पार्किंग
निर्गमन 2
हार्दिक शुभेच्छा
वी आई पी
पार्किंग
vivo T3x
Sushant Kamthikar Mar 8, 2026, 09:54


पार्किंग
निर्गमन 3
हार्दिक शुभेच्छा
वी आई पी
पार्किंग
vivo T3x
Sushant Kamthikar Mar 8, 2026, 09:55


← पार्किंग
निर्गमन 4
हार्दिक शुभेच्छा
वी आई पी
पार्किंग →
vivo T3x
Sushant Kamthikar Mar 8, 2026, 09:57


← पार्किंग
निर्गमन 5
हार्दिक शुभेच्छा
वी आई पी
पार्किंग →
vivo T3x
Sushant Kamthikar Mar 8, 2026, 09:59


पार्किंग
निर्गमन 6
हार्दिक शुभेच्छा
वी आई
vivo T3x
Sushant Kamthikar Mar 8, 2026, 10:00


पार्किंग
निर्गमन 7
हार्दिक शुभेच्छा
वी आई
vivo T3x
Sushant Kamthikar Mar 8, 2026, 10:01


vivo T3x
Sushant Kamthikar Mar 8, 2026, 10:04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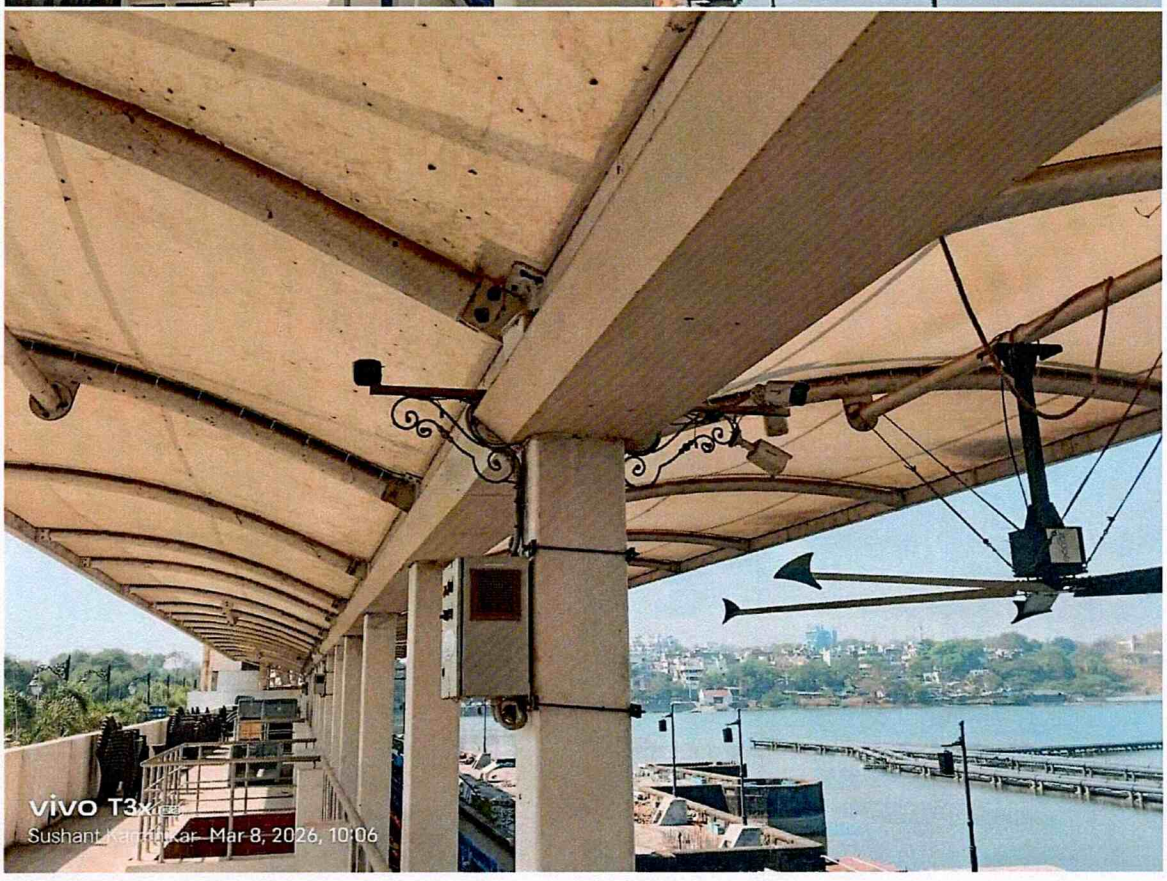
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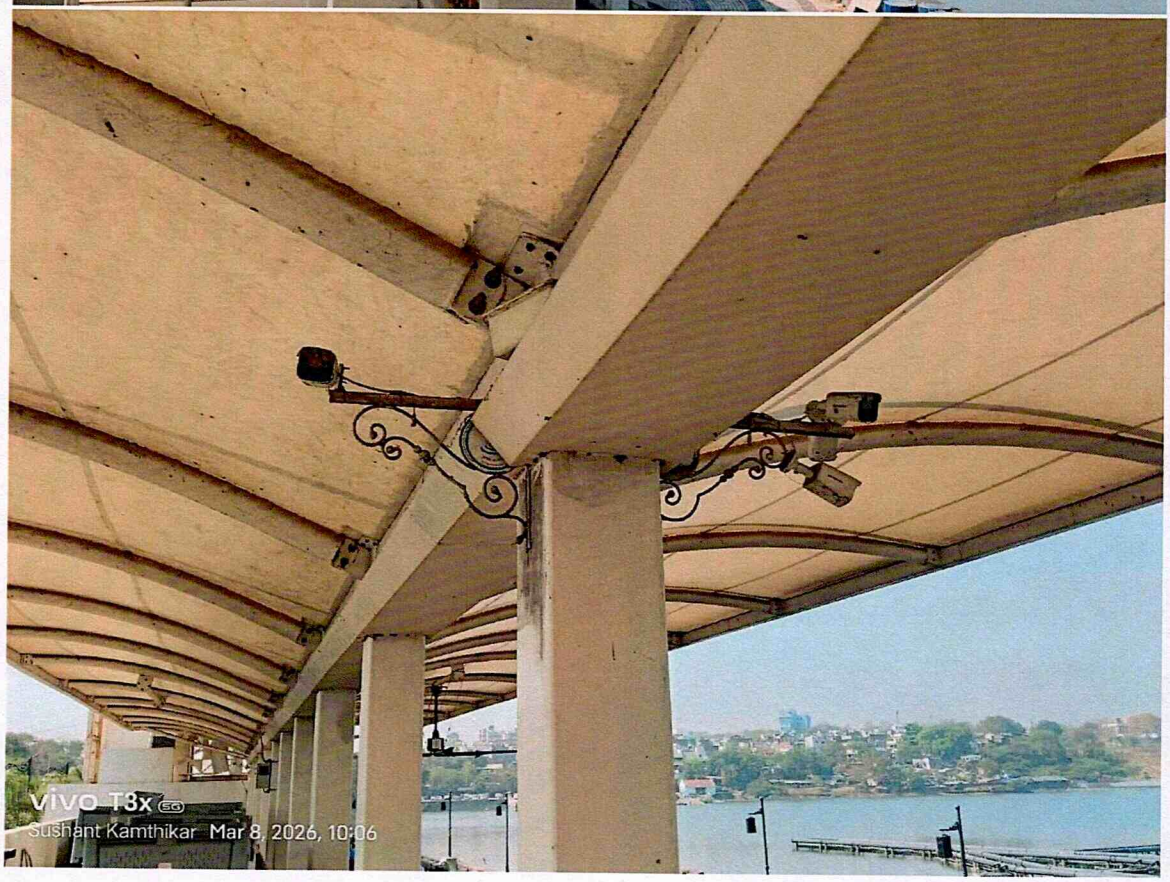
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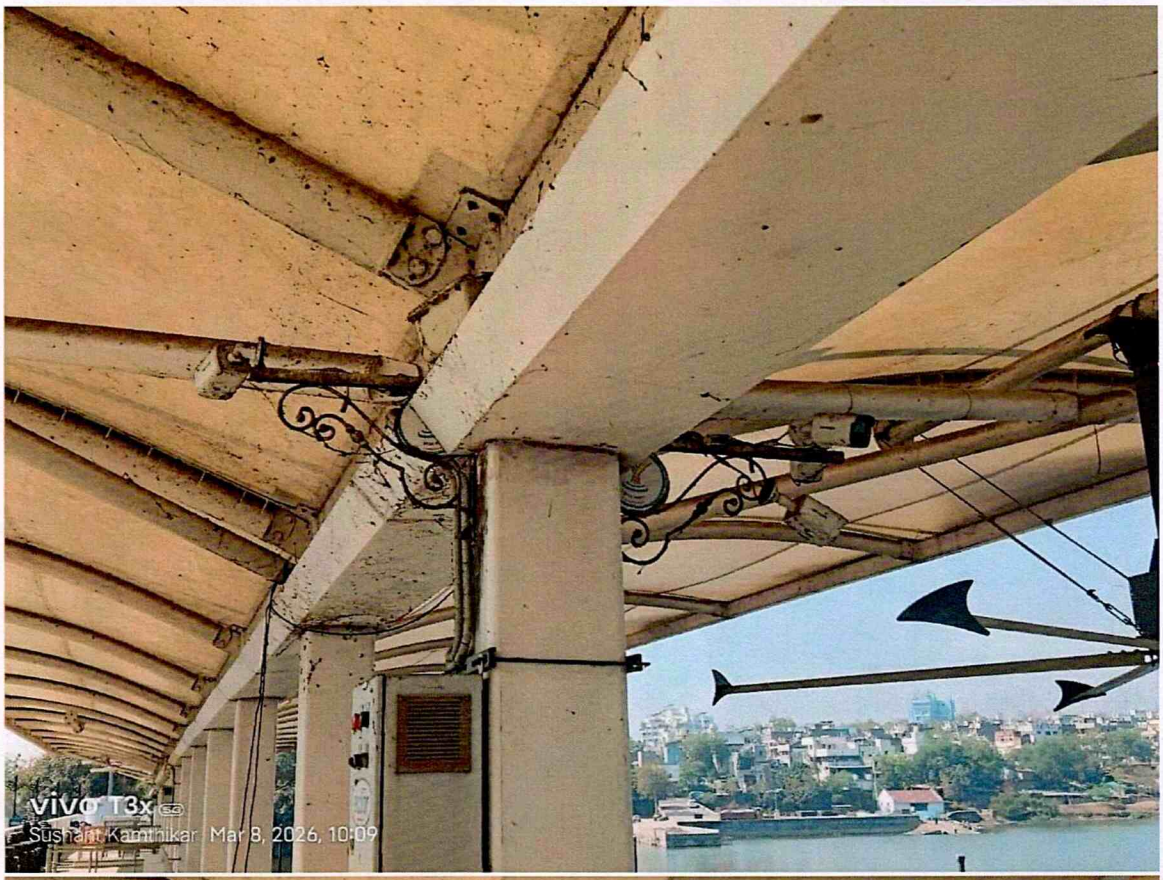
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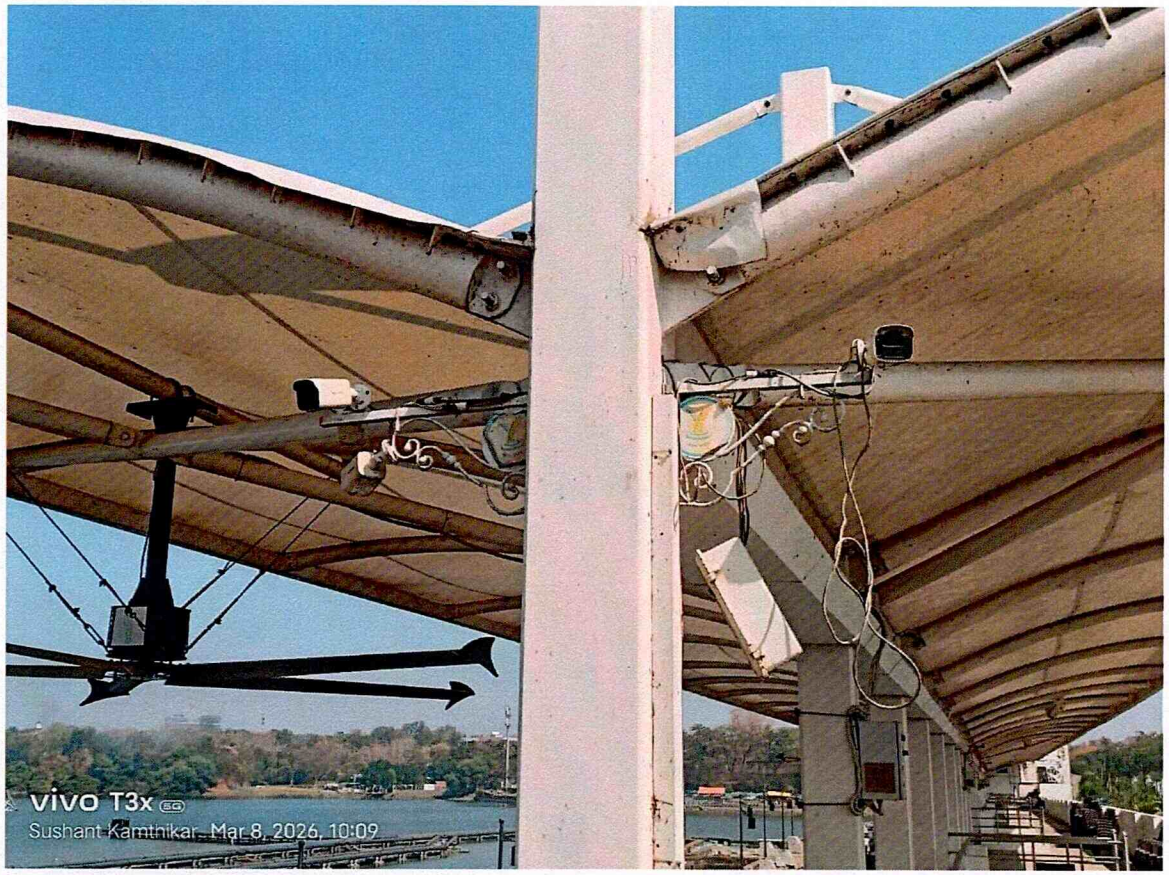
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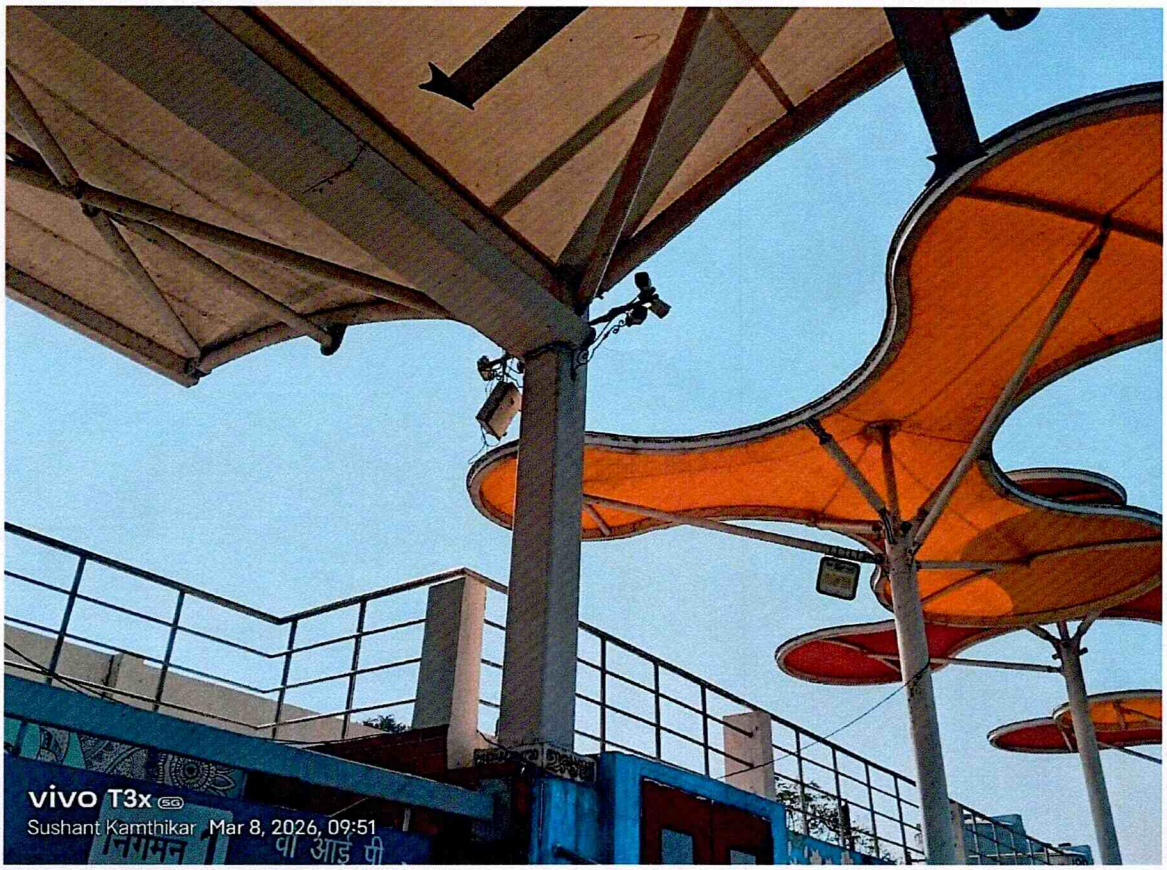
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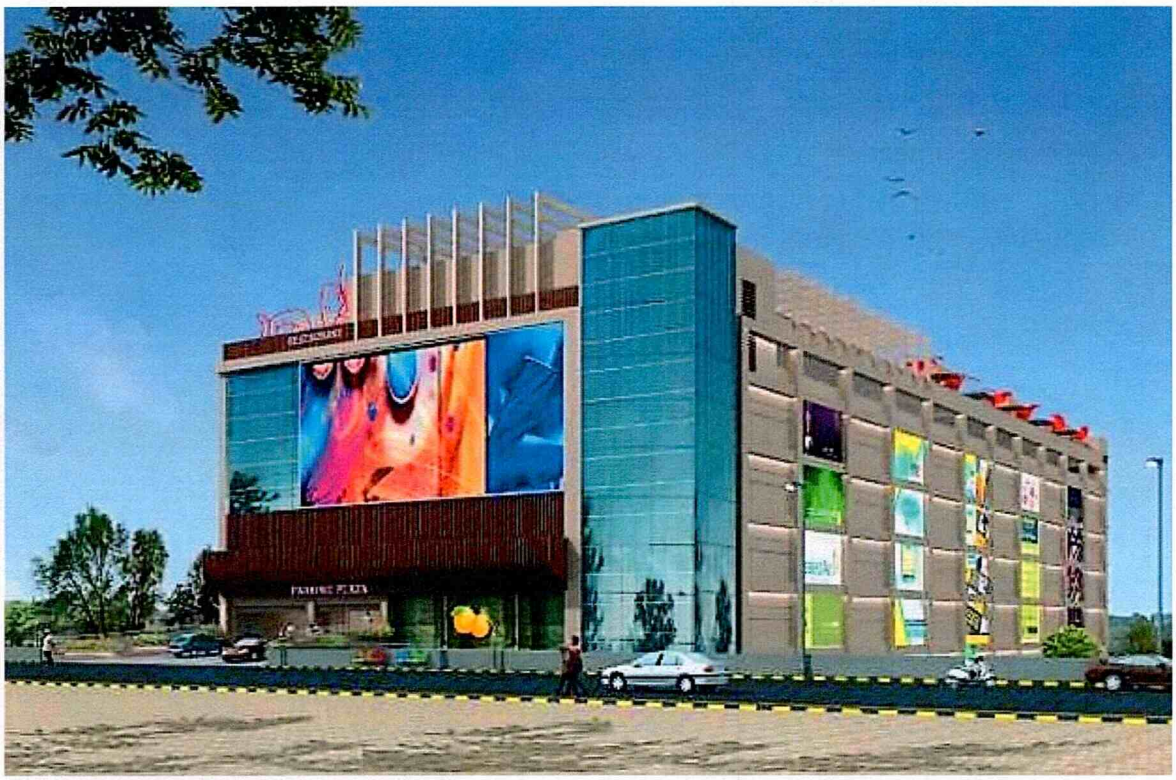
ANNNEXURE-R5/B

Maharashtra Metro Rail Corporation Limited (MAHA-METRO)

ENVIRONMENT MANAGEMENT PLAN



For

"Improvement of Traffic congestion at Futala Lake Road by Providing Parking Plaza at Futala Lake in Nagpur".

PECS Environment Engineers and Consultants

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CHAPTER-1 INTRODUCTION

Nagpur is the second capital and the third largest city of Maharashtra. The city is known for being the Geographical center of India (indicated by the Zero Mile Stone) and the "Orange City "as well as the "Tiger Capital of India". Furthermore, Nagpur is renowned for its Greenery, and is judge as the cleanest and second greenest city in India. The Government of India has selected Nagpur as a Model City of National Clean Air Mission due to its many natural and man-made lakes, tree-lined roads.

This is a site specific Environmental Management Plan prepared for the Proposed Parking Plaza at Futala Lake and Futala Lake is developing as tourist destination by Maharashtra Metro Rail Corp. Ltd.

1.1 Objectives of Environmental Management

The primary objective of Environmental Management is to control the various aspects which disturb the environment due to erection of the proposed project. It is important to exercise control over these aspects so as to minimize the environmental damage. The negative environmental impact further continues when permanent change in land usage occurs. Execution of various mitigation & management methods is carried out in order to reduce/control the possible the environmental damage. Environmental management is commonly divided in two main phases

a. Environmental management during construction phase
b. Environmental management in operation phase

The environmental management during the construction phase is managed by implementation of proper mitigation measures to reduce the impact on the environment as far as possible while environmental management during the operation phase is executed to exercise the control to meet the parameters set for maintaining the environmental status by reducing the impact created out of occupancy in the project.

An efficient environmental management plan helps to restore the impact created using various technologies & procedures involved in the erection of the project. It aims to increase environmental performance & reduce waste generation by adopting appropriate corrective measures and actions. It further ensures the confirmation of implementation of such remediate or preventive actions so as to attain the set parameters thereby achieving minimum environmental damage.

1.2 PROJECT LOCATION

The proposed project are located at Futala Lake, Nagpur The location map of the project, location on Toposheet and Google image are given in **Figure 1.1, 1.2**, and **1.3** The environmental setting of 10 km radius is given in **Table 1.1**.

Initially the number of affected trees was 167 at entire project of Futala Lake includes Concrete Road, Viewing Gallery and Parking Plaza.

At Parking Plaza area 16 trees were existed and obstructing the work are removed and transplanted by the Maha-Metro, Nagpur. In addition to that they have compensate 80 trees.

Plantation will be carried out as per norms, they have transplanted 149 trees out of 167 trees and additional 640 trees as compensate.

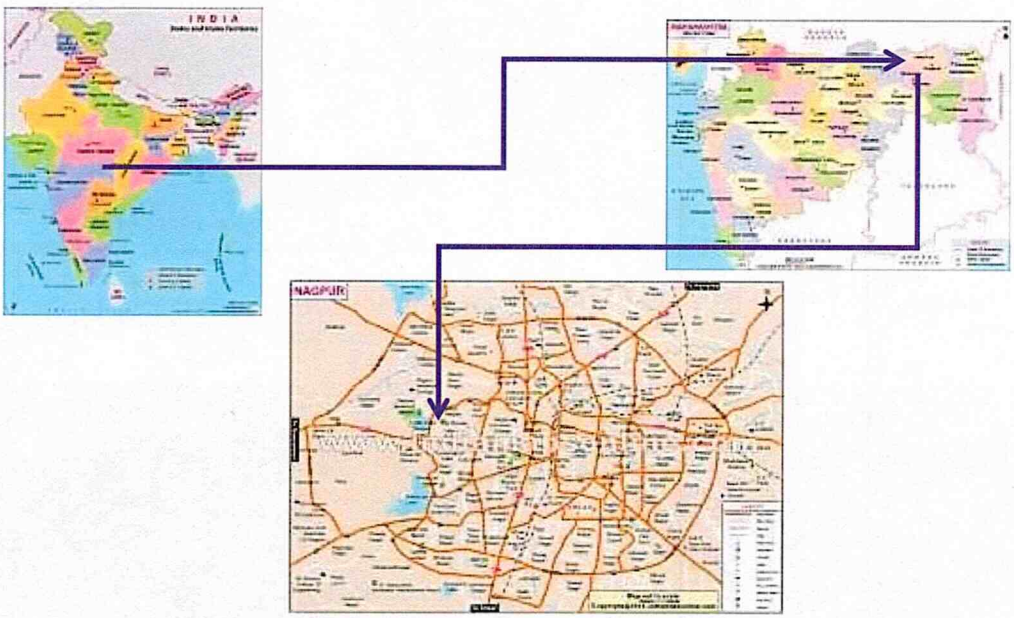
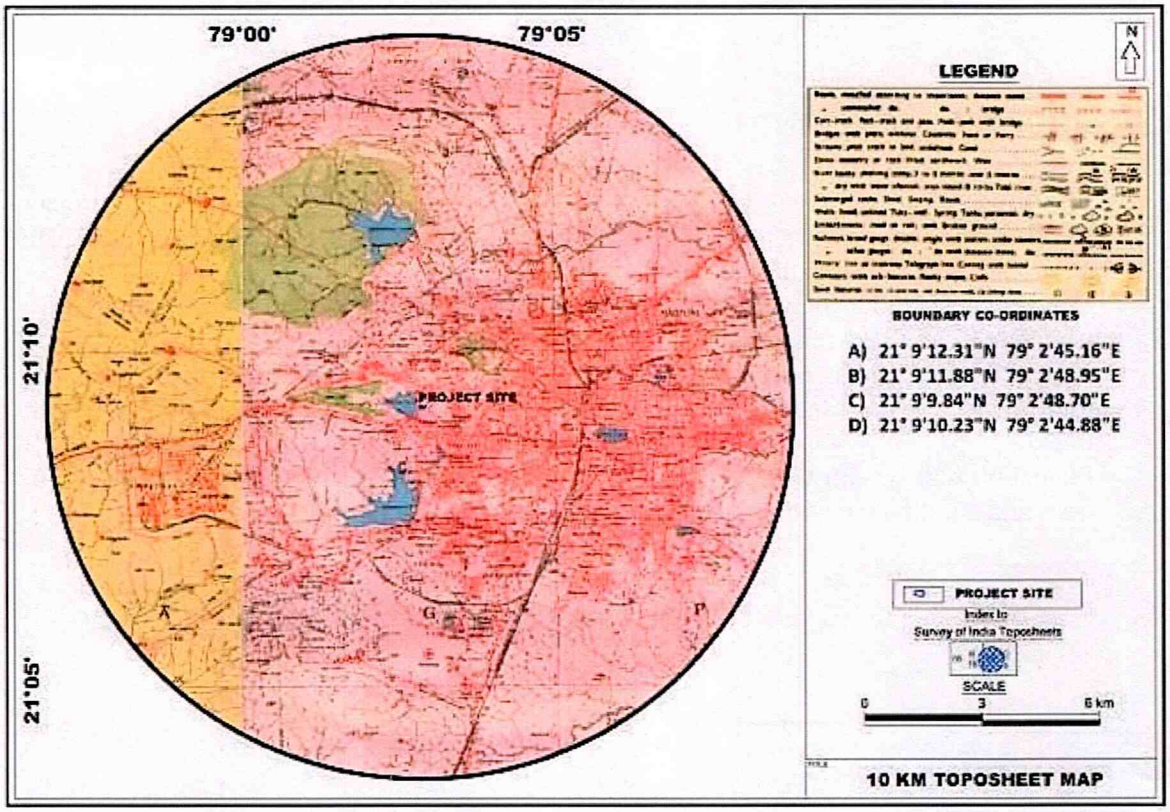


Figure 1.1: Location Map



Source: SOI Toposheet

Figure 1.2: Location on Toposheet

Source; Google Earth

Figure 1.3: Google Image of Futala Lake Project

1.3 Environmental Setting

Table 1.1: Environmental Setting (10 km Radius)

Sr No	Particulars	Details
1	Project Site	Near Futala Lake
2	Latitude Longitude	A 21° 9'11.88"N 79° 2'48.97"E B 21° 9'12.25"N 79° 2'45.25"E C 21° 9'10.10"N 79° 2'44.93"E D 21° 9'9.62"N 79° 2'48.51"E
3	Elevation above MSL	314 m
4	Toposheet	55 O/4
6	Nearest National Highway/State Highway	NH - 6 : 0.5 km
7	Nearest Airport/ Air Strip	Dr. Babasaheb Ambedkar International, Nagpur Airport: 7.0 Km (S)
8	Nearest Railway Station	Nagpur Railway Station :4.5 Km (E)
9	Nearest Habitation	Bharat Nagar : 0.3 Km (S)
10	Forest	Seminary Hills R F : 2.0 Km (NNE)
11	Ecologically Sensitive Zones like wild life sanctuaries, national parks and biospheres	NIL
12	Water Bodies	Futala Lake : 0.06 Km (W) Dhora Nadi : 8.0 Km (SSE) Nag Nadi : 2.2 Km (S) Ambajhari Talav : 1.7 Km (S) Gorewada Lake : 4.5 Km (N) Gandhi Sagar lake : 5.5Km (E) Sonegaon pond : 5.5 Km (S)
13	School	1) Kendriya Vidhyalaya, Vayusena: 0.8 km (N) 2) Maharashtra Animal & Fishery Sciences University: 0.5km (N) 3) Rashtrasant Tukdoji Maharaj University : 0.84 km (SE) 4) Nagpur University Campus : 0.8 Km (SW) 5) IGNOU Study Centre : 0.5 Km (ENE) 6) CP and Berar School : 1.0 Km (E) 7) Law College: 1.5 Km (ESE) 8) GS College: 1.8 Km (ESE)
14	Hospital	1) Sengupta Hospital: 1.0 Km (SE) 2) G B Multicare Hospital : 2.3 Km (S) 3) Dande Hospital : 1.5 Km (SE) 4) Alexis Hospital : 5 km (NE) 5) Wockhadt Hospital: 2.3 Km (SE)

Site Photographs:

1.4 Proposed Construction

The proposed construction on the said project after development shall include following building configuration

Table 1.2: Area Statement

1.	Area of plot	6000.00 Sq.m.
a)	Built up area with reference to Basic F.S.I. as per front road width (Sr. No. 5xbasic FSI) (20% OF 6000.00 SQ.M.)	1200.00 Sq.m.
b)	Ancillary Area FSI upto 60% or 80% with payment of charges. (sr.no.-15x0.80)	960.00 Sq.m.
c)	Total entitlement (a+b)	2160.00 Sq.m.
d)	Lower basement floor Proposed Built-up Area (as per 'P-line')	75.860 Sq.m.
e)	Upper basement floor Proposed Built-up Area (as per 'P-line')	75.860 Sq.m.
f)	Ground Floor Proposed Built-up Area (as per 'P-line')	73.362Sq.m.
g)	First Floor Proposed Built-up Area (as per 'P-line')	73.362Sq.m.
h)	First Floor Proposed Built-up Area (as per 'P-line')	73.362Sq.m.
i)	Second Floor Proposed Built-up Area (as per 'P-line')	73.362Sq.m.
j)	Third Floor Proposed Built-up Area (as per 'P-line')	73.362Sq.m.
k)	Fourth Floor Proposed Built-up Area (as per 'P-line')	1332.547 Sq.m.
l)	Fifth Floor Proposed Built-up Area (as per 'P-line')	382.285 Sq.m.
	Grand total of proposed Built up area	2160.00 Sq.m.

Multilevel car parking (Mechanized parking of Capacity Four Wheeler 969, Two Wheelers 770 Nos) Food Court, AC restaurant and Gazebo 18 Nos. Total height of Parking Plaza is

about 34.033 m.

Sr. No.	At Floor	Restaurant type	Capacity of person (Nos.)
1	Fourth Floor	Food Court	150 X 2 = 300
2	Fifth Floor	AC Restaurant	150 x 2 = 300
3	Fifth Floor	Gazebo 18 nos.	18 x 10 = 180 180 x 2 = 360

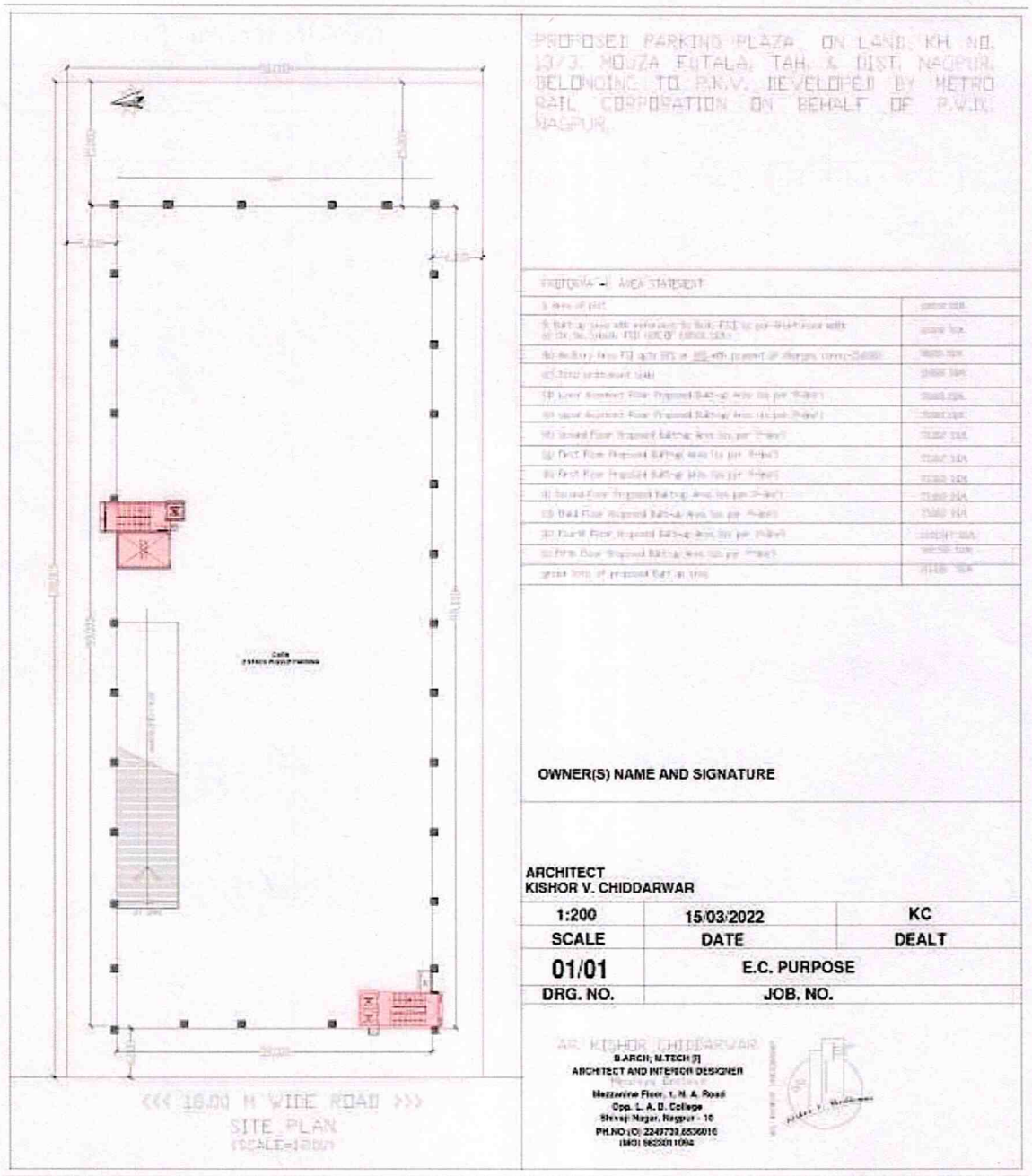


Figure 1.4 Site Plan

1.5 Site Connectivity

Table 1.3: Amenities available near Proposed Site

Amenities	Name	Distance (km) approx.
Airport	Dr. Babasaheb Ambedkar International Airport, Nagpur	7.0 Km (SW)
Nearest Railway Station	Nagpur Railway Station	4.5 Km (E)
Bus Depot	University Campus Bus Stop	0.75 Km (SW)
Highway	NH -6	0.5 Km (S)
Post office	Ravi Nagar Post Office	1.0 km (S)
Fire Station	Wadi Fire Station Fire Station NMC Building Liberty Chowk	4.5 Km (W) 4.3 km (E)
Police Station	Futala Police Station	0.2 Km (S)
Hospital	1) Sengupta Hospital: 2) G B Multicare Hospital : 3) Dande Hospital : 4) Alexis Hospital : 5) Wockhadt Hospital:	1.0 Km (SE) 2.3 Km (S) 1.5 Km (SE) 5 km (NE) 2.3 Km (SE)
Educational Facility	Kendriya Vidhyalaya, Vayusena Maharashtra Animal & Fishery Sciences University Rashtrasant Tukdoji Maharaj University Nagpur University Campus IGNOU Study Centre CP and Berar School Law College: GS College:	0.8 km (N) 0.5km (N) 0.84 km (SE) 0.8 Km (SW) 0.5 Km (ENE) 1.0 Km (E) 1.5 Km (ESE) 1.8 Km (ESE)
Bank / ATM	State Bank of India ATM Axis Bank ATM UBI Bank ATM Canara Bank ATM IDBI Bank ATM Punjab National Bank ICICI Bank ATM HDFC Bank ATM	1.0 Km (NW) 0.4 Km (S) 0.7 Km (SW) 0.7 Km (S) 0.7 Km (S) 0.9 Km (SE) 1.5 Km (SW) 1.5 Km (SE)
Petrol Pump	Bharat Petrol Pump – Law College Square	2.3 Km (SW)
Park / Play Ground	Nagpur University	1.0 Km

1.6 Emergency contact Nos.:

Table 1.4: Emergency Contact Numbers

Sr. No	Particulars	Contact Nos.
1	Police	100
2	Fire	101
3	Ambulance	102
4	Disaster Management	108

CHAPTER-2 EXISTING ENVIRONMENT SCENARIO

2.1 Environmental Monitoring Programme

Baseline Environmental status forms the basis for evaluation of the proposed development on the existing conditions. This can be broadly grouped into physical, social, aesthetic and economic environment. Physical environment includes air, water, land, aquatic and terrestrial flora & fauna, civic infrastructure, public services, etc. Social environment includes demography, community facilities and services, community characteristics, employment centres, commercial facilities servicing the area, etc. Aesthetic environment includes historical monuments, archaeological or architectural sites at and in the vicinity of the proposed project activity. Economic environment covers employment levels, sources and levels of income, economic base of the area, land values, land ownership etc.

2.2 Scope of Baseline Studies

For the present Environment study, the attributes of environment considered are:
Air environment (Meteorology, ambient air quality, noise levels);
Water environment (Surface and Ground water);
Land environment (land use, Soil Quality);

It is important to define the study area for conducting the Environmental Impact Assessment Study which could reflect the changes due to the proposed developmental activity. In the present project, area of study has been identified as 0.5 km radius of the site. Proposed project site forms 'Core Zone' and area outside project site falling within 0.5 km radius is considered as 'Buffer Zone'.

Following section of the report presents the existing environmental scenario in the study area with respect to the above stated environmental attributes along with its monitoring details, results obtained, data analysis and conclusions. The details of environmental attributes monitored and the monitoring criteria adopted along with monitoring locations are given in Table 2.1. The map showing baseline monitoring locations is given in **Figure 2.1.**

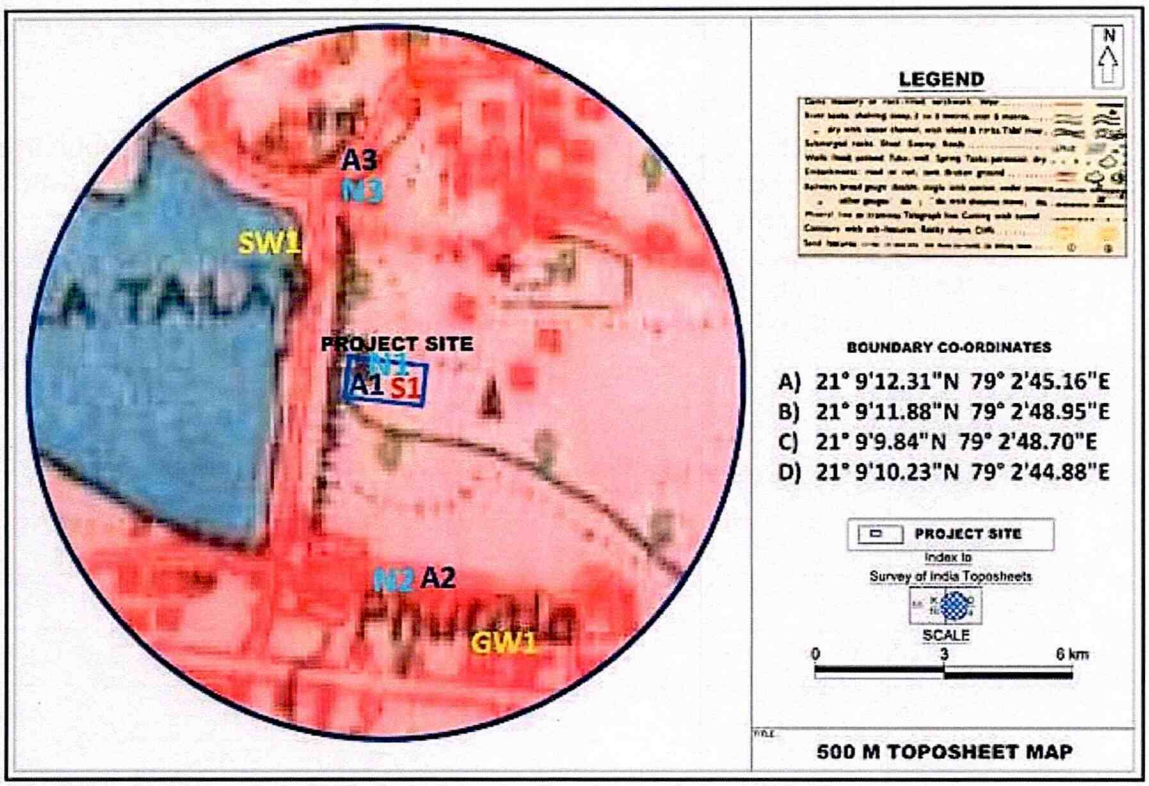


Figure 2.1: Study Area Map showing Baseline Monitoring Locations (Air, Water, Noise, Soil)

Table 2.1: Baseline Data Generation

Sr. No.	Environmental Attribute	Criteria Adopted
1.	Meteorology	The main source of secondary meteorological data for the study area was the Gazetteer of India published for Nagpur District
2.	Ambient Air Quality	
	A1	Project Site (DG Set)
	A2	Bharat Nagar (Up Wind)
	A3	Near Maharashtra Animal & Fishery Sciences University (Down Wind)
3.	Noise levels	
	N1	Project Site
	N2	Bharat Nagar
	N3	Near Maharashtra Animal & Fishery Sciences University
4.	Water Quality	
	SW1	Futala Lake
	GW 1	Borewell at Bharat Nagar

2.3 Air Environment

2.3.1 Meteorology

Meteorology (weather and climate) is the key to understanding the air quality. The essential relationship between meteorology and atmospheric dispersion involves the wind in the broadest sense of the term. Wind fluctuations over a very wide range of time accomplish dispersion and strongly influence other processes associated with them. Secondary data also plays an important role in identifying the general meteorological status of the region. Site specific data can be compared with secondary data in order to identify changes which may have taken place due to various developments in the area.

Table 2.2: Classification of months according to seasons

Season	Period
Summer	March to May
Monsoon	June to September
Post Monsoon	October to November
Winter	December to February

2.3.2 Ambient Air Quality

Air pollution can cause significant effects on humans, animals, vegetation and materials. The project construction is not a major contributor to the air pollution except for particulate matter emission during both construction phase due to machinery and vehicular pollution during operation phase. However, air environment monitoring covered the parameter for which National Ambient Air Quality standards have been defined by the Ministry of Environment and Forests. Accordingly, parameters monitored were PM10, PM2.5, Oxides of Nitrogen (NOx) and Sulphur dioxide (SO2).

An assessment of baseline air quality was undertaken:

(a) To establish the status of exposure of the major sensitive receptors, and

(b) To identify the major air pollution sources and their impacts on the area surrounding the site. 3.3. The locations selected for the air monitoring are shown in **Figure 2.2.**

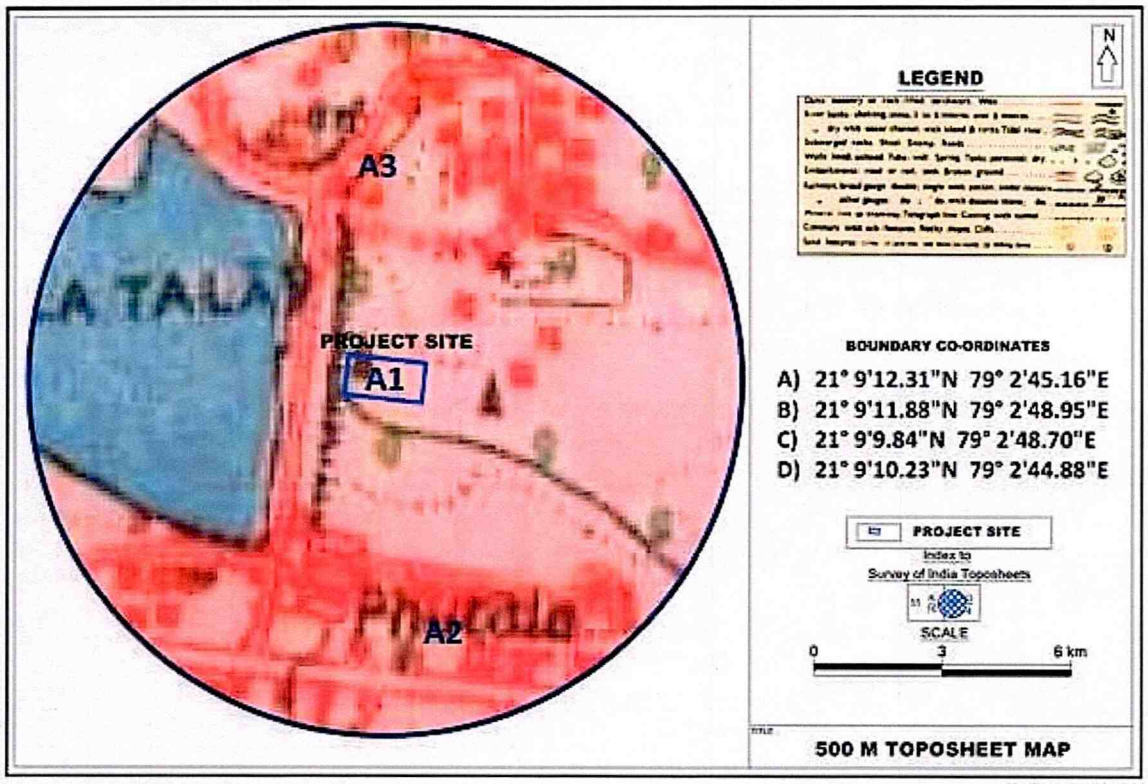


Figure 2.2: Ambient Air Quality Monitoring Stations Location

This assessment was accomplished by examining sources of air emissions within a 5 km radius of the proposed project site and through site specific background sampling program. In this manner, background data collected was expected to be representative of all meteorological conditions.

The following sources of air emissions were identified within the impact zone:
Vehicular Emissions on road.

Vehicular and construction activities in the surrounding areas of the site; and
Other sources of air pollution within the impact zone include domestic fuel combustion.

A well devised air quality monitoring program was undertaken to ascertain the major air pollutants (PM10, PM2.5, SO2 and NOx). For selection of the monitoring locations, long-term meteorological trends were taken into consideration to obtain the predominant wind direction during the time of ambient air quality sampling (i.e. 1 days (24 hrs)). Monitoring stations were placed at sensitive receptors within 500 m. radius from the project site. Air quality monitoring locations are described in **Table**

Table 2.3: Ambient Air Quality Monitoring Stations Location

Sr. No.	Monitoring Location	Code	Distance (km)	Direction
1.	Project Site	A-1	-	-
2.	Bharat Nagar	A-2	0.3	S
3.	Near Maharashtra Animal & Fishery Sciences University	A-3	0.3	N

Ambient air quality was monitored at 3 locations for 24 hours, Collected air samples are analysed by using standard procedures prescribed by Central Pollution Control Board (CPCB), Indian Standards: IS 5182 and American Public Health Association (APHA). The ambient air quality monitoring results are given in **Table 2.4** and the National Ambient Air Quality Standards are given in **Table 2.5**

Table 2.4: Ambient Air Quality Status

Sr. No.	Location	Particulars	Concentration			
			PM10	PM2.5	SO2	NOx
1.	Project Site (A1)	Minimum	49.9	27.4	22.4	15.9
		Maximum	63.3	44.3	39	26.4
		Average	56.6	35.85	30.7	21.15
		98 percentile	63.0	44.0	38.7	26.2
2.	Bharat Nagar (A2)	Minimum	40.8	29.2	23.1	18.1
		Maximum	55.1	47.2	30.9	25.6
		Average	47.95	38.2	27	21.5
		98 percentile	54.8	46.8	30.7	25.5
3.	Near Maharashtra Animal & Fishery Sciences University (A3)	Minimum	37.5	23.6	11	14
		Maximum	57.7	35.9	25.5	24.3
		Average	47.6	29.75	18.25	19.15
		98 percentile	57.3	35.7	25.2	24.1

Table 2.5: National Ambient Air Quality Standards

Pollutant	Unit	Time Weighted Average	Concentration In Air	
			Industrial Areas, Residential Rural & Other Areas	Sensitive Areas
PM10	µg/m3	Annual Average 24 hours	60.0 100.0	60.0 100.0
PM2.5	µg/m3	Annual Average 24 hours	40.0 60.0	40.0 60.0

Pollutant	Unit	Time Weighted Average	Concentration In Air	
			Industrial Areas, Residential Rural & Other Areas	Sensitive Areas
Nitrogen Dioxide (NOx)	µg/m3	Annual Average 24 hours	40.0 80.0	30.0 80.0
Sulphur dioxide (SO2)	µg/m3	Annual Average 24 hours	50.0 80.0	20.0 80.0

2.3.3 Observations

On the basis of observations, the parameter wise result of monitored parameters are discussed below.

PM_{10} PARTICULATE MATTER (<10 µm)

The Average PM_{10} concentration at all air quality monitoring stations A-1, A-2, A-3, are 63.0 µg/m^3, 47.95 µg/m^3, 57.3 µg/m^3 respectively. All monitored stations have PM_{10} concentrations well within stipulated 24 hours average limit, 100 µg/m^3 as prescribed for industrial, residential, rural and other areas as in revised NAAQ Standards from MoEF& CC. These values represent quite satisfactory condition regarding PM_{10} concentration in ambient air.

$PM_{2.5}$ PARTICULATE MATTER (<2.5 µm)

The average $PM_{2.5}$ concentration at all air quality monitoring stations A-1, A-2, A-3, are 35.85 µg/m^3, 38.2 µg/m^3, 29.75 µg/m^3 respectively. All monitored stations have $PM_{2.5}$ concentrations well within stipulated annual 24 hours limit, 60 µg/m^3 as prescribed for industrial, residential, rural and other areas as in revised NAAQ Standards from MoEF& CC. These values represent quite satisfactory condition regarding $PM_{2.5}$ concentration in ambient air.

SULPHUR DIOXIDE (SO_2)

The average SO_2 concentrations at all sampling stations A-1, A-2, A-3, are 30.7 µg/m^3, 27.0 µg/m^3, 18.25 µg/m^3 respectively. All monitored stations have SO_2 concentrations well within stipulated annual 24 hours limit, 80 µg/m^3 as prescribed for industrial, residential, rural and other areas as in revised NAAQ Standards from MoEF& CC.

OXIDES OF NITROGEN (NO_X)

The average NO_x concentrations at all sampling stations A-1, A-2, A-3, are 21.15 µg/m^3, 21.5 µg/m^3, 24.3 µg/m^3 respectively. All monitored stations have NO_X concentrations well within stipulated annual 24 hours limit, 80 µg/m^3 as prescribed for industrial, residential, rural and other areas as in revised NAAQ Standards from MoEF& CC.

2.4 Noise Environment

Noise in general is a sound composed of frequency components of various loudness distributed over the audible frequency range. The factors on which the sound is described as noise depends upon its degree of loudness, period of exposure and time of day and location at which it occurs.

The noise levels measurements were measured using precision noise level meter. The noise level survey was carried at all the air monitoring stations located within the 5 km radius of the proposed project site. The major source identified in the study area is of vehicular traffic movement and the construction activities. Background noise levels were also monitored in study area.

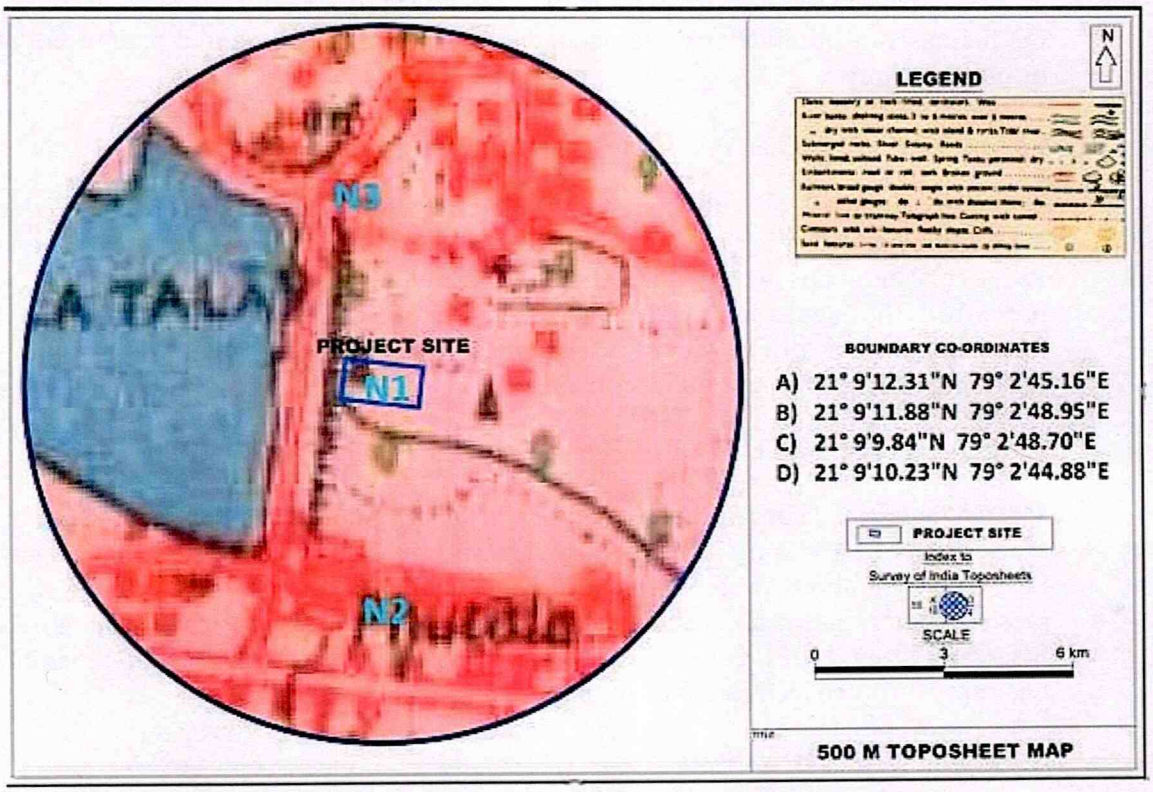


Figure 2.2: Noise Monitoring Stations Location Results

The equivalent noise levels viz., Lday and Lnight at all the noise monitoring locations are presented in Table 2.6. The equivalent noise levels obtained at these locations were compared with day time and night time Ambient Noise Quality Standards which are given in **Table 2.7.**

Table 2.6: Noise Monitoring Results

Location Code	Location	Day Time		Night Time	
		Leq (dBA)	Limit (dBA)	Leq (dBA)	Limit (dBA)
N-1	Project Site	68	65	45	55
N-2	Bharat Nagar	52	55	45	45
N-3	Near Maharashtra Animal & Fishery Sciences University	49	50	36	40

Daytime shall mean from 6.00 a.m. to 10.00 p.m.
Night time shall mean from 10.00 p.m. to 6.00 a.m.

Table 2.7: Ambient Noise Quality Standards

Area Code	**Category of Area**	**Limits in dB(A) Leq**	
		Day time	**Night time**
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

Day time shall mean from 6.00 a.m. to 10.00 p.m.
Night time shall mean from 10.00 p.m. to 6.00 a.m.
Silence zone is defined as an area comprising not less than 100 meters around hospitals, educational institutions and courts. The silence zones are zones, which are declared as such by the competent authority.
Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

Observations

From the monitoring survey of noise levels, it was observed that the day time noise at 1 location i.e. at project site is exceeding the limits prescribed by CPCB. This is due to vehicular movement on road. The night time noise levels observed at 3 locations were found to be within the night time standards. The day time noise levels were observed in the range of 49-68 dB (A). The night time noise levels were observed in the range of 36-45 dB (A).

2.5 Water Environment

The water quality monitoring stations were selected with a view to represent the surface and ground water sources in and around 5 kilometer radius of the study area of proposed Project site. Sampling stations for water samples were selected taking all water sources into account, as per MoEF norms. A total number of 02 (two), including one surface water & one ground water samples were collected and analyzed. Surface and ground water sampling locations are presented in Table 3.8 and are shown in **Figure 2.3.**

Table 2.8: Surface Water & Ground Water Sampling Locations

Sr. No.	Sampling station	Sample code	Distance from proposed project	Direction
1.	Futala Talav	SW-1	0.2 km	W
2.	Borewell at Bharat Nagar	GW-1	0.5 km	SE

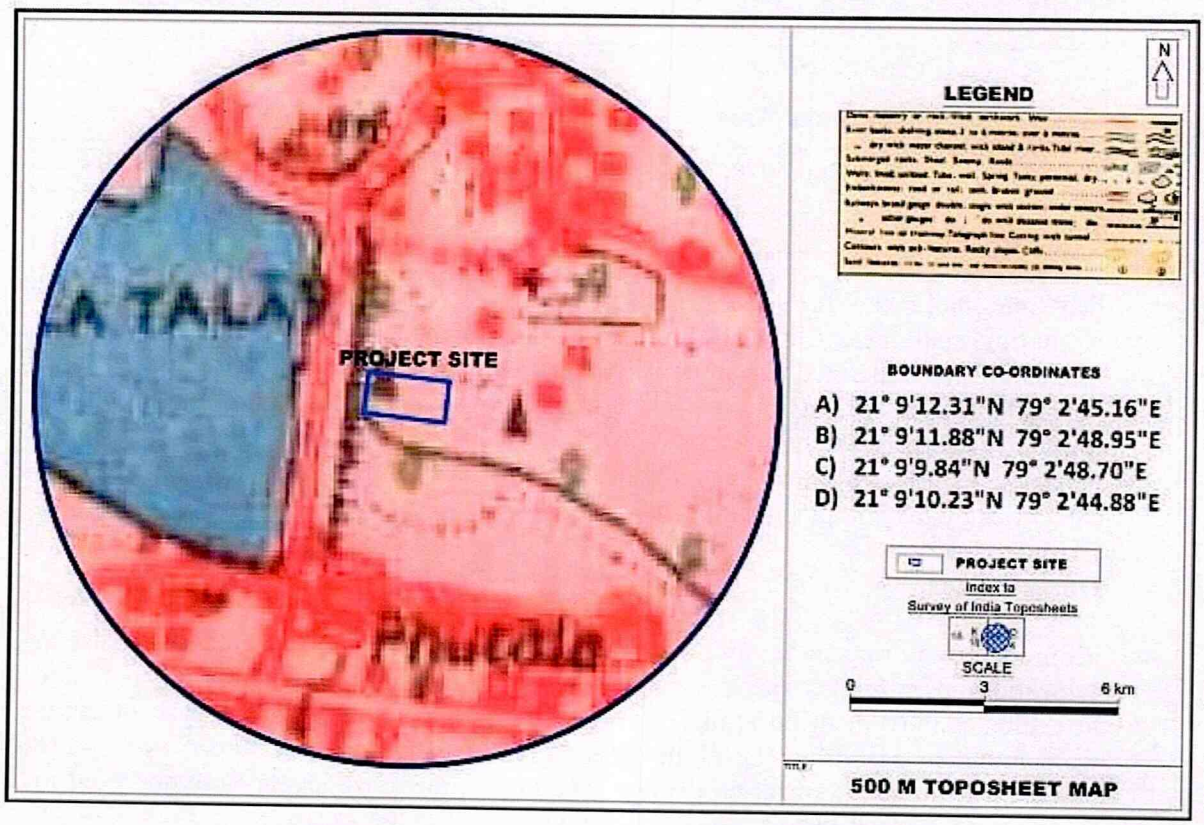


Figure 2.3: Surface & Ground Water Sampling Locations

The methodology for sample collection and preservation techniques was followed as per the standard methods for the examination of water and wastewater, published by APHA, AWWA, 22nd Edition, 2012. Standard Procedure for Water and Wastewater Sampling are presented in **Table 2.9.**

Table 2.9: Standard Sampling Procedure For Water And Wastewater Sampling

Parameters	Sample Collection	Sample Size	Storage/Preservation
pH	Grab sampling Plastic/glass container	50 ml	On site analysis
Electrical Conductivity	Grab sampling Plastic/glass container	50 ml	On site analysis
Total Suspended Solids	Grab sampling Plastic/glass container	100 ml	Refrigeration, can be stored for 7 days
Total Dissolved Solids	Grab sampling Plastic/glass container	100 ml	Refrigeration, can be stored for 7 days
BOD	Grab sampling Plastic/glass container	500 ml	Refrigeration, 48 hrs
COD	Grab sampling Plastic/glass container	100 ml	Add H2SO4 to pH>2, refrigeration; 7 days
Hardness	Grab sampling Plastic/glass container	100 ml	Add HNO3 to pH <2, refrigeration; 6 months
Chlorides	Grab sampling Plastic/glass container	50 ml	Not required; 28 days
Sulphates	Grab sampling Plastic/glass container	100 ml	Refrigeration, 28 days
Nitrates	Plastic Containers	100 ml	Refrigeration, 48 hrs
Fluorides	Plastic Containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/glass Containers	100 ml	Refrigeration, 14 days
Ammonia	Plastic/glass Containers	100 ml	Add H2SO4 to pH>2, refrigeration; 28 days
Hexavalent Chromium, Cr+6	Plastic/glass Containers rinse with 1+1 HNO3	100 ml	Grab sample; refrigeration; 24 hrs
Heavy & Trace Metals (Hg, Cd, Cu, Fe, Zn, Pb etc.)	Plastic/glass Containers rinse with 1+1 HNO3	500 ml	Filter, Add HNO3 to pH >2, Grab sample; 6 months

Source: Standard Methods for the Examination of Water and wastewater, Published by APHA, AWWA, w.e.f. 22nd Edition, 2012

2.5.1 Methodology for Sampling

Grab samples of surface and ground water were collected. On spot analysis was carried out for the parameters like pH, Temperature, Odour, Taste, DO etc. Samples for chemical analysis were collected in plastic/glass container. Samples collected for metal content were acidified with 1.0 ml HNO3. Bacteriological Samples were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analyzed for evaluating the existing base line water quality status in the study area. The analytical techniques (Indian Standard Methods / APHA) used for water and wastewater analysis for a few parameters is given in the **Table 2.10.**

The characteristics of surface and ground water samples are presented in **Table 2.11**. These tables have desirable as well as permissible limits of Indian Standard for each parameter. It was observed that the characteristics of the surface and ground water samples were found to be within the permissible limits of Indian Standards except the total coliforms in surface water samples which may be due to the human activities observed during sampling and requires disinfection before use for drinking purpose.

Table 2.10: Methodology for Sampling And Analysis Of Water & Wastewater

Sr. No.	Parameters	Methods (Indian Standard)	Methods (APHA)
1.	pH	IS 3025 (part 11) : 1983	APHA-4500-H+
2.	Colour	IS 3025 (part 4) : 1983	APHA-2120 C
3.	Odour	IS 3025 (part 5) : 1983	IS:3025, part-4
4.	Temperature	IS 3025 (part 9) : 1984	APHA-2550 B
5.	Dissolved Oxygen	IS 3025 (part 38) : 1989	APHA-2500 O
6.	BOD	IS 3025 (part 44) : 1993	APHA-5210 B
7.	COD	IS 3025 (part 58) : 2006	--
8.	Electrical Conductivity	IS 3025 (part 14) : 1984	APHA-2510 B
9.	Turbidity	IS 3025 (part 10) : 1984	APHA-2130 B
10.	Chlorides	IS 3025 (part 32) : 1988	APHA-4500 Cl
11.	Fluorides	--	APHA-4500 F
12.	Total Dissolved Solids	IS 3025 (part 16) : 1984	APHA-2540 C
13.	Total Suspended Solids	IS 3025 (part 17) : 1984	APHA-2540 D
14.	Total Hardness	IS 3025 (part 21) : 1983	APHA-2340 C
15.	Alkalinity	IS 3025 (part 23) : 1986	APHA-2320 B
16.	Sulphates	IS 3025 (part 24) : 1986	APHA-4500 SO4-2
17.	Arsenic	IS 3025 (part 37) : 1988	APHA-3120 B/ APHA-3114 B/ APHA-3500 As

18.	Calcium	IS 3025 (part 40) : 1991	APHA-3120 B/ APHA-3500 Ca
19.	Magnesium	IS 3025 (part 46) : 1994	APHA-3120 B/ APHA-3500 Mg
20.	Manganese	IS 3025 (part 59) : 2006	APHA-3120 B/ APHA-3500 Mn
21.	Mercury	IS 3025 (part 48) : 1994	APHA-3120 B/ APHA-3500 Hg
22.	Selenium	IS 3025 (part 56) : 2003	APHA-3120 B/ APHA-3114 B/ APHA-3500 Se
23.	Lead	IS 3025 (part 47) : 1994	APHA-3120 B/ APHA-3500 Pb
24.	Copper	IS 3025 (part 42) : 1992	APHA-3120 B/ APHA-3500 Cu
25.	Cadmium	IS 3025 (part 41) : 1992	APHA-3120 B/ APHA-3500 Cd
26.	Iron	IS 3025 (part 53) : 2003	APHA-3120 B/ APHA-3500 Fe
27.	Zinc	IS 3025 (part 49) : 1994	APHA-3120 B/ APHA-3500 Zn
28.	Boron	IS 3025 (part 57) : 2005	APHA-4500 B
29.	Coliforms	IS 5401 (part 1) : 2002	APHA-9215 D

Sr. No.	Parameters	Units	SW1	GW3	As Per IS 10500 of 2012	
					Acceptable	Permissible
Physical Parameters						
1	Ambient Temperature	0C	25.0	26.0	-	-
2	Colour	Hazen	1	1	5	15
3	Odour	-	AG	AG	AG	AG
4	Turbidity	NTU	1	1	1	5
5	pH at 25 0C	-	7.8	7.3	6.5-8.5	NR
Inorganic Parameters						
6	Electrical Conductivity	µS/cm	518	1358	-	-
7	Total Dissolved Solids	mg/l	284	758	500	2000
8	Total Suspended Solids	mg/l	<5	<5	-	-
9	Total Alkalinity as CaCO3	mg/l	250	388	200	600
10	Total Hardness as CaCO3	mg/l	248	552	200	600
11	Calcium as Ca++	mg/l	54.4	211.2	75	200
12	Magnesium as Mg++	mg/l	26.9	5.8	30	100
13	Sodium as Na	mg/l	19.0	52.0	-	-
14	Potassium as K	mg/l	BDL	26.4	-	-
15	Chlorides as Cl	mg/l	25.8	210.4	250	1000
16	Sulphates as SO4	mg/l	5.6	20.0	200	400
17	Nitrates as NO3	mg/l	BDL	BDL	45	NR
18	Fluoride as F	mg/l	0.5	0.3	1	1.5
19	Dissolved Oxygen	mg/l	6.0	-	-	-
Pollutants						
20	Amonical Nitrogen as NH3-N	mg/l	BDL	BDL	0.5	NR
21	Phenolic Compounds	mg/l	BDL	BDL	0.001	0.002
22	Total Oil & Grease	mg/l	BDL	BDL	-	-
23	B O D 3 days 27 0C	mg/l	BDL	BDL	-	-
24	C O D	mg/l	4.0	-	-	-
Trace Metals						
25	Boron as B	mg/l	BDL	BDL	0.5	1.0
26	Cadmium as Cd	mg/l	BDL	BDL	0.003	NR
27	Chromium as Cr6+	mg/l	BDL	BDL	0.05	NR
28	Copper as Cu	mg/l	BDL	BDL	0.05	1.50
29	Iron as Fe	mg/l	BDL	BDL	0.3	NR
30	Lead as Pb	mg/l	BDL	BDL	0.01	NR
31	Zinc as Zn	mg/l	BDL	0.02	5	15
Microbiology						
32	Coliform	MPN/100 ml	1100	0	-	-

Note:- BDL is Below Detectable Limit ; Minimum Detectable Limit For parameters tested are as Under
(NO2-0.1,PO4-0.05,Oil & Grease-5,BOD-1,COD-5,Al-0.02,AS-0.02,B-0.01,Cd-0.01,Cr+6-0.05,Cu-0.03,Fe-0.05,Pb-0.05, Mn-0.02,Hg-0.001,Zn-0.01, Se =0.005 ,Free CO2-5) (Unit mg/l)
NTU - nephalometeryturbitity unit;; NR - no relaxation; MPN - most probable number UO - unobjectionable: AG - agreeable; NA- not applicable

2.6 Land Environment

2.6.1 Soil Quality

Soil samples were collected at selected locations in the study area to assess the existing soil conditions around the proposed project site. This will establish the baseline characteristics and will facilitate for identifying the incremental concentrations due to the proposed project at a later stage. The baseline characteristics, which are analyzed, now include the impact on soil due to all the miscellaneous activities and natural soil quality.

Three sampling locations have been selected in the study area. The locations of soil quality monitoring are shown in Figure 3.4 and their distance and direction from proposed site is given in **Table 2.12.**

Table 2.12: Details of Soil Sampling Locations

Sr. No.	Sampling Sites	Station Code	Distance from proposed project	Direction
1.	Project Location	S – 1	-	-

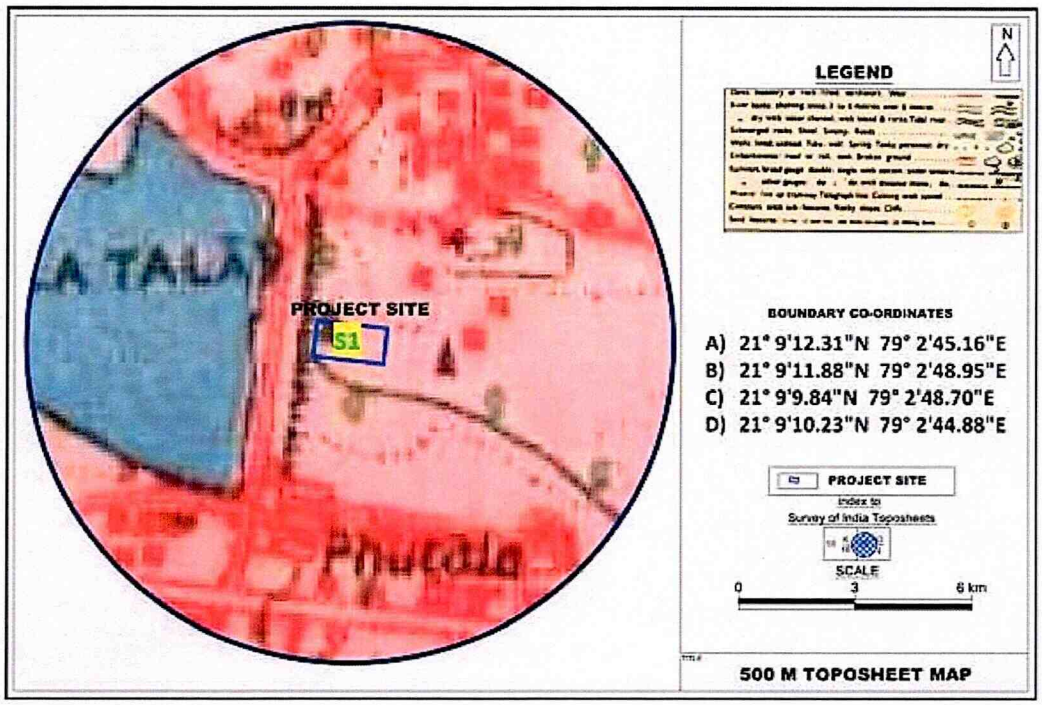


Figure 2.4: Soil Sampling Locations

Total three samples from three different locations of three different depths viz. 0-30, 30-60 and 60-90 cm below the surface, homogenized and sampled. This method is in line with IS: 2720 & Methods of Soil Analysis, Part-1, 2nd edition, 1986 (American Society for Agronomy and Soil Science of America). The soil samples were collected and analyzed for physical and chemical characteristic as the standard methods described in

Table 2.13: Analytical Techniques for Soil Analysis

Parameters	Method (Indian Standard)	Method (ASTM number)
Particle size distribution	IS 2720	Sieve analysis (D 422 – 63)
Natural Moisture	IS 2720	Gravimetric
Texture Classification	IS 2720	USDA Textural classification chart
Permeability	IS 2720	Infiltrometer
Liquid Limit	IS 2720	Gravimetric
Plastic Limit	IS 2720	Gravimetric
Bulk density	IS 2720	Sand replacement, core cutter
Porosity	IS 2720	Void ratio
pH	IS 2720	pH meter (D 1293 – 84)
Electrical conductivity	IS 2720	Conductivity meter (D 1125 – 82)
Ca, Mg &Cl	IS 2720	Titrometric
Sulphate	IS 2720	Turbidometric
Nitrogen	IS 2720	Kjeldahl distillation (D 3590 – 84)
Phosphorous	IS 2720	Molybdenum blue, colorimetric (D 515 – 82)
Potassium	IS 2720	Flame Photometer (D 1428 – 82)

The physico-chemical characteristics of soil sample is reported in Table 2.14.

Table – 2.14: Barren Land near Project Site (S-1)

Sr. No.	Parameters	Unit	00.0 - 30.0 cm	30.0 - 60.0 cm	60.0 - 90.0 cm
A. PHYSICAL PROPERTIES					
1	Color	--	Yellowish	Yellowish	Yellowish
2	Soil Texture	--	Silt Loam	Silt Loam	Sandy Loam
3	Grain Size Distribution %	Gravel	33	31	57
		Sand	28	26	29
		Silt	34	39	11
		Clay	5	4	3
4	Natural Moisture Content	%	6	5	6
5	Bulk Density	gm/cc	1.85	1.82	1.97
6	Liquid Limit	%	Nil	Nil	Nil
7	Plastic Limit	%	Nil	Nil	Nil
8	Porosity	%	66.8	61.0	66.6
9	Water Holding Capacity	%	45.1	45.7	42.5
B. CHEMICAL PROPERTIES					
1	pH	-	7.87	7.48	7.40
2	Electrical Conductivity	mmhos/cm	0.092	0.090	0.065
3	Organic Matter	%	0.67	0.78	0.62
4	Calcium as Ca++	mg/kg	132.0	141.9	138.6
5	Magnesium as Mg++	mg/kg	123.4	131.6	115.1
6	Chlorides as Cl	mg/kg	33.8	35.7	23.8
7	Sulphates as SO4	mg/kg	64.0	60.0	68.0
8	Total Nitrogen as N	kg/ha	273.0	315.0	252.0
9	Total Phosphorous as P	kg/ha	47.6	43.5	38.6
10	Total Potassium as K	kg/ha	278.3	271.1	263.4

Standard Soil Classification

Standard soil classification regarding agriculture, in view of its test parameters, is detailed below in **Table 2.15** The use of soil for agriculture or for other use may be decided on basis of soil characteristics.

Table 2.15: Standard Soil Classification

Sr. No.	Test Parameters	Classification	
1.	pH	< 4.50 extremely acidic 4.51-5.00 very strongly acidic 5.01-5.50 strongly acidic 5.51-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 neutral*	7.31-7.80 slightly alkaline* 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline > 9.0 very strongly alkaline (*tolerable to crops)
2.	Salinity or Electrical Conductivity (mmhos/cm) (1mmhos/cm = 640 ppm)	upto 1.00 average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops > 3.00 sensitive to salts	
3.	Organic Carbon (%)	upto 0.30 very less 0.31-0.40 less 0.41-0.50 medium 0.51-0.80 on an average sufficient	0.81-1.00 sufficient > 1.0 more than sufficient
4.	Nitrogen (kg/ha)	upto 50 very less 51-100 less 101-150 good	151-300 better > 300 sufficient
5.	Phosphorous (kg/ha)	upto 15 very less 16-30 less 31-50 medium	51-65 on an average sufficient 65-80 sufficient > 80 more than sufficient
6.	Potassium (kg/ha)	0 very less 120-180 less 181-240 medium	241-300 average 301-360 better > 360 more than sufficient

Observations:

The observations of soil characteristics are discussed parameter wise below;
Texture of soil samples from agriculture lands are silty-clay loam and sample from waste land and barren land are silty-loam in Texture Classification.
Colour of soil samples from project site land is yellowish.
The bulk density of soil samples from Project site land is in the range of 1.82 to 1.97 g/cc.

Soil samples from project site land has 7.40 to 7.87 ranges of pH values. The pH values are indicating nature of soil samples is neutral to alkaline.
Soil samples from project site land has conductivities between 0.065 to 0.092 mmhos/cm.

Soil sample from Project Site land has Organic Matter between 0.62 to 0.78 %. These values represent good fertility of soil.

Soil samples from Project site land have 252.0 to 315.0 kg/ha Available Nitrogen value.

Soil sample from barren land have 38.6 to 47.6 kg/ha.

Soil sample from Project site land has concentration of Available Potassium values range between 263.4 to 278.3 kg/ha.

Soil is moderately suitable for cultivation of climatic crops and have good fertility.

CHAPTER-3 APPLICABLE LAWS AND COMPLIANCES

3.1 Statutory Compliances:

Table 3.1: Statutory Laws

ACT	Responsibilities under section	Penalties under section
Water (Prevention & Control Of Pollution) ACT, 1974 (No 6 OF 1974)	19, 20 (2) & (3), 21 (3) (e), 23, 24 (1) (a)	41(1), 41(2), 42(1), 42(2), 43, 44, 45, 45A
Environment Protection Act, 1986 (No 29 of 1986)	5, 7, 8, 9(1), 9(3), 10(1), 10(2), 11(1)	15, 26

Compliances Schedules:

There will be three facets to design and follow the schedules viz: (A) for compliances of responsibilities (B) for day-today operation and management of STP, ECE, solid waste management facility (C) for routine environmental monitoring to assess the impact and take timely warning.

The schedule –

Daily observations:

Take meter readings for

1. Water consumption
2. Treated water output
3. Sub meter reading for STP energy consumption

Maintain electricity consumption record for ascertaining the efficiency of the equipments installed and its operational conformity.

Monthly Reporting:

1. Monitor ambient air periodically as per consent. Monitor the emission sources through the competent authority and submit the analysis reports to the board.
2. Treated water parameter analysis

Quarterly compliance:

1. Monitor ambient/ work zone noise levels & ensure conformance
2. Compose analysis report

Yearly compliance:

1. Carryout "Environmental Audit Statement" of various environmental aspects, review the environmental policies with the help of experts and make the up gradation / changes accordingly.

2. Submit the "Environmental Statement" to the State Pollution Control Board in Form V under Rule 14 of Second Amendment Rules 1992 of the Environment (Protection) Act, 1986.
3. Renew the consent the Consent to Operate under the Water & Air Acts on due dates

Responsibility – The responsibility for the compliances shall be of the Environment Manager / authorized person duly appointed by the executing agency in the construction phase and thereafter by the O & M of the Project.

CHAPTER-4 CONTENTS OF ENVIRONMENTAL MANAGEMENT

4.1 Land Environment –

The construction project brings in permanent change in land usage. The land which is proposed has to be assessed from various angles viz. vegetation on the land under proposed project, the structure of the soil, geological strata of the land which plays crucial role in rain water harvesting and excavation which may be required to refill the surround of the project site.
The trees which are unavoidable to retain require compensatory plantation according to the plantation scheme proposed. The cutting and filling must also be assessed and restoration of the organic soil must be considered.

4.2 Water Environment –

Ground/Land physiography is mainly responsible for controlling the water drainage pattern. It is equally important to assess the drainage pattern of the region. The rain water harvesting scheme for the project is to be prepared. The plan is to be prepared for incremental harvesting.

4.3 Air Environment –

The permanent change in land use by way of construction is sure to create a detrimental impact on the air environment surrounding the project. The impact is twofold. The mitigation plan to reduce the impact during construction phase and augmentation plan to maintain the air environment during operation phase is to be planned.

4.4 Noise environment –

Construction equipment and road traffic are the major sources of noise. Baseline data of noise at the project area and the neighborhood habitat areas is to be ascertained.
The noise levels during the day time or at various time slot in a day is helpful in ascertaining the construction machinery operation timings.

4.5 Biological environment –

The biological surroundings which include birds, aquatic life and vegetation etc. must be maintained to reduce the negative impact on environment.

4.6 Socio economic environment –

This is another important aspect for the development. The development of the surrounding areas and availability of the resources and services is equally important to assess which has an indirect impact on the environment.

4.7 Solid waste –

In the recent urbanization, this is one of the most critical issues at par with water. The disposal of the waste both bio-degradable and non-biodegradable is essential to consider.

4.8 Liquid (water) Waste –

The commercial users are sure to generate waste water. Proper waste water treatments are both, vital & essential, for use of recycled water, as well as reduce the BOD load for excess treated water to be discharged, avoiding waste water to contaminate inland.

CHAPTER-5 PROPOSED SERVICES & PROVISIONS

To reduce the negative impact on environment and to maintain the environment following services are proposed and provisions are made –

Table 5.1: Quantification of Waste with Proposed Services and Provisions

Particulars	Quantification
Waste-Water Treatment	100 % waste water generated shall be treated
	The parameters as prescribed by CPCB shall be attained
	The treated water shall be used for flushing and gardening as required.
	Technology – MBBR Packaged Type STP
	Capacity 40 KLD
Biodegradable Waste	Wet Waste will be treated in OWC or will be disposed through NMC.
Non-Biodegradable Waste	The Dedicated, segregated and hygienic storage spaces shall be provided for dry waste Multicolored bins for e-waste, organic waste, plastic waste, paper waste, metal waste and glass waste shall be provided
	Non biodegradable waste shall be disposed through NMC.
	The recyclable waste shall be handed over to scrap vendor
Rain-Water Harvesting	Collection of rain water from terrace to recharged pits.
	04 no. of RWH Recharge pits will be provided
Plantation	All local species to be considered for plantation
	Non allergic plants considered
	Species absorbing higher CO_2 are considered
	80 nos. of Trees are proposed to be planted and 16 existing trees were removed and transplanted by Maha-Metro.
Energy Conservation	LED fixtures and other conservation gadgets proposed Solar Street Light will be provided.

CHAPTER-6 TRAFFIC MANAGEMENT PLAN

6.1 Introduction

This traffic survey report is prepared to analyze existing and proposed increase in traffic load on existing road network around the project site.

Need of Study

There is a need to determine the potential traffic impact of the proposed project by estimating the future traffic inside the proposed project and also on the NH-6 and intermediate road. It is therefore necessary to quantify the volume of traffic and parking demand. The impact shall be followed by the mitigation measures to be taken for addressing the issues

Objective

- To Prepare Traffic Management Plan
- To Prepare Traffic Circulation Plan
- To appreciate the existing traffic conditions
- To Estimate Future Footfall
- To Estimate Future Traffic on Network

6.2 Primary Traffic Survey & Analysis

A traffic survey is carried out for 24 hrs.in normal working day to assess the traffic characteristics. The following are the survey conducted.

- Turning Movement Survey
- Classified Turning Volume Count
- Road Inventory Survey

The survey location were finalized after the through reconnaissance survey. The figure below shows the primary traffic survey location.

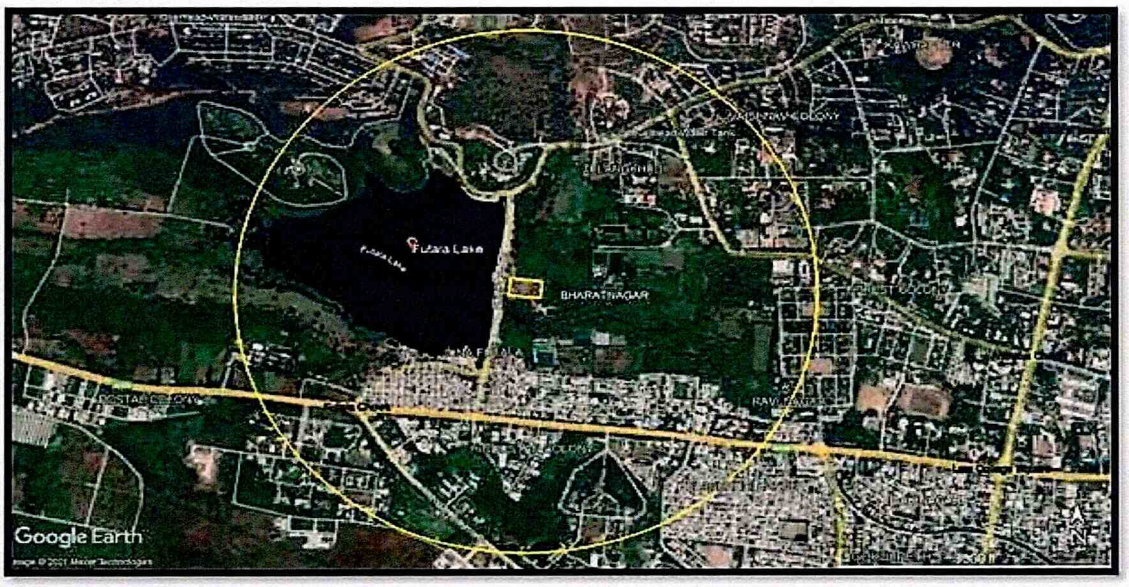


Figure 6.1: Traffic Survey Location Google Image

6.3 Primary Traffic Survey & Analysis

A traffic survey is carried out for 12 hrs.in normal working day and weekend to assess the traffic characteristics on both the days. The following are the survey conducted.

I. Turning Movement Survey
II. Classified Turning Volume Count
III. Road Inventory Survey

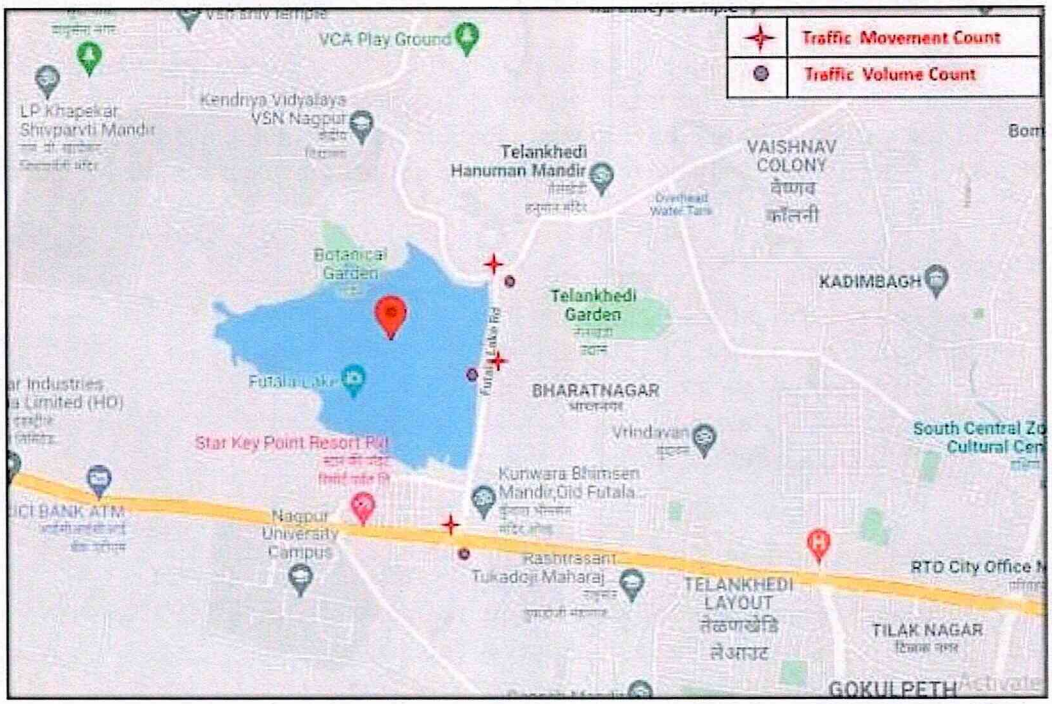


Figure 6.2: Traffic Survey Location

6.4 Turning Movement Survey

The objective of the survey was to assess the traffic flow and delay characteristics of arm at the intersection. The survey was carried for 12 hours in fine weather condition on normal working day and weekend. The survey location is listed in **Table below.**

Table 6.1: Traffic Survey Location

Sr. No.	Road Name	Carriage width m	Median (m)	Earthen Shoulder (m)
1	Nagpur Amravati Road	4lane	Provided	1.5
2	Vayusena-Sadar Road	2Lane Sub-Arterial	Provided	1.5
3	Futala Road	2Lane Collector	Provided	1.5

6.5 Classified Traffic Volume Count

Classified Traffic Volume Survey was conducted in order to appreciate the traffic characteristics in terms of average daily traffic, traffic composition, peak hour traffic and directional split at survey location.

6.6 Road Inventory Survey

Road network inventory survey was carried out in order to assess physical characteristics and condition bounding and access road to proposed expansion project. The data collected as part of this survey includes road and road side features like carriageway width, availability of service road, footpath, median, drainage, parking, abutting landuse, pavement details in terms of pavement type and condition, street furniture that includes street lighting, road marking, traffic signage and various traffic management measures.

6.7 Traffic Analysis

To appreciate the traffic and travel characteristics number of surveys were conducted near the project. The salient features and the detailed analysis of the survey conducted are described under this section.

Table 6.2: Passenger Car Unit

Type	Mode	PCU's
Passenger Vehicles	Car/Jeep/Van/Taxi	1
	Auto/Shared Auto	1
	Two Wheeler	0.5
	Mini Bus	1.5
	Standard Bus	3
Freight Vehicles	Mini LCV	1
	LCV	1.5
	2/3 Axle	3
	Multi Axle	4.5
	Agriculture Tractor	1.5
	Agriculture Tractor Trailer	4.5

6.8 Turning Movement Analysis

Turning movement survey was conducted between 08:00 – 20:00 hours for the duration of 12 hours at different intersection of road. The total number of passenger and freight, as well as total volume in Passenger Car Units (PCU) has been calculated and shown in the Table below.

6.9 Road Carriage width

Road width is calculated during traffic analysis study. All road connecting to site is 4lane, 2 lane Carriageway of main road is 15m and intermediate road is 9 meters.

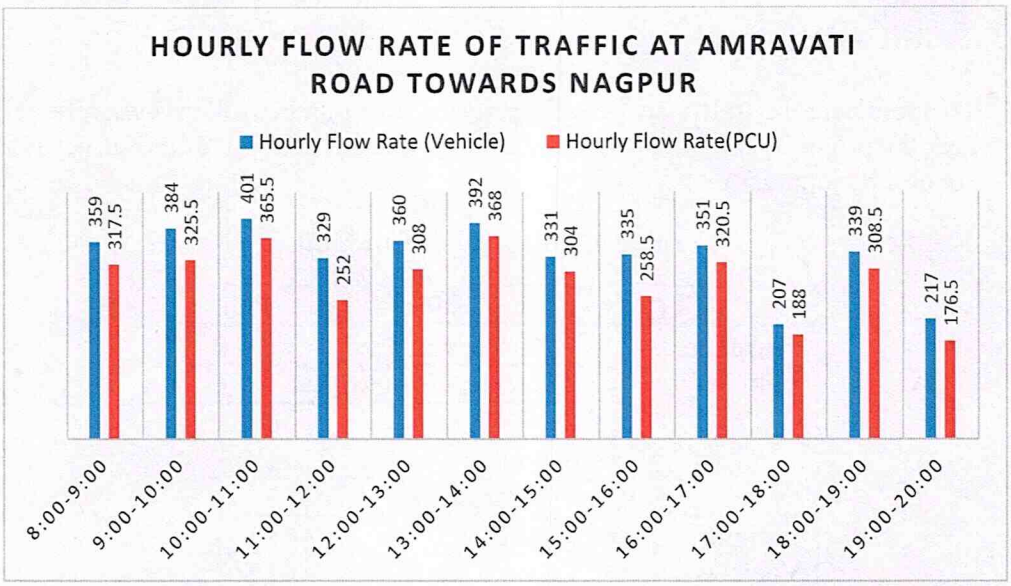
6.10 Peak Hour Vehicular Variation

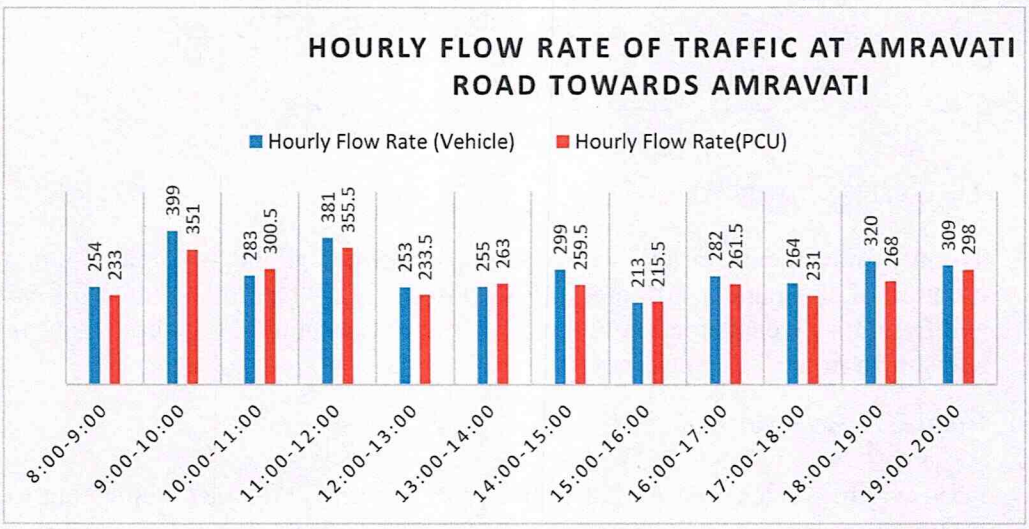
Modal composition amongst total traffic near different intersection at project road on Weekday and weekend is shown in the Figure below. The peak hour is observed at morning and evening when traffic is more as compared to the total observation for working day. Traffic variation is not found constant during survey.

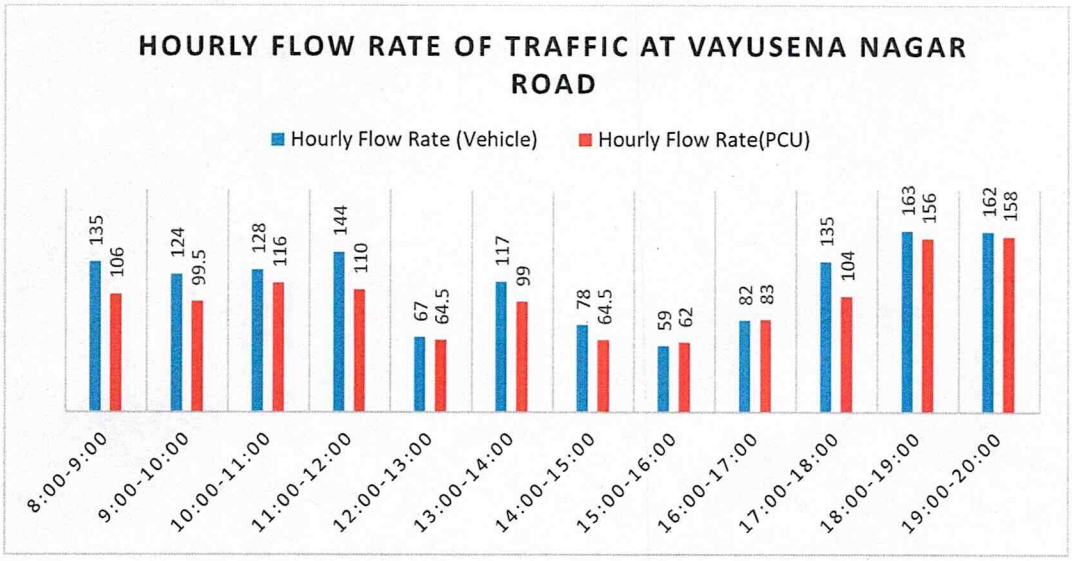
6.11 Peak Hour Vehicular variation

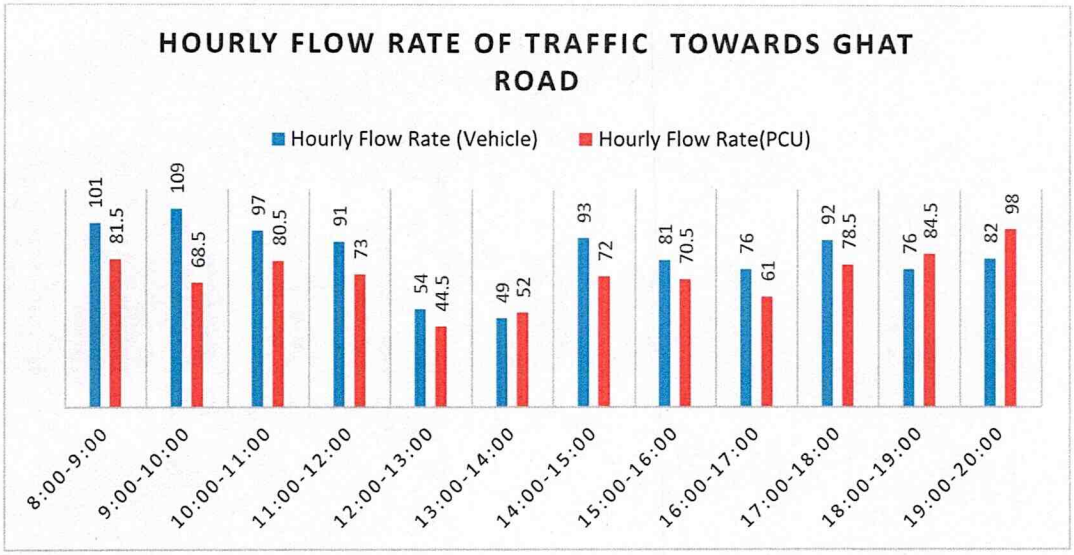
Modal composition amongst total traffic near different intersection at project road on Weekday and weekend is shown in the Figure below.

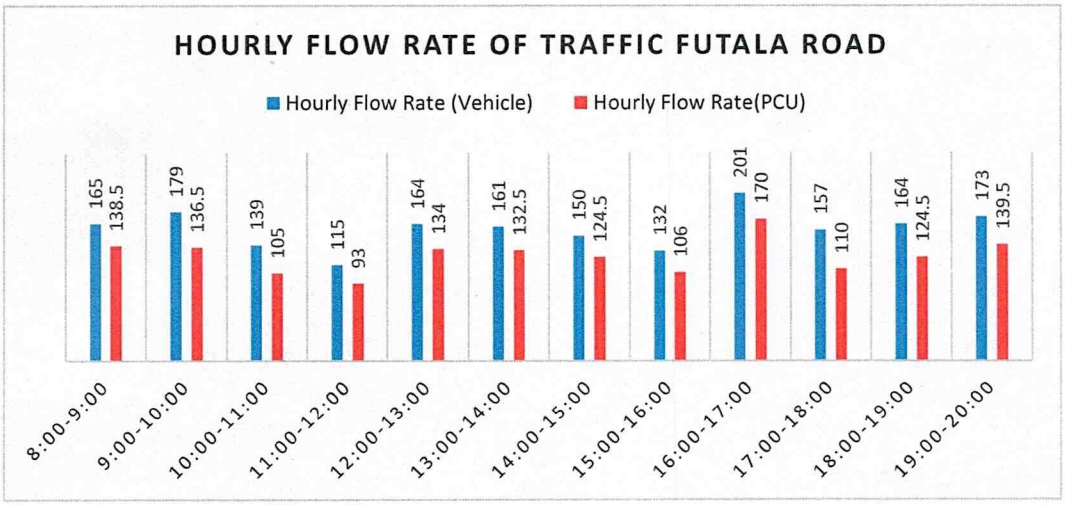
Weekday traffic composition



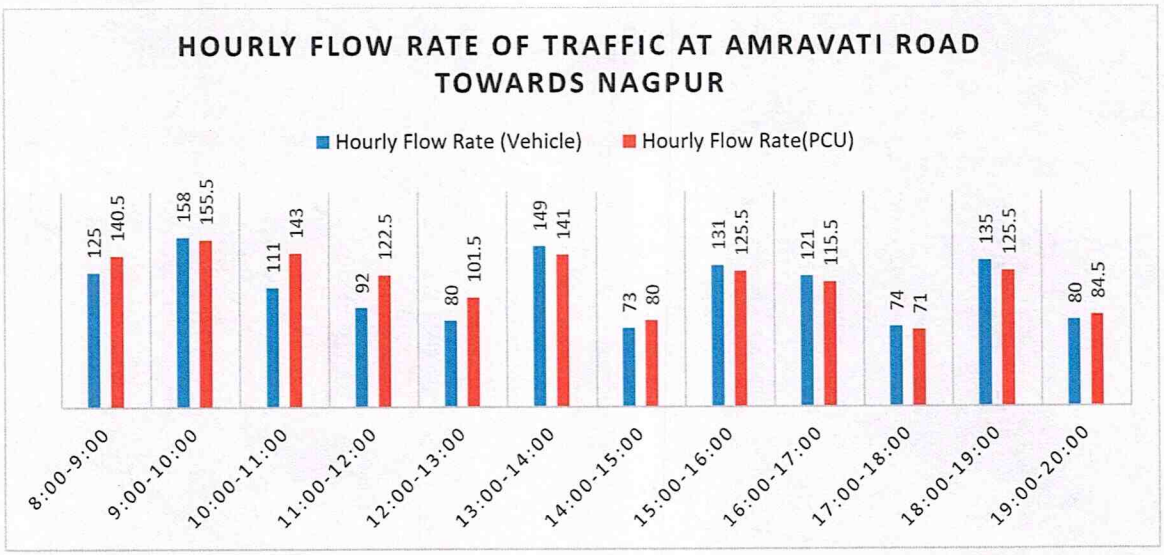


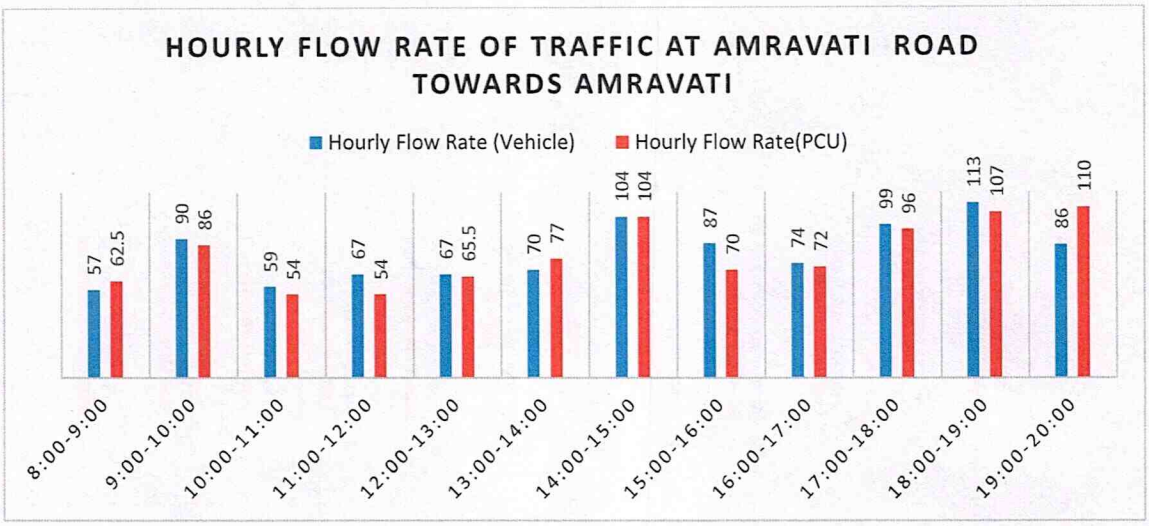

HOURLY FLOW RATE OF TRAFFIC AT VAYUSENA NAGAR ROAD
Hourly Flow Rate (Vehicle)
Hourly Flow Rate(PCU)
135 106
124 99.5
128 116
144 110
67 64.5
117 99
78 64.5
59 62
82 83
135 104
163 156
162 158
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00
18:00-19:00
19:00-20:00

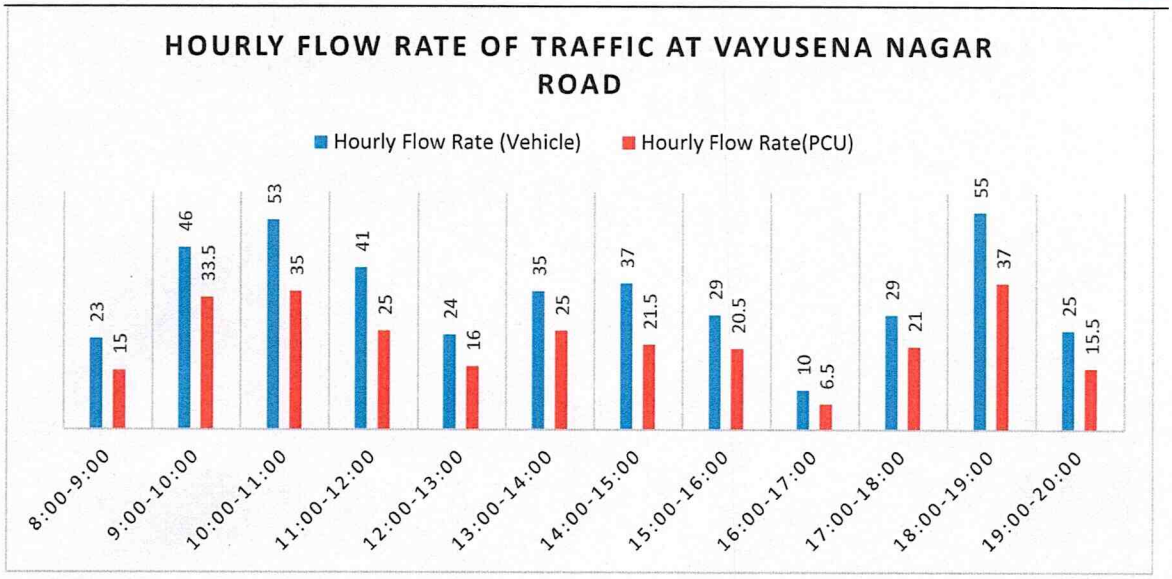

HOURLY FLOW RATE OF TRAFFIC TOWARDS GHAT ROAD
Hourly Flow Rate (Vehicle)
Hourly Flow Rate(PCU)
101 81.5
109 68.5
97 80.5
91 73
54 44.5
49 52
93 72
81 70.5
76 61
92 78.5
76 84.5
82 98
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00
18:00-19:00
19:00-20:00

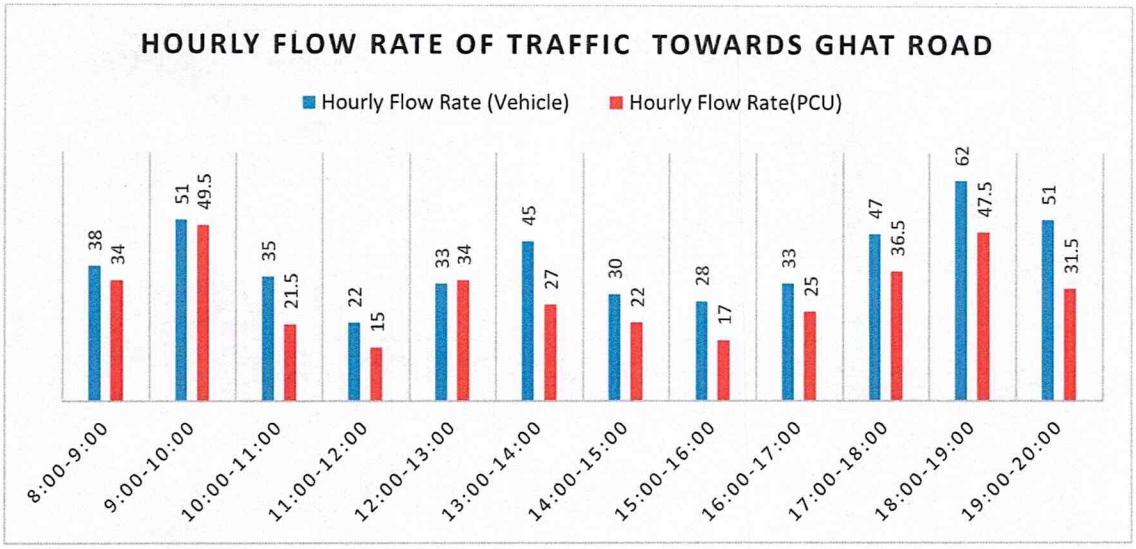

HOURLY FLOW RATE OF TRAFFIC FUTALA ROAD
Hourly Flow Rate (Vehicle)
Hourly Flow Rate(PCU)
165 138.5
179 136.5
139 105
115 93
164 134
161 132.5
150 124.5
132 106
201 170
157 110
164 124.5
173 139.5
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00
18:00-19:00
19:00-20:00

Weekend traffic composition






HOURLY FLOW RATE OF TRAFFIC AT VAYUSENA NAGAR ROAD
Hourly Flow Rate (Vehicle)
Hourly Flow Rate(PCU)
23
15
46
33.5
53
35
41
25
24
16
35
25
37
21.5
29
20.5
10
6.5
29
21
55
37
25
15.5
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00
18:00-19:00
19:00-20:00


HOURLY FLOW RATE OF TRAFFIC TOWARDS GHAT ROAD
Hourly Flow Rate (Vehicle)
Hourly Flow Rate(PCU)
38
34
51
49.5
35
21.5
22
15
33
34
45
27
30
22
28
17
33
25
47
36.5
62
47.5
51
31.5
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00
18:00-19:00
19:00-20:00

6.12 Traffic Volume Count

The traffic volume is counted to identify existing traffic load on project site road at 3 locations in both directions. Traffic survey was conducted for 12 hour on fine weather condition on weekday and weekend. The total traffic volume and PCU in each direction is shown in Table below.

Route: Nagpur Amravati Road (Towards Nagpur)

Weekday Traffic Volume

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini Bus	MSRTC Bus	Govt. Inter City Bus	Private Bus	School Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PCU)
8:00-9:00	70	10	86	140	19	3	3	9	10		8	1	359	317.5
9:00-10:00	60	60	55	90	80	5	8	6	13		2	5	384	325.5
10:00-11:00	90	50	84	97	46	2	6	5	6	6	3	6	401	365.5
11:00-12:00	66	19	68	85	71	1	4	3	5	4	1	2	329	252
12:00-13:00	92	29	87	56	68	8	6	5	8			1	360	308
13:00-14:00	89	84	96	38	52	6	2	8	4	5	5	3	392	368
14:00-15:00	68	50	76	68	40	2	6	6	1	3	4	7	331	304
15:00-16:00	95	39	45	72	64	3	5	4			6	2	335	258.5
16:00-17:00	85	48	82	83	26	2	3	8	3		7	4	351	320.5
17:00-18:00	64	40	13	49	21	1	7	4	1		6	1	207	188
18:00-19:00	67	56	86	89	18	4	6	6	2		4	1	339	308.5
19:00-20:00	82	70	85	98	62	7	8	8	6		5		431	367.5

Route: Nagpur Amravati Road(Towards Amravati)

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini Bus	MSRTC Bus	Govt. Inter City Bus	Private Bus	School Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	65	30	32	89	16	3	5	5	6	3			254	233
9:00-10:00	103	48	69	130	21	8	8	4	4	1	3		399	351
10:00-11:00	87	46	48	64	3	5	6	5	6	2	5	6	283	300.5
11:00-12:00	98	25	91	83	46	8	19	2	8		1		381	355.5
12:00-13:00	49	8	37	96	28	9	10	8	3			5	253	233.5
13:00-14:00	76	16	46	49	28	5	6	6	5	4	6	8	255	263
14:00-15:00	95	17	42	52	63	7	8	6	3	6			299	259.5
15:00-16:00	76	15	36	43	18		6	7	2		4	6	213	215.5
16:00-17:00	94	10	68	58	26	5	4	3	6		5	3	282	261.5
17:00-18:00	67	17	26	94	31	6	7	6	4	4	2		264	231
18:00-19:00	89	8	48	81	62	5	6	5	9	4	3		320	268
19:00-20:00	102	19	67	76	17		8	4	10		6		309	298

Route: T Point at Futala Vayusena Nagar(Towards Vayusena Nagar)

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Private Bus	School Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	30	1	10	80	5	2		6	1		135	106
9:00-10:00	19	2	28	65	4	4				2	124	99.5
10:00-11:00	16	9	31	60		2		7	3		128	116
11:00-12:00	21	8	10	94	3	1	2	1		4	144	110
12:00-13:00	15	12	4	29		6			1		67	64.5
13:00-14:00	20	4	8	68	6	1		4		6	117	99
14:00-15:00	18	16	7	31	2	2			2		78	64.5

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Private Bus	School Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
15:00-16:00	17	5	9	20	1	3	2	2			59	62
16:00-17:00	27	8	2	34		4			2	5	82	83
17:00-18:00	35	16	7	68	5	4					135	104
18:00-19:00	47	40	3	48	7	5	1	6	3		163	156
19:00-20:00	37	46	1	64		2		4		8	162	158

Route: Towards Animal and Fishery college

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Private Bus	School Bus	Mini LCV	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	18	4	5	67		1		6		101	81.5
9:00-10:00	13	6	2	85		1			2	109	68.5
10:00-11:00	24	1	4	61				7		97	80.5
11:00-12:00	35	5		48		2		1		91	73
12:00-13:00	14	9	2	25	1		2		1	54	44.5
13:00-14:00	18	12		14		1		4		49	52
14:00-15:00	31	5	3	42	6	3			3	93	72
15:00-16:00	42	8		29				2		81	70.5
16:00-17:00	24	20	4	18	8	1			1	76	61
17:00-18:00	46	10	1	27					8	92	78.5
18:00-19:00	16	5	2	35	2	2	6	6	2	76	84.5
19:00-20:00	17	31	6	16			8	4		82	98

Route : Futala Road

	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	75	8	2	71	3		6	165	138.5
9:00-10:00	68	10	1	91	1	6	2	179	136.5
10:00-11:00	48	6	6	68	2	8	1	139	105
11:00-12:00	49	5	4	48	4	2	3	115	93
12:00-13:00	85	4	2	68		3	2	164	134
13:00-14:00	75	10	1	67	1	4	3	161	132.5
14:00-15:00	84	3		55		7	1	150	124.5
15:00-16:00	69	5	6	48	2	2		132	106
16:00-17:00	105	0	8	82		1	5	201	170
17:00-18:00	57	5		92	1	2		157	110
18:00-19:00	63	9	2	87		1	2	164	124.5
19:00-20:00	95	4	6	67		1		173	139.5

Weekend Traffic Flow

Route: Nagpur Amravati Road(Towards Nagpur)

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini Bus	MSRTC Bus	Govt. Inter City Bus	Private Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PCU)
8:00-9:00	40	19	13	25	6		6	2	9	5		125	140.5
9:00-10:00	80	13	8	46		1	2	2	6			158	155.5
10:00-11:00	55	10	8	10	5		4	3	8	2	6	111	143
11:00-12:00	29	19	18	5		6	1	1	13			92	122.5
12:00-13:00	31	4	14	9	4		1	1	8	3	5	80	101.5
13:00-14:00	41	5	16	68	2	4	5	2	6			149	141

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini Bus	MSRTC Bus	Govt. Inter City Bus	Private Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PCU)
14:00-15:00	32	16	8	10			2	1	1	1	2	73	80
15:00-16:00	48	10	9	36	3	23	1	1				131	125.5
16:00-17:00	60	8	7	25	8	6	3	1	2	1		121	115.5
17:00-18:00	40	6	6	18			1	2		1		74	71
18:00-19:00	55	4	8	51	4		2	2	2		4	135	125.5
19:00-20:00	44	3	4	19			3	3	1	3		80	84.5

Route: Nagpur Amravati Road(Towards Amravati)

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini Bus	MSRTC Bus	Govt. Inter City Bus	Private Bus	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate (PUC)
8:00-9:00	16	1	6	25	0	0	6	2	1		0	57	62.5
9:00-10:00	40	6	2	28	6	0	2	3	3		0	90	86
10:00-11:00	12	2	4	29	2	3	4		1	2	0	59	54
11:00-12:00	16	8	2	38	0		1	1	1		0	67	54
12:00-13:00	18	6	3	21	5	4	3	3		4	0	67	65.5
13:00-14:00	18	13	6	18	0		4	2	2	7	0	70	77
14:00-15:00	19	1	10	52	0	4	6	0	6	6	0	104	104
15:00-16:00	34	2	5	34	8		1	2	1		0	87	70
16:00-17:00	13	8	7	31		3	2		3	6	1	74	72
17:00-18:00	20	4	6	57	0	0	5	2	4	0	0	99	96
18:00-19:00	16	6	10	60	6		4	4	6	0	1	113	107
19:00-20:00	28	1	9	24		8	6	5	5	0	0	86	110

Route: T Point at Futala Vayusena Nagar (Towards Vayusena Nagar)

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	5	2		16			23	15
9:00-10:00	18			25	2	1	46	33.5
10:00-11:00	6	4	2	34	5	2	53	35
11:00-12:00	8			28	4	1	41	25
12:00-13:00	6	1	1	16			24	16
13:00-14:00	10		3	18	3	1	35	25
14:00-15:00	2	3	1	31			37	21.5
15:00-16:00	6		2	19	1	1	29	20.5
16:00-17:00	1	2	1	5	1		10	6.5
17:00-18:00	3	4	3	16	2	1	29	21
18:00-19:00	5	3	1	44		2	55	37
19:00-20:00	6			19			25	15.5

Route: Towards Animal and Fishery college

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	16	2	2	16		2	38	34
9:00-10:00	24	3	1	19		4	51	49.5
10:00-11:00	8	1	1	23	2		35	21.5
11:00-12:00	6		2	14			22	15
12:00-13:00	13	14	3	2		1	33	34
13:00-14:00	9	4	1	26	5		45	27
14:00-15:00	4			24		2	30	22
15:00-16:00	6	2	2	14	4		28	17
16:00-17:00	16	1		16			33	25

Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Govt. Inter City Bus	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
17:00-18:00	15	3	3	25		1	47	36.5
18:00-19:00	32	1		29			62	47.5
19:00-20:00	10			40			51	31.5

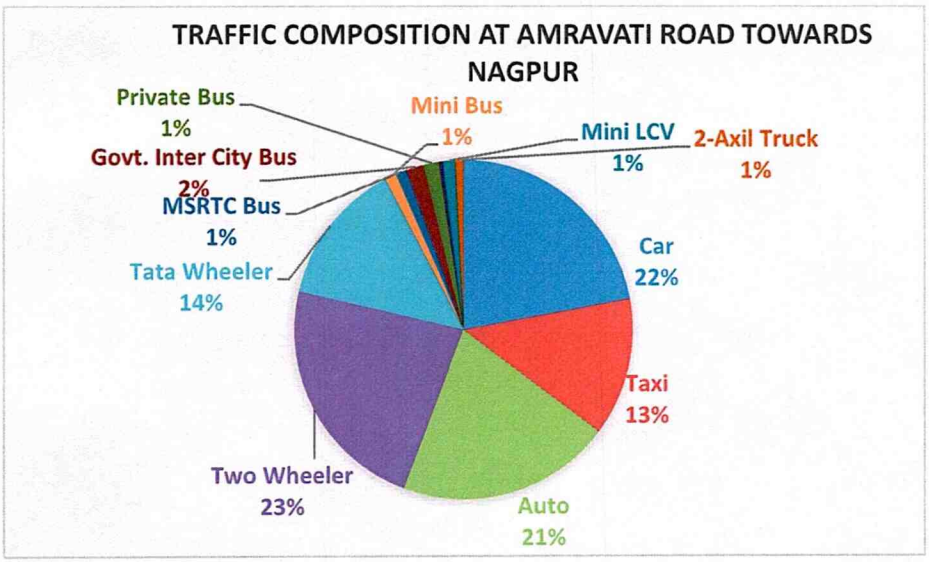
Route: Futala Road

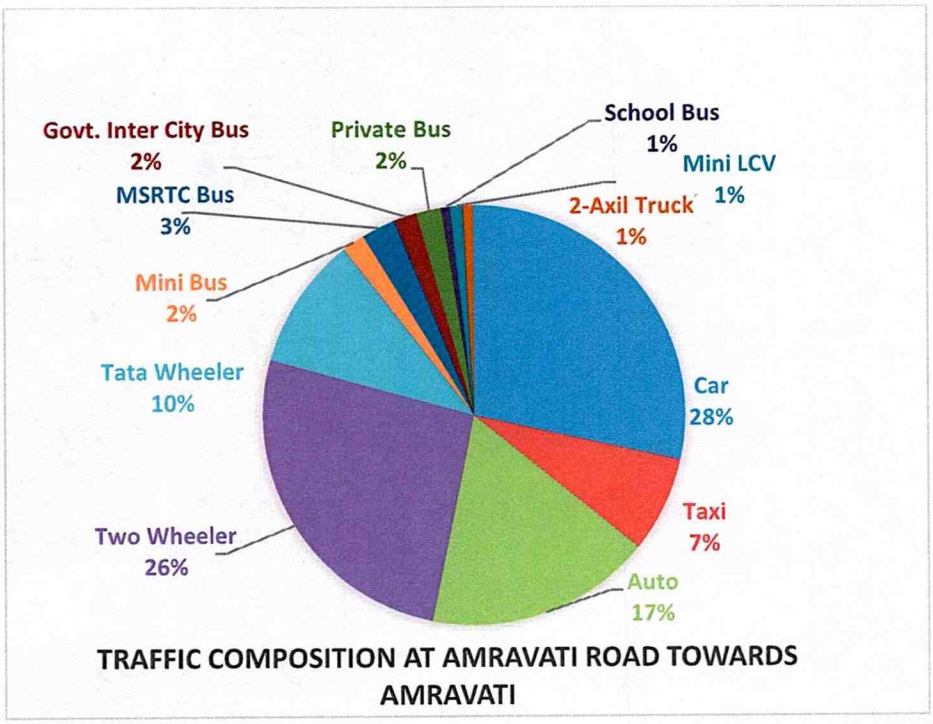
Time	Car/Jeep/Van	Taxi	Auto Rikshaw	Two Wheeler	Tata Wheeler	Mini LCV	2-Axil Truck	Hourly Flow Rate (Vehicle)	Hourly Flow Rate(PUC)
8:00-9:00	6	2	0	19				28	18.5
9:00-10:00	4	1	0	16		5		26	18
10:00-11:00	2	3	3	24	5		6	43	38
11:00-12:00	5	4	5	21	4	2		41	26.5
12:00-13:00	16	6		43			1	66	46.5
13:00-14:00	18	2	6	26	6	3	2	63	48
14:00-15:00	32	4		14	12	4	1	67	50
15:00-16:00	16		4	18				38	29
16:00-17:00	5	2		34		2	1	44	29
17:00-18:00	19	1	1	61	3			85	51.5
18:00-19:00	32	3	2	24			2	63	55
19:00-20:00	14		3	28				45	31

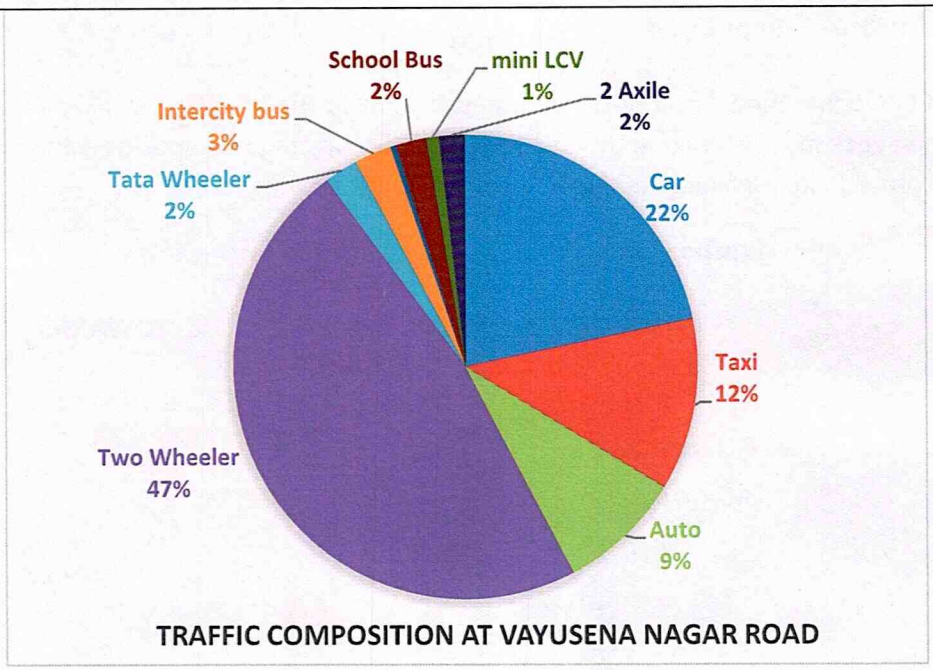
6.13 Vehicular Composition

The average modal composition amongst total traffic at different location for weekday and Weekend is shown in the Figure below. The average composition among total traffic at project site road and main road are shown in following tables.

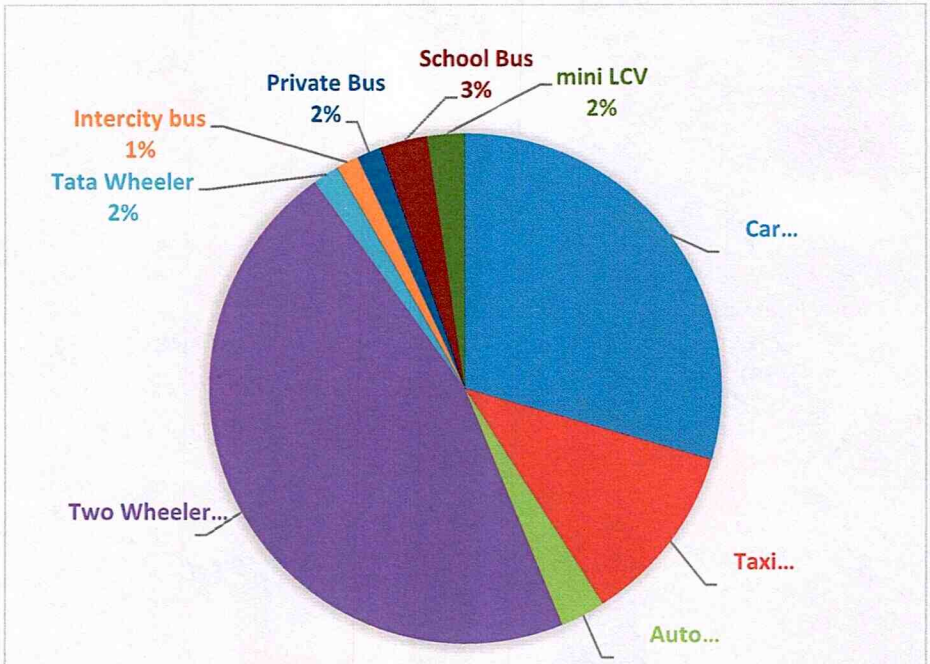
Traffic Composition at different road on weekday



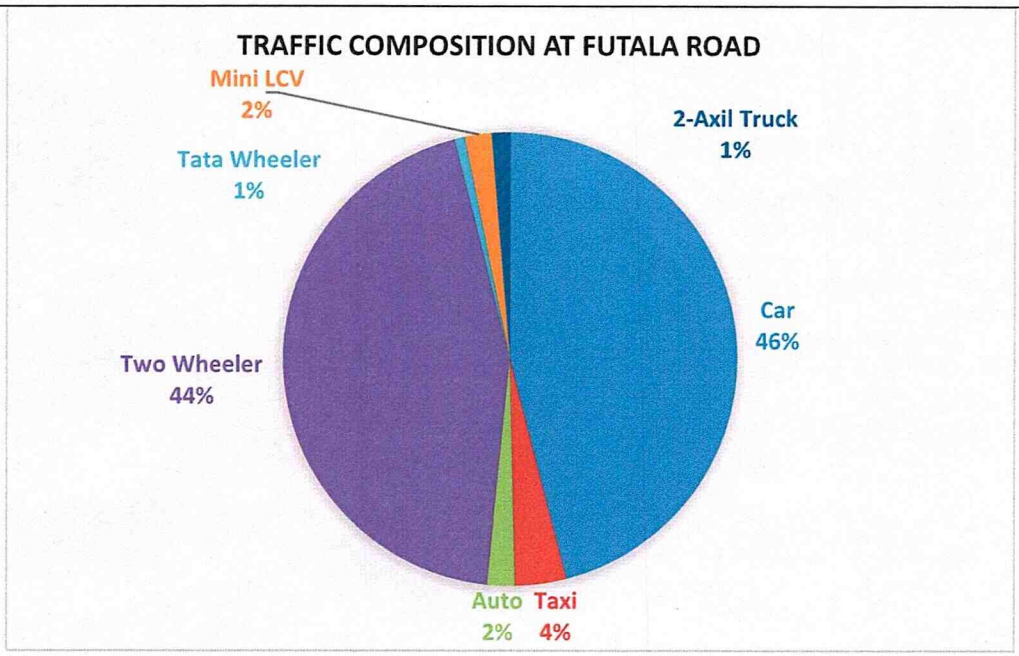




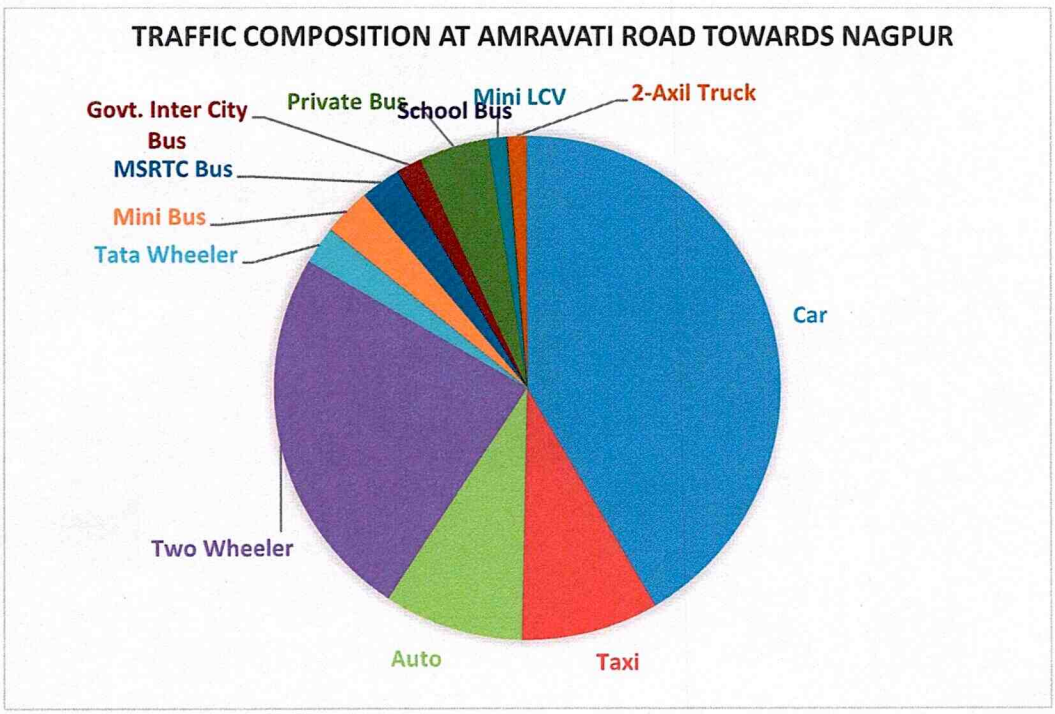
TRAFFIC COMPOSITION AT VAYUSENA NAGAR ROAD

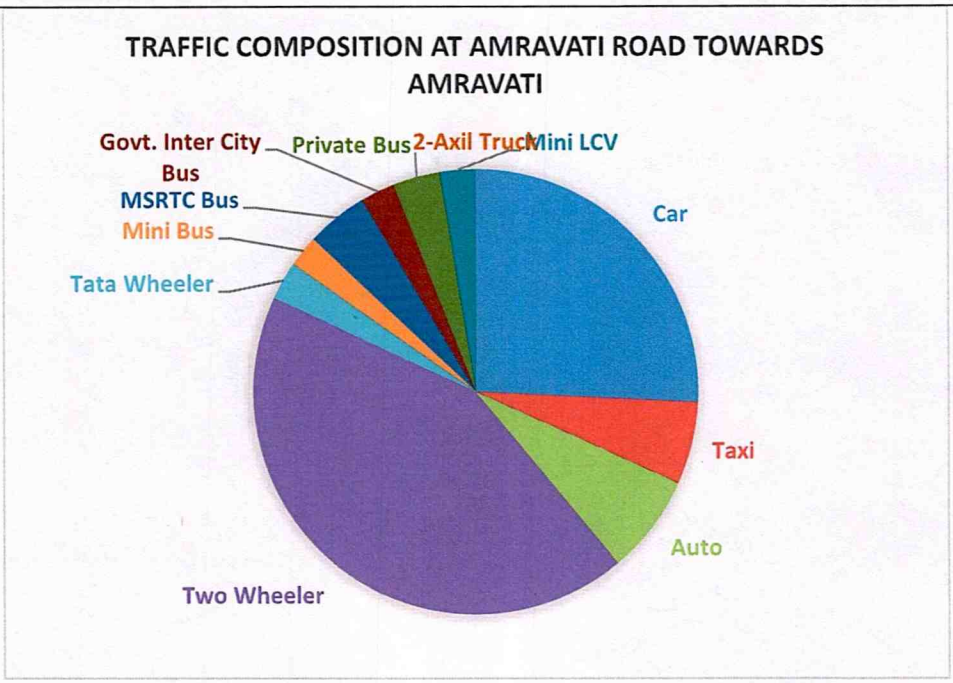


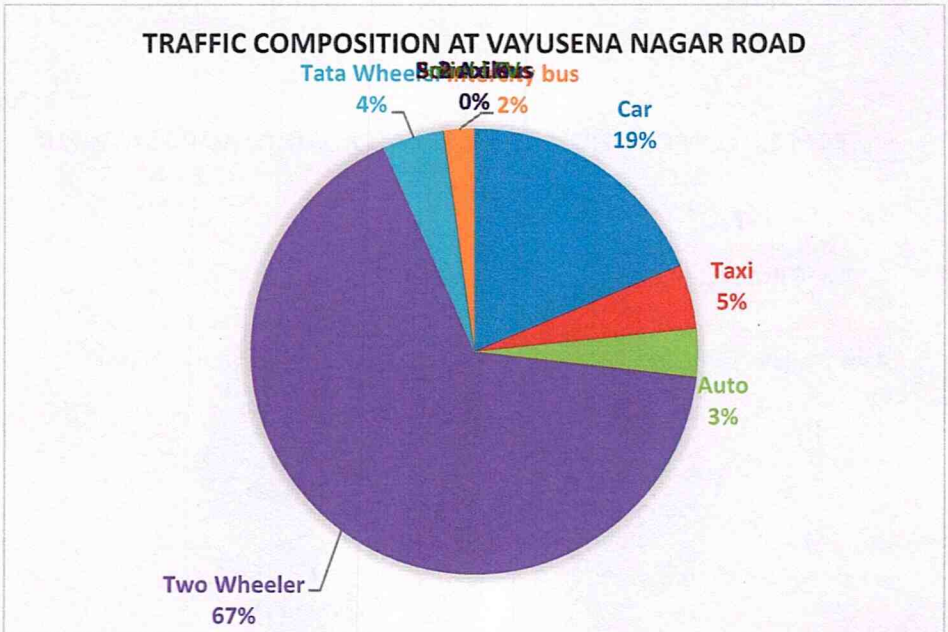
TRAFFIC COMPOSITION AT GHAT ROAD

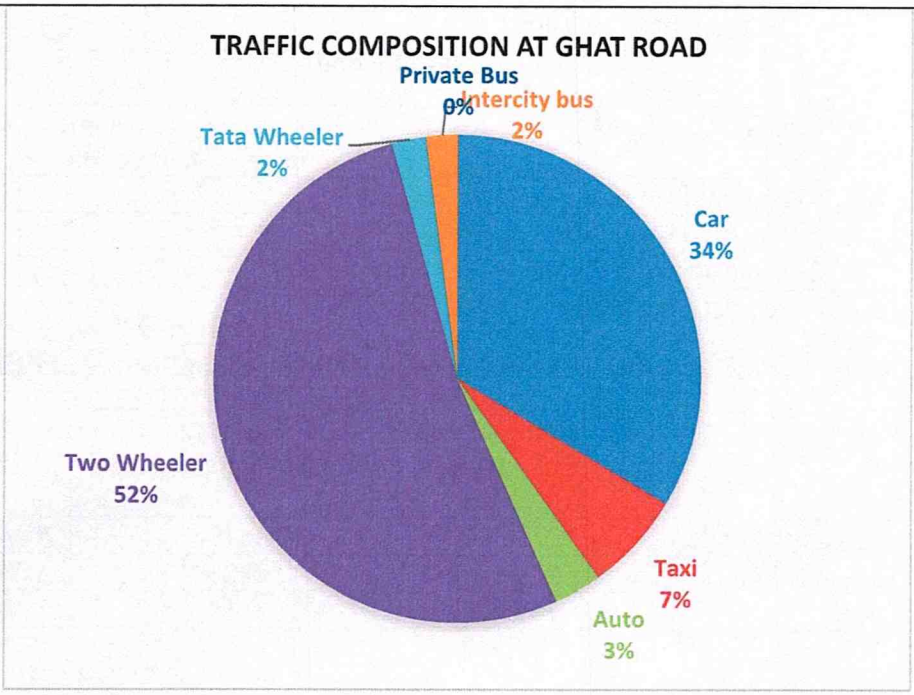


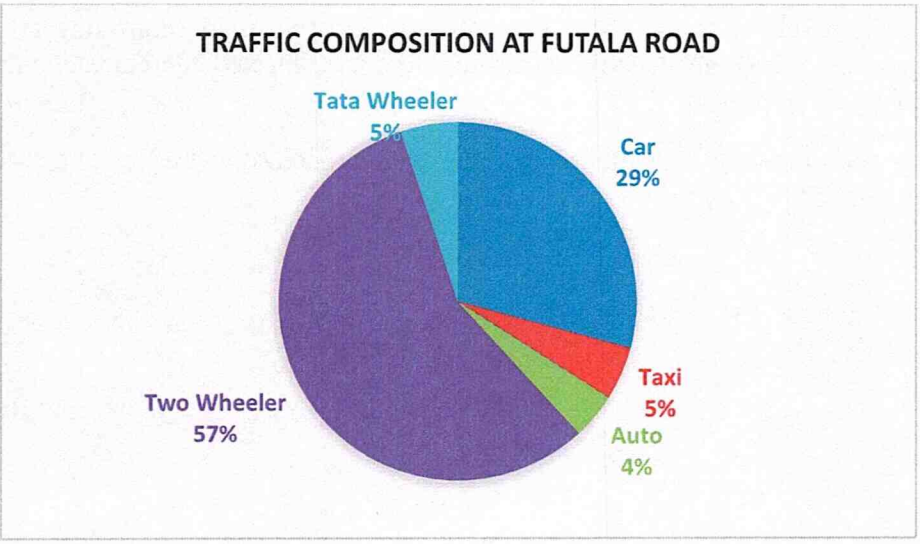
Traffic Composition at different road on Weekend




TRAFFIC COMPOSITION AT AMRAVATI ROAD TOWARDS AMRAVATI
Govt. Inter City Bus
Private Bus
2-Axil Truck
Mini LCV
MSRTC Bus
Mini Bus
Tata Wheeler
Car
Taxi
Auto
Two Wheeler


TRAFFIC COMPOSITION AT VAYUSENA NAGAR ROAD
4%
0%
2%
Car
19%
Taxi
5%
Auto
3%
Two Wheeler
67%





6.14 Findings and Observation

In the proposed project provide the parking space for 996 four wheeler and 770 two wheeler parking. Approach road is single lane two way divided road. Footpath is provide at both the side of road for walkers.

Level of Service Standard

Sr. No.	Existing Volume/Capacity	Level of Service
1	0.0-0.2	A-Very Good
2	0.2-0.4	B-Good
3	0.4-0.6	C-Fair
4	0.6-0.8	D-Poor
5	0.8-1.0	E-Extreme
6	>1.0	F-Breakdown

Source: IRC106:1990

Capacity of Road

Type of Carriage way	Total Design Service volume PCU/hours in both direction
4-lane divided two way	3600
2-lane (two way) Sub Arterial	1200
2-lane (two way) Collector	900

Source IRC106:1980

Total existing volume PCU/hour in both direction and Level of Service at different road.

Location	Existing Volume capacity PCU/hour	Existing Volume/Capacity ratio	Level of Service
Amravati Nagpur Road	716	0.19	A-Very Good
Vayusena-Sadar Road	242.5	0.20	A-Very Good
Futala Road	139.5	0.16	A-Very Good

6.15 Conclusion

Traffic survey data clearly indicate that the existing road connecting to project site is catering to average density of traffic and that expected incremental increase in road traffic due to project.

The road network is sufficient to cater to this increase in traffic. The road condition is very good.

CHAPTER-7 MITIGATION MEASURES FOR CONSTRUCTION PHASE

The first part in the Environmental Plan is the construction phase which is executed following well planned Mitigation Measures. The mitigation measures plays crucial role in reducing the negative impact during construction phase. The mitigation measures include –

1. Planning for the space available
2. Traffic Management Plan
3. Labour Camp at the proposed Location
4. Waste Disposal Plan
5. Construction Storage Facility
6. Proposed Material Usage
7. Air pollution Measures
8. Noise pollution Measures
9. Safety Measures

7.1 Action Plan for Healthcare Management

First aid facilities will be kept readily available with the site supervisors. The safety department will supervise the safe working of the contractor and their employees. Work spots will be maintained clean, provided with optimum lighting and enough ventilation to eliminate dust. Workers employed at construction site will compulsorily wear helmets.

7.2 Availability of Space & Temporary separation of constructed and proposed construction area

The proposed site having a sufficient open space to be used during the construction phase the remaining project to accommodate labour camp, storage, for vehicular movement and for services as required.

CHAPTER-8 ENVIRONENT MANAGEMENT PLAN

8.1 EMP Construction Phase

8.1.1 Introduction & Objective

The objective of the debris management is to –

Plan the construction activity in such a manner whereby the minimum waste is generated. Plan to maximize the quantity of material to be sent to reuse or recycle and to minimize the material to be sent to landfill areas.

The debris management on the site basically includes –

1. The debris generated out of demolition at the site
2. The excavated soil and
3. Debris generated during the construction at the site

The debris management is based on the following factors –

1. The first and foremost is to identify the items of material waste.
2. To estimate the quantity of wastes.
3. To focus on avoidance this in practicality may be very difficult to execute due to various limitations.
4. To identify the services of various agencies for disposal of wastes.
5. To make provision for storage of various identified waste from where they can be disposed either by way of reuse or for recycle or for disposal.
6. To assign the responsibility and monitor the execution.

The avoidance to the possible extent can be achieved with little planning and execution.

a. Estimating the correct quantity of the material is one way to avoid waste generation at the site
b. Proper storing of various products also contribute in avoidance of waste generation at site which may otherwise occur due to damage or breakage
c. Some of the fixtures which are available in modular form should be preferred to avoid wastage at site like readymade windows, doorframes etc. of exact size.

Assigning the responsibility and identifying the services is key to attain success in debris management.

Proper storage and easy handling facility also adds to reduction of waste generation at the site. The improper storage may enhance damages as well as loss due to theft.

8.1.2 Waste Generation from Demolition Work

The project is not consisting any existing structures to demolish.

8.1.3 Waste Generation During Construction Phase

The waste generation during construction phase includes –

1. Excavation at the site
2. Construction material waste

Table- 8.1 Earthwork Waste quantity during construction

Particulars	**Quantity (Cum.)**
Gross Excavated Quantity	20965
Excavated material for filling at Project Site	16500
Construction Material waste for filling at Project Site	220
Leveling & Road:	1000
Net Excavated Quantity	3245
Deduct Top Soil preservation at RG Area	2725
Total Available excavated topsoil	3090
Balance Top Soil preservation for Greenbelt development in future expansion location.	365
Excavated material shall be utilized at other metro sites	155

8.1.4 The Excavation

The contour –

East–315-313
West–317-316
North–315-313
South– 316-315

Disposal of Excavated Quantity
The disposal has following means –

1. Backfill : 16500 Cum
2. Leveling & Road: 1000 Cum
3. Top Soil preservation for landscape: 2725 Cum
4. Disposal out of site :155 Cum

8.1.5 Construction Waste Material

The construction waste material is the one which is unused or bit and pieces from the cuttings of materials such as tile, blocks, plywood, unused gravels, glass, packing material, iron etc.

As stated above the first part of the debris management is the estimation of the quantities for various materials. The second part is plan for avoidance of the waste generation as far as possible. The third part is to reuse the material out of the waste generated and / or use the recycling mode and the last part is the disposal methodology to be applied for various materials used in completion of the construction.

8.1.6 Estimated Quantity

The estimated quantity of the various materials for the proposed BUA is as under:

Table- 8.2 Construction Waste quantity during construction

CONSTRCTION WASTE QUANTITIES		
Type of Material	**Quantity of Waste Generation**	**Disposal Method**
Cement (cum)	10-12	Used in Internal Roads
Steel (kg)	500-550	Recycled via Recycler
River Sand (cum)	1.5-2	Used in Internal Roads
AAC Blocks (Nos.)	500-600	Used in Internal Roads excess will dispose out of site
Paints (Ltr)	30-35	Disposed off via authorized agency
Tiles (sqm)	50-60	Used in Internal Roads excess will dispose out of site cutting portion will be used in skirting part

The quantity of waste to be disposed on site includes cement, sand, AAC block, & tiles which is approximately 15-16 Cum.

Avoidance of Waste

There are various ways and means whereby waste generation can be avoided at a large as compared to conventional construction methods.

1. The use of augur piling machine can restrict excavation at a large as it excavates only the required size for columns and area required for labour operation.
2. The use of MS plates and bars avoids use of plywood and timber in casting of slabs as well it also helps in restricting the concrete during plastering.
3. The iron scaffolding also restricts the use of wooden structures and can be reused over and again.
4. The use of RMC instead of conventional concrete mixing is proposed where by not only waste generation is reduced to great extent but also environment friendly materials are used.
5. Another use of RMC is restricting the use of river sand as it contains crush sand as well as fly ash.

6. Use of wire harnessing for electrical installations. This shall allow to attain almost zero waste in terms of electrical wires more particularly PVC and non ferrous metals.
7. Use of vitrified tiles. The right selection of tile size based on the floor area also helps in avoiding the waste.
8. The use of precut TMT bars and stirrups also contributes towards almost zero ferrous waste generation.
9. The use of readymade door frames avoids use of timber and the timber waste.
10. The use of readymade windows out of recycled aluminum contributes in saving and helps in restricting environmental damage.
11. The use of AAC blocks instead of bricks is another ways of avoiding waste.
12. The use of Gypsum instead of plastering and use of chemicals for tile fixing saves water, labour and material and contributes in maintaining environment.

Reuse and Recycle

The top soil – organically rich soil of about 200 – 250 mm must be essentially stored and reuse in the landscape and plantation area.

The gravel waste can be used in the RWH pits along with the blocks / brick pieces for construction of pits.

There are various material wastes which can be consumed on site itself. The broken tiles, blocks, small pieces of ferrous and non ferrous materials can be used while compacting the area under internal road.

Material	Disposal Mechanism
Plywood/Timber	Plywood/Timber – compost, garden
Ferrous waste	Excess through scrap vendor
Non-ferrous waste	Excess through scrap vendor
Concrete	Waste in internal roads
Flooring Tiles	Waste in internal roads
Blocks / Bricks	Waste in internal roads
Plaster	Waste in internal roads
Hazardous – Paints, Solvents	Through authorized vendor (Contractor)
Plumbing fixtures	Through scrap vendor (Contractor)
Glass	Through scrap vendor (Contractor)
Sand	Waste in internal roads
Top soil	In open space and for plantation
Plastic	Through scrap vendor
P V C	Through scrap vendor
Food Waste by Labour	In-situ by composting
Dry Waste by Labour	Through NMC

8.1.7 Labor Camp Details

The proposed number of labor during construction stationed at the site shall be approx. 60 nos.

1. Filtered Water tankers shall be provided to cater the need of drinking water.
2. The construction water shall be provided through water tankers.
3. Each residing labour shall be provided with 8 sqmt tenement temporarily constructed using tin sheets. Therefore area for the labour camp shall be 500 sqm.
4. Bathroom is available for laborers.
5. Separate water tank proposed to be provided for Labour camp.

8.1.8 Water Requirement

Construction phase

The water requirement for the construction purposes is estimated to be 15-20 KLD depending upon activities and about 2 KLD water will be required for drinking and domestic use for the construction workers. During construction phase, water demand will be met through authorized tankers

8.1.9 Solid & Liquid Waste disposal

The waste includes

1. Solid Waste from the labour Camp – The bio-degradable solid waste approx. 4Kg/day generated and non-biodegradable solid waste approx. 2 Kg/day from the labour camp shall be disposed off through NMC authorized agency.
2. Liquid Waste from the Camp – The labour shall be used Sulabh Souchalay located near the site. Hence no need of extra facility for liquid waste.
3. Reusable Construction Material waste – The reusable construction waste basically includes debris generated during the construction involving pieces of bricks, assorted gravel, metal etc. which shall be consumed in the internal roads and pathways.
4. Non-reusable construction waste – The non-reusable construction waste includes packing material, boxes, cans, ply material etc. which shall be disposed off through scrap vendor.

8.1.10 Storage facility for Construction Material

The storage facility is required for steel, cement bags, sand, gravels, bricks or blocks, door frames, electric material, pumps, generator, and other equipment. The area earmark for is 800 sqm.

It is therefore considered that storage space which includes covered and open space is provided separately.

The storage is provided with proper access for the vehicular traffic for easy unloading and to avoid congestion of vehicular traffic (drawing given below).

8.1.11 Use of various materials

To reduce the environmental hazards in terms of air and noise pollution as well as accumulation of non-biodegradable materials following actions are proposed

1. Use of RMC (ready mix concrete) to reduce the material storage for cement, gravels, sand and to avoid air pollution as well as noise pollution using concrete mixers
2. Use of Tentatively 10 lakhs bricks for construction made using fly ash as component
3. Use of iron scaffolding instead of bamboo
4. Use of iron plates for slab casting instead of plywood
5. Use of metal door frames instead of wooden for all internal doors
6. Use of aluminum window frames which are supplied to the sizes
7. Use of wire harnessing to avoid pilferage and accumulation of waste of plastic material

8.1.12 Air Pollution Control Measures

Demolition work – There is no existing construction for demolition

Removal & disposal of debris – 3 m high barricading on all sides shall be provided and dust suppression shall be done through water sprinkling. Wheel washing at entry and exit points to control dust emission.

Excavation – The excavation area is approx.4050 Sqm for the buildings under proposed construction. Thus total area under excavation is about 4050 Sqm. The area to be excavated shall be provided with barricades to restrict the air pollution from the excavation. Water sprinkling shall be made compulsory before the excavation to restrict the airborne of the soil. Use of Auger Cast Pile machine is proposed to restrict the excavation to minimum area.

Storage of excavated soil – The excavated soil is estimated at 20965 cum. The excavated soil shall be stored in the open space and shall be covered for the period of time under construction.

Disposal of excavated soil – The excavated soil shall be used in the garden area which is equal to 600 Sq.m. at Project Site and at Viewing gallery for land scape development. The balance quantity shall be consumed for future development site. The care shall be taken that excavated soil shall be disposed out of the site as per guidance of authorized agency.

During structural erection – The air pollution control shall be executed adopting methodology for the construction. RMC shall be used for the concreting for the structural work. This will totally reduce the air pollution.

During brick work – The use of cement is unavoidable during the brick work. To reduce the impact of air pollution, fly ash bricks are proposed. The shred net is proposed to be used on the outer surface of the structural erection which shall prevent the air pollution during the brickwork. The floors are also proposed to be covered with the net whereby material shall be collected on the shred net and shall prevent air pollution due to wind.

During plastering work – The plastering is proposed in the enclosed environment. The shred net shall be used from all the sides of the floor where plastering is made. The waste material during the plastering of walls shall be collected and used in the internal road leveling.

During Tiling work – The tiling work is proposed using vitrified tiles , stones & granite. The cut tiles shall be reused as far as possible to avoid generation of waste. The tile pieces shall be consumed in the pathways, roads.

During painting work – The painting shall be used using eco-friendly paints as far as possible. The paint barrels shall be disposed of using authorized vendor

8.1.13 Noise Pollution Control Measures

Demolition work – There is no existing construction for demolition

Excavation – The Excavation is integral part of the building construction and is unavoidable. The precautions are proposed to reduce the noise pollution. The conventional method of excavation is not proposed for the construction. The excavation is proposed using Auger Piling equipment which excavates only the column area and area required to movement of manpower for raising the plate structure. Further, the work of pile equipment shall be limited to day time to avoid disturbance to the nearby residents.

During Structural Erection– The structural work is proposed using steel plates fixed using nut bolts and therefore the noise shall be just negligible. The use of RMC is proposed whereby the noise due to the operation of concrete mixer is avoided.

Safety Measures – It shall be ensured that the various safety measures as per the guidelines will be followed during construction of the project. A well qualified& responsible Safety Officer shall be appointed by contractor to ensure the implementation of the same.

8.1.14 EMP Cost

Table 8.3-EMP Cost During Construction Phase

S.N.	Pollution Control & Other Environment Infrastructure	Capital Cost In Rs. Lakhs	Annual O & M Cost in Rs. Lakhs
1	Water for Construction, Labour & Dust suppression	--	2.0
2	Site Sanitation & Safety	--	1.0
3	Environmental Monitoring	--	1.0
4	Disinfection	--	0.5
5	Health Check up	--	0.5

8.2 EMP - Operational Phase

1. Disposal of Bio-degradable waste
2. Disposal of Non-Bio-degradable Waste
3. Disposal of E-Waste
4. 100 % Sewage Treatment and Recycling of Water
5. Landscape providing biodiversity

6. Rain Water Harvesting
7. Solar Water provisions
8. Ambient Air monitoring (DG) Set – Air and Noise monitoring
9. Ambient noise monitoring
10. Drinking Water Monitoring
11. Environmental Audit

Environmental Management Plan includes following for each of the above aspects for implementation:

1. Manpower Requirement
2. Executable Actions
3. Parameters for the Environmental Norms
4. Executors and their actions
5. Report/s generation
6. Corrective measures
7. Compliances

8.2.1 Disposal of Bio-degradable Waste –

The solid waste from the proposed development will comprises of biodegradable wastes like domestic food waste, horticultural waste and recyclable waste like plastics, paper, wood etc. As per the manual on municipal solid waste prescribed by Central Public Health and Environmental Engineering Organization (CPHEEO), the quantity of solid waste generated varies between 0.2- 0.6 kg / capita / day.

Quantity of solid waste generated from the proposed buildings as given below:

Solid Waste Generation	No. of Users	60% wet solid waste (Kg)	40% dry solid waste (Kg)	Total solid waste (Kg)
Food Court	300	27	18	45
AC Restaurant	300	27	18	45
Gazebo 18 nos.	180	16.2	10.8	27
	360	32.4	21.6	54
Total		102.6	68.4	171

Note: For Commercial: 60% non-biodegradable and 40% biodegradable out of total 0.15 Kg/person /day.

Considerations for solid waste generation as per norms:

S.N.	Description	Quantity (kg/day)	Mode of treatment / disposal
1	Biodegradable waste	102.6	Will be treated in Organic Waste Converter or dispose through authorized agency of NMC
2	Non-biodegradable waste	68.4	Handed over to NMC for recycle and disposal

Actions: Wastes generated from the restaurant will be segregated into Bio degradable waste and non- bio degradable waste in the source itself (by the Owner) in separate bins.

The wastes from such bins are collected separately on daily basis and stored in common disposal area. The bio degradable waste will be treated in an organic waste converter at site or disposed through NMC. Non bio degradable waste will be handed over to recyclers for scientific disposal.

Adequate Manpower for housekeeping and supervision shall be done by O&M of the Project.

Reporting – The parameters of the compost obtained must be monitored every month to ascertain the results attaining the parameters as per FCO norms through NABL approved Laboratory if OWC shall be used.

Corrective Action – In case of failure to attain the parameters as per the FCO, the vendor must be immediately called for and necessary rectification must be implemented as suggested.

Responsibility – Environment Manager/O & M Staff of the project.

Cost Estimates –

Capital Cost	Rs.6 Lacs, Organic Waste Convertor of 125 kg Capacity.
Annual Maintenance Cost	Rs.1.0 Lacs

Note: *Procurement of OWC will be decided based on the actual waste generated.*

8.2.2 Disposal of Non-Bio-degradable Waste

Action –

- Collection of non-biodegradable waste at the collection point in separate bin
- Handing over the waste to Authorized Agency
- Renewal of contract with Authorized Agency on annual basis

Reporting – Environment Manager/O & M Staff to keep Reporting of the same

Cost Estimate –The Agreement shall be done with Authorized Agency with O & M of Project at the time of initiation of the work and shall charge as per their norms which shall be provided for.

Responsibility – It is the responsibility of the Environment Manager to enter into an Agreement with Authorized Agency through the O & M In-charge of the Project.

8.2.3 Disposal of E-Waste and Hazardous Waste

- Electronic Goods waste
- Paint Tins, cans
- Pesticides
- Fluorescent tubes etc.

Reporting – Environment Manager/O & M Staff to keep Reporting of the same

Cost Estimate – The Agreement shall be done with Authorized Agency with O & M of Project at the time of initiation of the work and shall charge as per their norms which shall be provided for.

Responsibility – It is the responsibility of the Environment Manager to enter into an Agreement with Authorized Agency through the O & M In-charge of the Project.

8.2.4 Action Plan for Health care Management

During the Operation phase:

Updated guidance to reflect the current understanding and ongoing response needs of healthcare systems and facilities. Current guidance is for managing operations during the pandemic.

Primary First Aid Facility will be provided with basic treatment facility.

Health Planning - Community health is the process of defining problems, identifying needs and resources, setting prioritized goals, and determining the administrative action to implement.

Bio-Medical Waste Management

Bio-medical Waste (Management & Handling) Rules, 1998 were notified by the Ministry of Environment & Forests (MoEF) under the Environment (Protection) Act, 1986. In exercise of the powers conferred by Section 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Bio-Medical Waste (Management and Handling) Rules, 1998 and further amendments made thereof, the Central Government vide G.S.R. 343(E) dated 28th March, 2016 published the Bio-medical Waste Management Rules, 2016 will be followed.

Disposal of Medical Waste.

Different Color bins will be provided:

1. **Yellow:** A yellow colored waste bin indicates several different types of wastes. In yellow bins, there could be human waste, Sanitary pad, diaper or bodily fluids. They could also contain chemicals, soiled bed sheets, animal carcasses, etc.

2. **Red:** In red containers, there should be contaminated waste material that has been in contact with hazardous substances. For instance, IV tubes, catheters, tubing, or syringes (without the needle), hand gloves, mask can all be collected in red bins.

3. **White:** These containers are used for sharps, and must be lined with puncture-proof bags. Sharps can include used needles, scalpels, or blades.

After filling the container, it will be handover to authorized vendor from Municipal Corporation for disposal. Medical waste shall not be mixed with household waste.

8.2.5 Water Requirement

Operation phase

During operation phase, water requirement will be met through NMC. The total water demand during operation phase will be about 51 KLD. Out of this, total fresh water requirement is 38 KLD will be met from Nagpur Municipal Corporation. The balance

water demand will be met through recycling of treated wastewater from onsite STP. Details of water demand during operation phase are given in **table below.**

Particulars	No. Users	Domestic KLD	Flushing KLD	Total KLD
Food Court	**300**	7.5	3	10.5
AC Restaurant	**300**	16.5	4.5	21
Gazebo 18 nos.	**180**	4.5	1.8	6.3
	360	9	3.6	12.6
Total		**37.5**	**12.9**	**50.4**

Source: Values per capita as per CGWA Notification 24/09/2020

8.2.6 100 % Sewage Treatment and Recycling of Water

- The waste water generation i.e. (black + gray) is estimated as 40 KLD from visitors and commercial users. The treated sewage water will be 36 KLD out of which 13 KLD will be used for flushing and 23 kld will be reused for horticulture.
- STP will be installed based upon latest Technology is proposed.
- Capacities of STP will be 40 KLD
- Manpower must be employed for operation of the plant

Parameters –

Table 8.4: Parameters of Treated Water

TREATED WATER	PARAMETER (After tertiary Filtration System)	
pH	6.5-7.5	
COD	≤ 30	mg/lit
BOD (3 days @ 27^0C)	≤ 10	mg/lit
Suspended Solids	≤10	mg/lit
Oil & Grease	≤5	mg/lit
Nitrogen	≤10	mg /lit
Phosphate	≤5	mg /lit
USE	Flushing & Gardening	

Action –

- requirement of operator/s for the STP
- Training of the appointed persons
- Ascertaining the operations of the plant and keeping the 'LOG' for the operations
- Recording the sub- meter readings for the cost calculations and continued operations
- Recording the output water quantity from water meter

Reporting –

- The treated water sample testing to be carried out every quarterly.
- The sample test must attain parameters as per CPCB / MoEF norms
- Machine operation 'LOG' will be maintained

Corrective Measures – In case of non attainment of parameters, immediate intimation and action from the maintenance contractor against AMC

Cost Estimate –

Capital Cost	Rs.25 Lacs (STP - 40 KLD)
Annual Maintenance Cost	Rs.2.0 Lacs

Responsibility – It is the responsibility of the O & M of the Project to enter into an Agreement with Authorized Agency.

8.2.7 Landscape providing biodiversity

The total plantation proposed is 640 Nos. Plants bearing fruits, flowers and helping biodiversity are proposed

In addition following Trees will be planted

Table 8.5: List of Proposed Plantation

Sr. No.	Botanical Name	Common Name	Nos.	Characteristics & ecological importance
1	Nyctanthes arbor-tristis	Parijatak	40	This Small tree has highly fragrant flowers those attract Bees and Butterflies, Fruits attract Birds.
2	Ochnaobtusata	KanakChampa	60	Native, this shrub has yellow fragrant flowers, Host plant for Butterflies.
3	Mangiferaindica	Amba	40	Mango trees provide fruit, firewood, poles, organic matter for soil amendment, living fence post, shade, soil conservation and cattle feed (the rotting fruits).
4	Psidiumguajava	Amrud	40	Grown from seed, guava trees can bear fruit in two years, and can continue to do so for forty yearsThe fruit is cultivated and favored by humans, and many other animals such as birds consume it.
5	Murrayapaniculatum	Kamini/Kunti	50	Native to Western Ghats, this shrub has fragrant white flowers and dense foliage. It is a host plant for Butterflies.
6	Citrus limon	Lemon	50	This Shrub is used in everyday Cooking and acts as a host plant for Butterflies.
7	Bauhinia racemosa	Apta	60	Native , this Shrub has a Religious importance
Total A			340	
List of proposed plantation along the Compound Wall				
1	Mimusopselengi	Bakul	45	Native, Evergreen Foliage and Flowering tree has dense branching, hence good for Wind screening. Flowers are deeply fragrant and attracts birds and Bees.

2	Pongamiapinnata	Karanj	45	Native , this Deciduous White Flowering tree. Attracts Birds and Arboreal Mammals.
3	Lagerstroemia reginae	Tamhan	60	This Purple Flowering plant is the State flower of Maharashtra.
4	Cassia fistula	Bahava	45	This Flowering and Deciduous tree has beautiful Yellow chandeliers in Summers. Good perching site for Birds.
5	Erythrinavariegata	Pangara	45	Native, this Reddish-Orange Flowering and Deciduous tree attracts lot of Birds for the Nectar.
6	AzardicaIndica	Neem	60	Improve the ground water level, have medicinal values.
		Total B	300	

TOTAL TREES PROPOSED (A+B) = 640 Nos.

Reporting –

- Record of the plantation to be maintained
- Numbering the plants to ascertain the total proposed is maintained

Corrective Measures –

- Harvesting of the plants to ascertain no growth on hindering the clear driveway

Cost estimates –

Capital Cost	Rs. 5 Lacs
Annual Maintenance Cost	Rs. 1.0 Lacs

8.2.8 Rain Water Harvesting

Keeping in mind the importance of such secondary sources of water and sustainability. The project proponent will successfully implement Rainwater Harvesting system. Rainwater harvesting is a mechanism to recharge the groundwater level.

Rain water harvesting will be done by two ways;

- Recharge through Roof Top or RWH tanks through
- Recharge through surface run-off

Advantages of Rain Water Harvesting

There are various advantages of Rain Water Harvesting from which some of them are listed below:

- Outsourcing is reduced as it allows use of rainwater in case of scarcity.
- Solution to water problems.
- Effective rise in Ground Water levels.
- Inexpensive and simple technology.

- It's economical & energy saving as it prevents extraction of water from depleting Ground Water Table.
- Provides high quality water, having low mineral content.
- Easy operation & maintenance.
- Reduces soil erosion.

Design of Rain Water Harvesting

Quantity of Rain water collected depends upon:

- Average Rainfall Intensity.
- Catchment area.
- Run-off coefficient

Design Calculations

Area Available Rain Water Harvesting is as under:

Total Land Area	: 6000 Sqm
Roof Top area of building/sheds	: 3769 Sqm.
Road/ paved area	: 1331 sqmts
Green belt Area	: 900 sqmts

Rainfall Intensity for the region

Average/Peak Rainfall per year is 900 mm No historical rainfall available at site.

Co-efficient and Factor Adopted: Runoff Co-efficient

Surface Type	**Run off Co efficient**
Roof top area of building/sheds	0.80
Road and Paved area	0.60
Green belt area	0.15

(Source: Concepts & Practices for Rain Water Harvesting NBC 2016)

Retention Time in Recharge Well

(15) min per hour

Volume of Harvesting Pit

Q * Retention Time

Where,
Q = Catchment Area x Harvesting Factor x Rainfall intensity (mm/ hour)

Components for Rain Water Harvesting Scheme

Catchment

The Catchment of a water harvesting system is the surface which directly receives rainfall. It can be a paved area like Terrace of a building or an unpaved area like lawn or open ground.

Manhole

Manholes are Brick Masonary Structure placed in between the Drainage line so that some percentage of water gets percolated directly through manhole. Percolation of rain water through manhole depends upon the permeability of the soil.
Each Manhole, in this case, contributes around 10% of percolation depending on soil permeability.

Conduits/Pipeline

Conduits are pipelines or drains that carry Rain Water from the Catchment area to Rain Harvesting System.

Desilting Chamber

The rainwater first enters the desilting chamber where the silt & floating oil gets separated from the flow. This oil is manually removed by scrapping from the top of the Chamber and then overflows into the filtering chamber. The filtering chamber consists of pebbles, which further filters the rainwater before diverting it into the recharge well.

Filter Media in Rain Water Harvesting Pit

The Filter is used to remove suspended pollutant from rainwater collected. A filter unit is a chamber filled with filtering media such as course sand, Gravels, etc. to remove suspended material before it enters the recharge structure.

Recharge Structure

Rain water will be charged into ground water aquifers through recharge structure. It conducts water to a greater depth from where it joins the ground water.

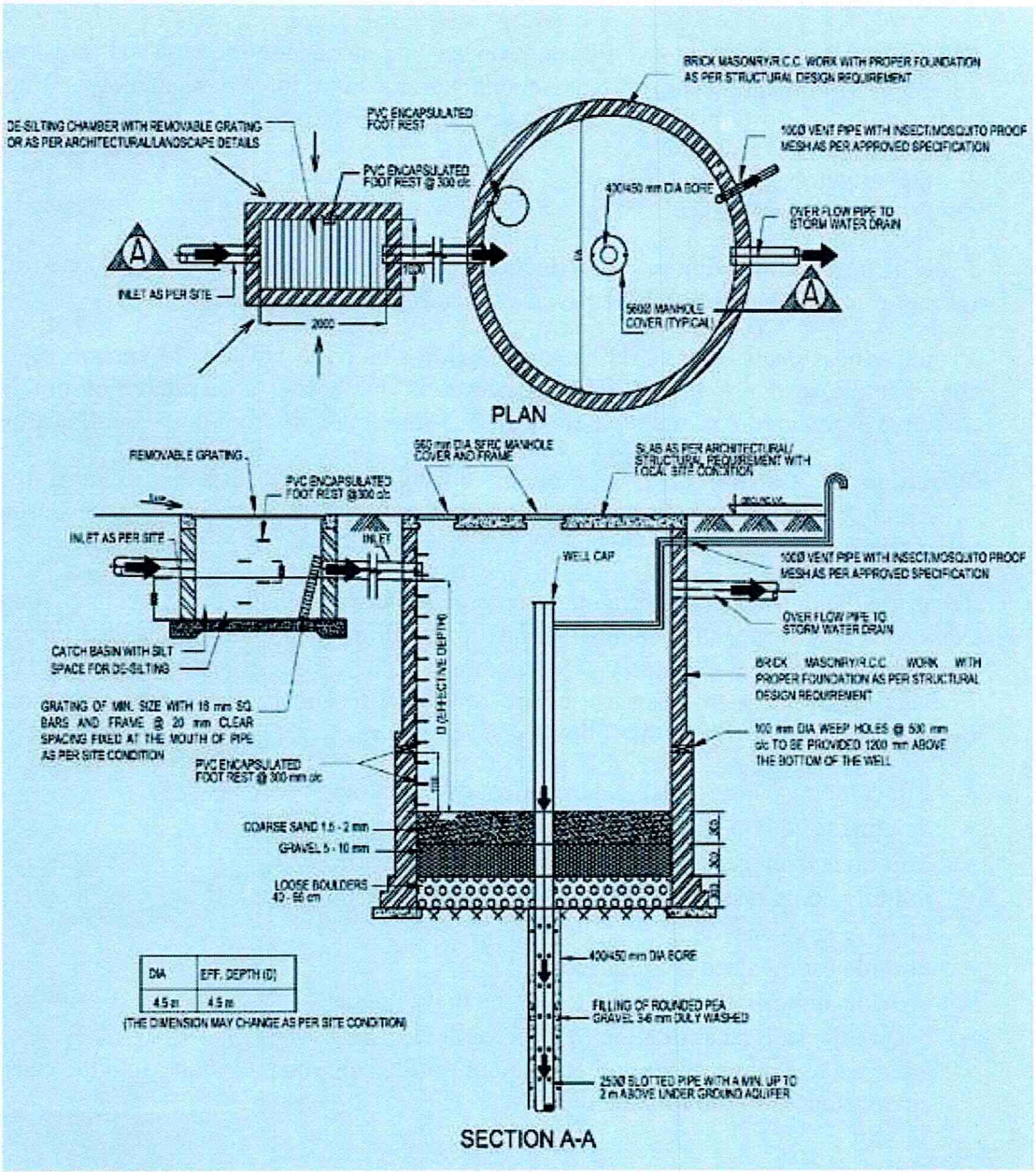
Rainwater harvesting Quantity

Sr. N0.	Land use type	Area (in Square meters)	Average Rainfall (in meters)	Runoff Coefficient (As per NBC Guidelines)	Potential of Rainfall Runoff Generated (Available for Harvesting / Artificial Recharge)(in m^3/Annum)
1	Green Belt Area	900	0.9	0.15	121.5
2	Road / Paved Area	1331	0.9	0.6	718.74
3	Rooftop Area of Buildings / Sheds	3769	0.9	0.8	2713.68
	Total				**3553.92**

Average recharge of rain water annually is **3553.92** m^3 in the project premises.

Size of Various Units

The typical design for the recharge pit is shown in below figure



All Dimensions are in MM

CHAPTER-9 DISASTER MANAGEMENT PLAN

Disaster management is an integrated process of planning, organizing, coordinating and implementing measures that are needed for effectively dealing with its impact of disaster/s on people, property and environment.

Disasters bring about the loss of lives, property and damage to the physical infrastructure and the environment. Disaster Management is divided into three parts namely –

- Prevention & Mitigation
- Preparedness and
- Provision of assistance

Prevention & Mitigation or risk reduction activities include structural and non-structural measures undertaken to limit the adverse impacts of natural hazards

Preparedness deals with activities and measures taken in advance to ensure provisions for effective response to the impact of hazards, including the issuance of timely and effective early warnings and temporary evacuation of people from threatened locations

Provision of assistance or intervention during or after a disaster to meet the life preservation and basic subsistence needs of those people affected is made during the relief phase

To tackle the consequences of a major emergency inside the site or immediate vicinity of the site, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan". The objective of the Disaster Management Plan is to make use of the combined resources of the project site and the outside services to achieve the following:-

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area;
  Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

9.1 Manmade Disaster (Human-Caused Incidents.)

The Major Man-Made disasters are classified broadly as below:

A. Fire
B. Power Failure

A. FIRE:

1.) Fire could take place through various means; one of them is through electrical fire. Hence, all the electrical works and material of the building would adhere to the standards. Regular maintenance and audit of the electrical systems would be carried out by external auditors.

2.) Fire alarm would be installed. The functioning of these fire alarms would be checked periodically by security manager. A report of the same would be submitted to safety manager. The occupants of the proposed building would undergo mock fire drills. These mock drills would be conducted by qualified staff (e.g. fire brigade). Fire extinguishers would be placed in every floor. All occupants would be given training on how to use these fire extinguishers. Fire extinguisher equipment would be evaluated periodically to ensure that it is in working conditions by security manager. If any faulty equipment is observed then it would be repaired or replaced by O & M of Project. Proper evacuation plan would be chocked for the building. The map for the evacuation plan would be provided to all the occupants.

The Emergency Preparedness programme shall comprise the following elements:

- Proper Fire Escape routes
- Adequate underground FF tank of desired Capacity
- Fire pumps, booster pumps, sprinkler pumps & jockey pump.
- Wet risers, Sprinkler system including parking floors and tenant common areas
- Pressurized hydrant lines and yard hydrants around the building
- Portable fire extinguishers of IS specification.
- Alternate source of power supply
- Provision of External & Internal Hydrants
- The Main Line from the pump room is laid in the ring main system & also connected with Fire Brigade inlet connection post.

a. Response Sequence during Fire:

i. Person noticing the fire should attempt to isolate and extinguish the fire with the available equipment and Inform or arrange to inform the security regarding the:

- Location of the fire
- Material of burning
- Extent of fire
- Callers name and number

"A proper code of communication shall be maintained wherein the caller makes sure that the message has been conveyed to the right person".

ii. Security or the coordinators will

- Respond to the scene of the incident.
- Arrange to send the necessary fire fighting equipment to the scene of the incident.
- Extinguish the fire with the available equipment.
- Ensure closure of gates immediately to regulate traffic in such a way that free movement of outside assistance like fire tenders, ambulance etc. is available.

- Security will cordon off the area and local city fire fighting staff should be notified for further assistance.

All the occupants will need to stop their operations/ work, switch off lights, fans, machines etc. All persons should assemble to refuge or designated area for fire and hazardous situation.

iii. Reporting and Follow up System

- All cases of fire occurrence, no matter how small, must be reported promptly to the Security for further action to avoid such incident.
- Fire extinguishing equipment once used, should not be returned to its location without it is being recharged/ certified fit by the security.
- All fire extinguishers after use should be laid horizontally to indicate that they have been exhausted.

b. Refuge Area:

The Refuge Area will have the following resources available:

- Copies of the Disaster Management Plan.
- Layout Plan of the complex.
- Information regarding Safety Equipment, Fire Fighting material.
- A list of important telephone numbers like those of neighboring police station, Fire Brigade, Hospitals etc.
- First - Aid Kit.
- Communication equipment - Internal and External telephones and other communication equipment.
- Drinking water facility.

In addition to many of the above measures an attempt will be made to add any site specific steps and manpower based instruction. Instruction should be in multiple languages including "Marathi and Hindi". The communication equipment will be checked periodically to ensure that they are functional.

B. Power Failure:

Power failure is a short- or long-term loss of the electric power to an area. Failure of electrical power to a building will have a serious impact on its operations, particularly if the failure occurs during normal operating hours when the building is fully occupied.

a. Causes of Power Failure:

There are many causes of power failures in an electricity network which are caused by either of the following faults:

i. Manmade / Technical Fault

- Faults at power stations,
- Damage to electric transmission lines, substations or other parts of the distribution system,
- Short circuit,
- Overloading of electricity mains.
- Collision of person or object with utility poles or power transformers

- Human error in operating equipment within the building or outside (such as at the utility company supplying the power), or malicious tampering.

ii. Natural Events.

Natural events include storms, floods, earthquakes & lightning.

b. Types of Power Failure:

Power failures are categorized into three different phenomena, relating to the duration and effect of the failures:

- A transient fault is a momentary (a few seconds) loss of power typically caused by a temporary fault on a power line. Power is automatically restored once the fault is cleared.
- A brownout or sag is a drop in voltage in an electrical power supply.
- A blackout refers to the total loss of power to an area and is the most severe form of power outage that can occur.

c. Effects of Power Failure:

- Loss of visibility
- Safety is at risk
- Stoppage of elevators
- Computer memory loss and equipment damage
- Stoppage of working of Fire fighting system
- Stoppage of working of building utilities like water pumps, Sewage treatment plants etc.
- Loss of comfort

d. Mitigation plan:

Buildings have emergency and standby power systems to provide safety and comfort to building occupants during interruptions in their normal power supply.

i. Diesel Generators

A diesel generator is the combination of a diesel engine with an electrical generator (to generate electric energy. Diesel generating sets are used in places without connection to the power grid or as emergency power-supply if the grid fails. The packaged combination of a diesel engine, a generator and various ancillary devices (such as base, canopy, sound attenuation, control systems, circuit breakers, jacket water heaters and starting system) is referred to as a generating set. In case of emergency these diesel generators will backup for electric supply for the common area lighting and utilities like elevators, water pumps, fire lifts, fire pumps & Sewage Treatment plant etc. In the present project total 02 DG sets are proposed in case of power failure.

ii. Provision of Independent electrical circuits for critical equipments as per Norms

Also as per specific requirement of Fire fighting department the Electric supply for Fire pumps, booster pumps, sprinkler pumps will be on independent circuit.

iii. Uninterruptible power supply (UPS)

Uninterruptible power supply, also uninterruptible power source, UPS or battery/flywheel backup is an electrical apparatus that provides emergency power to a load when the input power source, typically the utility mains, fails. A UPS differs from an auxiliary or emergency power system or standby generator in that it will provide instantaneous or near-instantaneous protection from input. Even if

DG sets are provided as power backup a UPS is typically used to protect computers, data centres, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption or data loss.

iv. Power Outage Tips:

- Check to see if others are without power. If office is the only one without electricity, check fuse box and if needed call an electrician.
- Turn off appliances that were running before the outage to protect the motor.
- Turn off the computers and air-conditioning system.
- If stuck in elevator, please be patient, it only takes a few minutes to get out of the elevator once the backup system is on.

The other Human-caused incidents include, but are not limited to, the following:

- Bombs and bomb threats
- Weapons of mass destruction
- Chemical
- Biological
- Radiological/nuclear
- Workplace violence

1. Natural Disasters Broadly Classified As Follows:

- Earthquakes
- Floods
- Cyclones
- Lightning

Earthquake

Seismic Environment & Precautions

As per the Seismic Zoning Map of India, Nagpur region falls under Seismic Zone-II, which is considered to be least active.

Floods

Particularly in Nagpur, areas having good drainage characteristic so, could not flooded by accumulation of water from heavy rainfall; following precautions would be taken to manage flood disasters:

- Storm water system would be checked and cleaned periodically.
- Mapping the areas within or leading in or out of the building that will be water logged, flooded or isolated due to the flood. The areas will be marked after completion of the project (as final ground levels etc. will be available after completion).
- Vulnerability of basement should be mapped.
- Dewatering pumps shall be installed at vulnerable locations.

Cyclones

Cyclones are caused by atmospheric disturbances around a low-pressure area distinguished by swift and often destructive air circulation. They are usually accompanied by violent storms and bad weather. There is no history of any cyclone in this area. However in such an instance the occupants should be advised to stay in the shelter in tightly secured windows and doors. The glass of windows etc. should be covered with paper/cardboards to avoid glass breaking due to flying objects outside.

Lightning

Lightning is an atmospheric electrostatic discharge accompanied by thunder which typically occurs during thunderstorms and dust storms. It often leads to physical damage to the building and occupants. It can also lead to short circuits, failure of power supply and fire. Lightning arrestor systems is provided to abate the impact of lightning hazard.

Building incidents include, but are not limited to, the following:

- Building system failures
- Elevators
- Emergency power systems
- Flooded areas
- Medical emergency
- Utility disruptions
- Adjacent building fire

9.2 On-Site Disaster Management

i) Formation of the DMC

The building will have Security In-charge/ O & M In-charge of Project (and alternate), and who will direct the evacuation of persons from their respective areas as quickly as possible in a safe and controlled manner.

ii) DMP on site Matrix

Goal: To keep the disaster management plan up to date 24X7			
Objectives: To safeguard the inmates and neighbour's in the event of disaster			
Scenario	**Who is responsible**	**When to contact and how**	**Contact number**
Lift failure	O & M In-charge/ Security In-charge	Lift does not move. From the lift, use the alarm. If outside use phone (internal) or reverse alarm system(not running on electricity or battery backup	Safety In-charge

Fire in building (limited area)	Security In-charge, O & M In-charge	Will be finalized after completion of the project safety in-charge.	
Fire in large area (floor)	Security In-charge, O & M In-charge		
Fire in utility areas	Security In-charge		
Electrical failure	Security In-charge, Maintenance & Service manager		
Water supply interruptions	Security In-charge, Maintenance & Service manager		
Building damage (minor)	Building manager		
Building damage (major)	Security		
Landscaping	Landscape Gardener	----	*O & M's Responsibility*
Lift problems	Liftman ,electrician and service provider	----	*O & M's Responsibility*

iii) Training of the occupants & security team

a. The team will be trained on DMP and following information will be covered:
   - Map of the building
   - Evacuation Plan
   - Information on number of floors, rooms, occupants
   - Information on security and safety system in the building
   - Contact information of nearest fire station, civil defence in-charge(s), nearest medical facility, local Red Cross/fire brigade

b. Building Walkthrough: Following area should be covered
   Training of DMC and occupants, a sample outline for routine patrols of the building and inspecting its fire life safety systems and equipment is given below:
   - Walk the site, Walk the perimeter of the building and inspect all exits, including exits from the parking structure.
   - Access to the terrace.
   - On a typical floor, inspect the location of manual fire alarm stations and automatic detection devices (smoke, heat, or gas detectors).

c. Inspect out-of-building safe refuge areas.

iv) Regular Mock Drill

Mock drills Plan

Sr. No.	Types of Drills	Frequency of drill	Who must attend
1	Earthquake safety	Once a year	Security, Maintenance & Service manager all Employees
2	Fire safety	Quarterly	Security, Maintenance & Service manager all Employees
3	Fire and any other equipment maintenance	Quarterly	Security, Maintenance & Service manager all Employees
4	Lift security	Monthly	Security, Maintenance & Service manager
5	Water management	Monthly	Security, Maintenance & Service manager
6	Safety kit check	Quarterly	Security, Maintenance & Service manager
7	Overall safety awareness programme	Quarterly	Security, Maintenance & Service manager all Employees

v) Possible off Site Hazards

Fires due to Fire Crackers

During celebration time, people tend to use roads for bursting fire crackers. The fire crackers that jump to heights of 100 m & above and then bursting are in vogue. Such crackers may result into sparks entering the residential buildings and setting fires. It needs to be ensured that the roads around the project site are not used for bursting fire crackers. The security staff needs to be vigilant. The residents also need to be vigilant in ensuring that no combustible material is dumped on the window or veranda grills.

Cyclones

The Proposed site does not fall under the cyclone zone.

Offsite Disaster Management Plan

List of nearest clinics and hospitals shall be maintained for medical emergency as also any other eventuality. The table below will be ready and will be distributed to all members within the building and later for off-site plan to neighbourhood. These information need to be updated every six months before safety drills. The information thus updated should also be shared with occupants.

Emergency Situation Clinics and Hospitals

Hospital	Sengupta Hospital:	1.0 Km (SE)
1	G B Multicare Hospital	2.3 Km (S)
2	Dande Hospital	1.5 Km (SE)
3	Alexis Hospital	5 km (NE)
4	Wockhadt Hospital	2.3 Km (SE)

Emergency Situation Government Agencies and Offices

Fire Station	Wadi Fire Station	4.5 Km (W)
	Fire Station NMC Building Liberty Chowk	10.2km (E)

9.3 Disaster Management Plan - Construction Phase:

Safety Plan & rules

Safety of both men and materials during construction and operation phases will be undertaken. Project will have proper safety plan and the same will be made available during construction, operation and maintenance phases. The safety plans and rules shall be formed by the respective contractor.

- Safety rules or policy will be formed and will be implemented on site.
- Necessary protective equipment, safety appliances and clothing, will be provided and to ensure their proper use.
- Providing appropriate facilities for first aid and prompt treatment of injuries and illness.
- Proper implementation of fire prevention methods and an appropriate fire fighting service.
- Maintaining collection of data on accidents with a view to take corrective, remedial and preventive action.
- Regular safety inspection by a competent person at suitable intervals of all buildings, equipment.

Safety Rules (Policy) the project Site:

- Observe "No Smoking" regulations.
- Consuming or using alcohol or illegal drugs in the workplace is prohibited. Occupants will not be allowed to work or to continue their shift if their ability to work is impaired.
- Where required, protective equipment will be used.
- Maintain floor coverings in good condition to avoid tripping hazards caused by loose tile and frayed carpet edging.
- Keep designated walkways and doorways clear, unobstructed, and free of electrical cords, boxes and office equipment.
- Use proper step stools, not chairs, when climbing to reach high items.

- Properly store and handle any potentially hazardous chemicals.
- Occupants should report hazardous workplace conditions to a supervisor immediately.
- The existing medical hospital facilities will be made available round the clock for attending to emergency arising out of accidents, if any.
- The working personnel will be given appropriate personal protective safety gears.

9.4 Disaster Management Plan - Operation Phase

(Fire Protection) Fires & Alarms

The threat of fire is ever present in high-rise buildings. High-rise fires can be particularly dangerous to building occupants. The most critical risks in high-rise structures include fire, explosion and contamination of life-support systems such as air and potable water supply. These threats can be actualized accidentally or intentionally and because they propagate rapidly can quickly develop to catastrophic levels. Despite the fact that fires are rare occurrences, if one does occur, everyone in a building must react quickly.

Precautionary steps to handle Fire Emergencies

Building Property In-charge/Security Officer and alternate O & M In-charge responsibilities includes:

- The Emergency Response Team will respond to the area, in a timely manner. The supervisor of the Emergency Response Team will assess the situation and notify the Fire Department as needed by calling only those residents trained in the use of portable fire extinguishers should attempt to extinguish or contain the fire by use of portable extinguishers.
- The person discovering the fire shall immediately contact the Supervisor/ Security In charge on duty at the time. The person making such notification should give an accurate description of the situation including location and property involved. The Supervisor/Security In charge will notify the Emergency Response Team and dispatch trained personnel to the location.
- Call the fire department by dialling 101, if this service is available. If another number is required, a sticker showing this number should be on all telephones. The following information should be given to the emergency service operator:
  - Building name and address
  - Nearest street
  - Location of fire in the building (floor number, suite/room number)
  - Caller's call-back telephone number

Design & System Details– Mitigation

- Fire Protection system will be as mandated by the Chief Fire Officer (CFO).
- The project comprising the firefighting system for all the buildings including convenient shopping centre.

All units of the project will also be having the firefighting system as below

- Wet hydrant ring around building blocks.
- Wet riser in all staircases with one Internal Fire Hydrant & hose reel for each landing.

In addition to this, Hand Appliances will be provided at suitable locations in the tower, electrical rooms, car parking etc.

Fire Fighting System for the Project:

Proposal for Fire Protection System

Fire Protection System is divided into the following sections.

- Under ground fire water tank & Pump Room
- Hydrant System & Wet Riser Piping
- Manual Fire Alarm System as per NBC 2016
- Fire Control Room

Under ground fire water tank & pump room will consist of:

1. Diesel engine pump
2. Electric driven Hydrant Pump set for Fire Hydrant,
3. Jockey Pump separate for Hydrant Pump,
4. Control Panel for Electric Driven Pumps for each Installation in all the units.
5. Lot Piping Headers, Brackets & Valves
6. Makes & Model of Pump as per standards.

Under ground fire water tank shall have Fire Brigade inlet connection as per Rules.

CHAPTER-10 ENVIRONMENTAL MONITORING PROGRAMME

Ambient Air Monitoring

- Half yearly monitoring
- Selecting the points
- Contract with NABL Laboratory for monitoring

Action –

Locations :-

- Parking Area
- DG set point

Corrective Measures –

As suggested by the monitoring agency

Air emissions are observed during the operation phase of the project. The air emissions will be reduced by ensuring smoother flow of traffic within the premises by better traffic management plans. It is proposed to have plantation all through the boundaries of the site and along the either side of the internal roads. This will reduce the particulate matters from being transported to the nearby areas.

DG Set – Air and Noise Monitoring

Action –

- Half yearly monitoring
- Stack Monitoring
- Contract with NABL Laboratory for monitoring

Corrective Measures –

As suggested by the monitoring agency

Environmental Audit and Report

- Appointment of Consultant for Environmental Audit
- Reporting

Corrective Measures –

- As suggested by the monitoring agency
- Cost Estimates for Monitoring & Environmental Audit: Rs.1,00,000/-

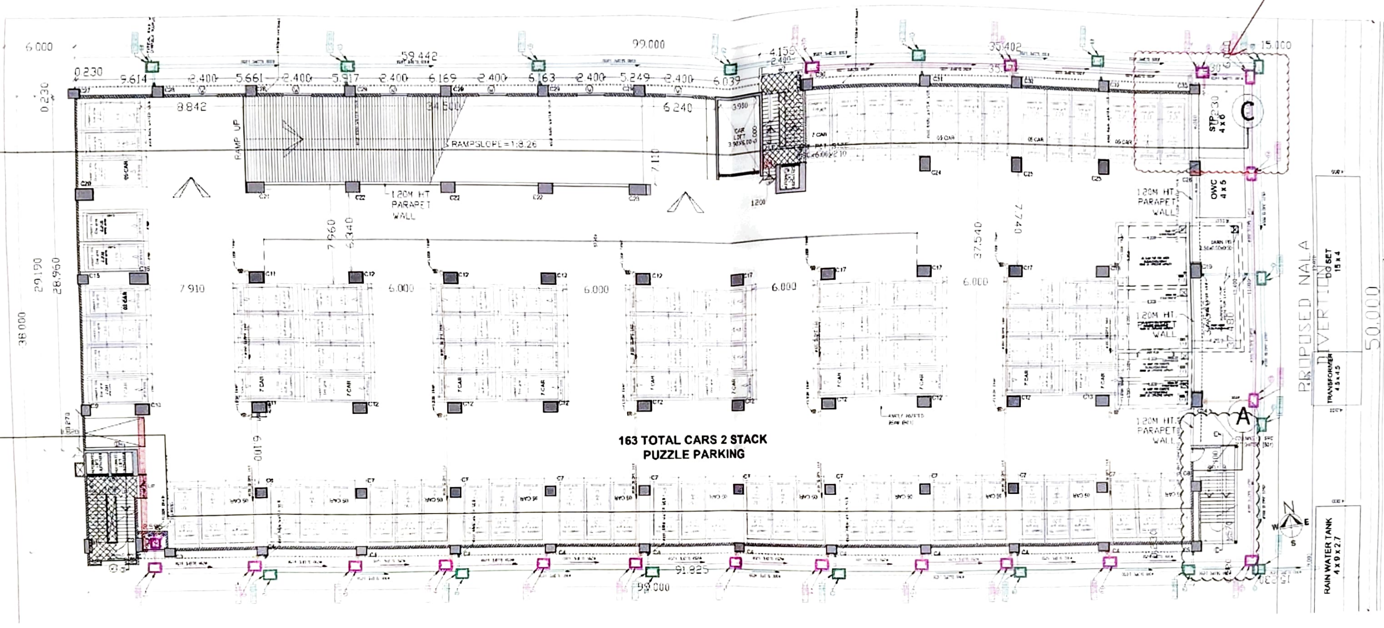
Table 10.1: EMP Cost

Cost - Environment Management Plan			
S.N.	**Pollution Control & Other Environment Infrastructure**	**Capital Cost In Rs. Lakhs**	**Annual O & M Cost in Rs. Lakhs**
A	**During Construction Phase**		
1	Water for Construction, Labour & Dust suppression	--	2.0
2	Site Sanitation & Safety	--	1.0
3	Environmental Monitoring	--	1.0
4	Disinfection	--	0.5
5	Health Check up	--	0.5
	Total (A)	00	**5.0**
B	**During Operation Phase**		
1.	Rain Water Harvesting	02.00	0.10
2.	Sewage Treatment Plant	25.00	2.00
3.	Organic Waste Convertor	06.00	1.00
4.	Tree Plantation & Landscape	05.00	1.00
5.	Solar Street Light	05.00	0.10
6.	Environmental monitoring	--	8.20
7.	Laying of Storm & Sewer line up to final disposal point	Included in the Cost of the Project	
	Total (B)	**43.00**	**12.4**
	Total (A) + (B)	**43.00**	**17.4**

SEWAGE TREATMENT PLANT FOR PARKING PLAZA

ANNEXURE-R3/3

Location of Sewage Treatment Plant



NOTES

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CPM CRF-II

AGM CRF-II

PROJECT: FUTALA LAKE PROMENADE DEVELOPMENT FOR PWD, NAGPUR

CLIENT: MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: FUTALA LAKE, NAGPUR

TITLE: PARKING PLAZA, STP LOCATION AND LAYOUT

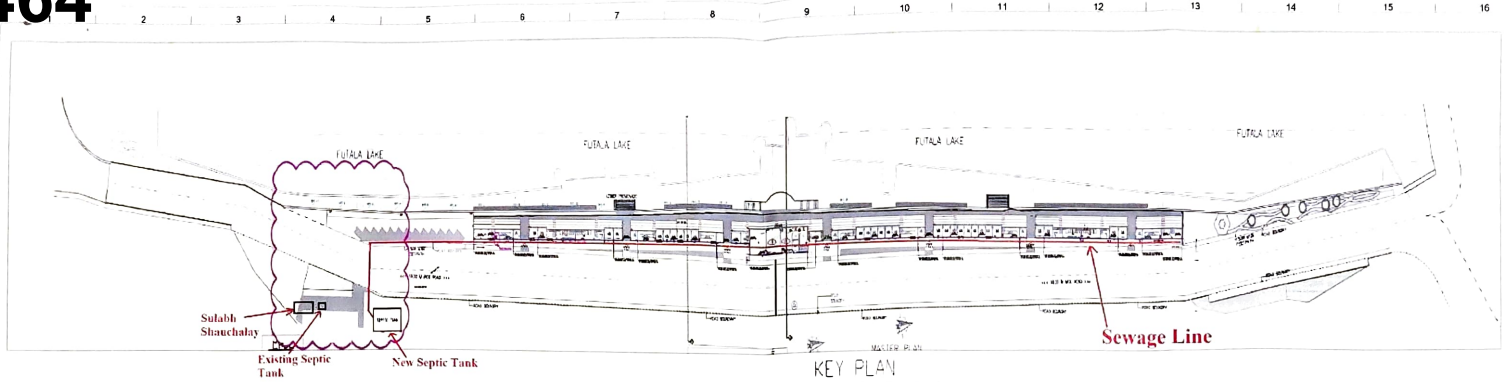
SCALE: 1:250, 1:50 | DATE: | STATUS: GOOD FOR CONSTRUCTION | REVISION NO: R0

DRG NO:

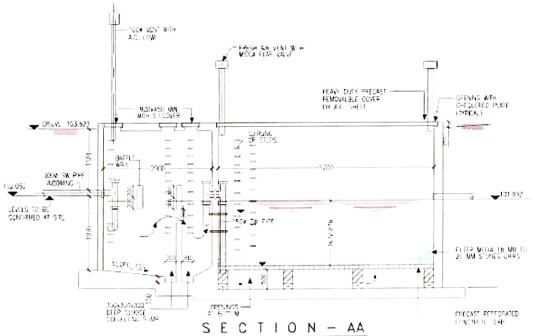
NAGPUR METRO

ARCHITECTURAL

SEPTIC TANK FOR VIEWING GALLERY



KEY PLAN
(PLAN AT GROUND LEVEL)
(SCALE 1:500)



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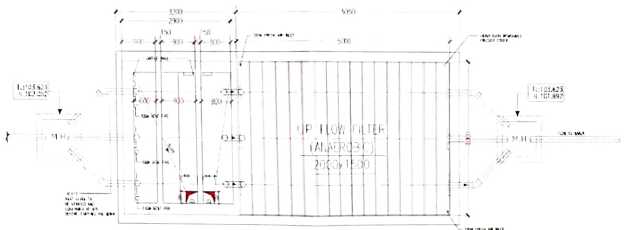

PLAN OF SEPTIC TANK FOR 66.1m³

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REV NO	DATE	DESCRIPTION	SIGN

PROJECT: FUTALA LAKE PROMENADE DEVELOPMENT FOR PWD, NAGPUR

CLIENT: MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: FUTALA LAKE, NAGPUR

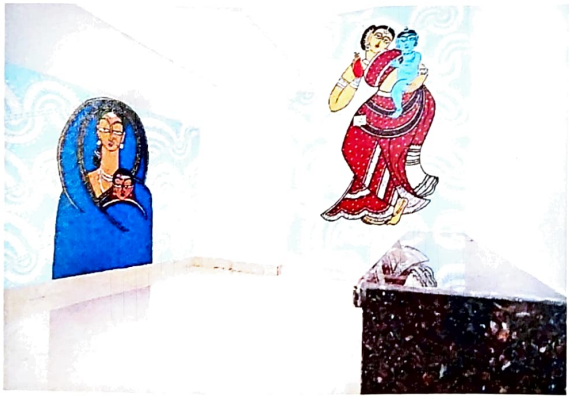
TITLE: FUTALA LAKE VIEWING GALLERY SEPTIC TANK DETAIL

SCALE: 1:500, 1:250

REVISION NO: R0

NAGPUR METRO

Viewing Gallery Toilet / Baby Feeding Room Photos



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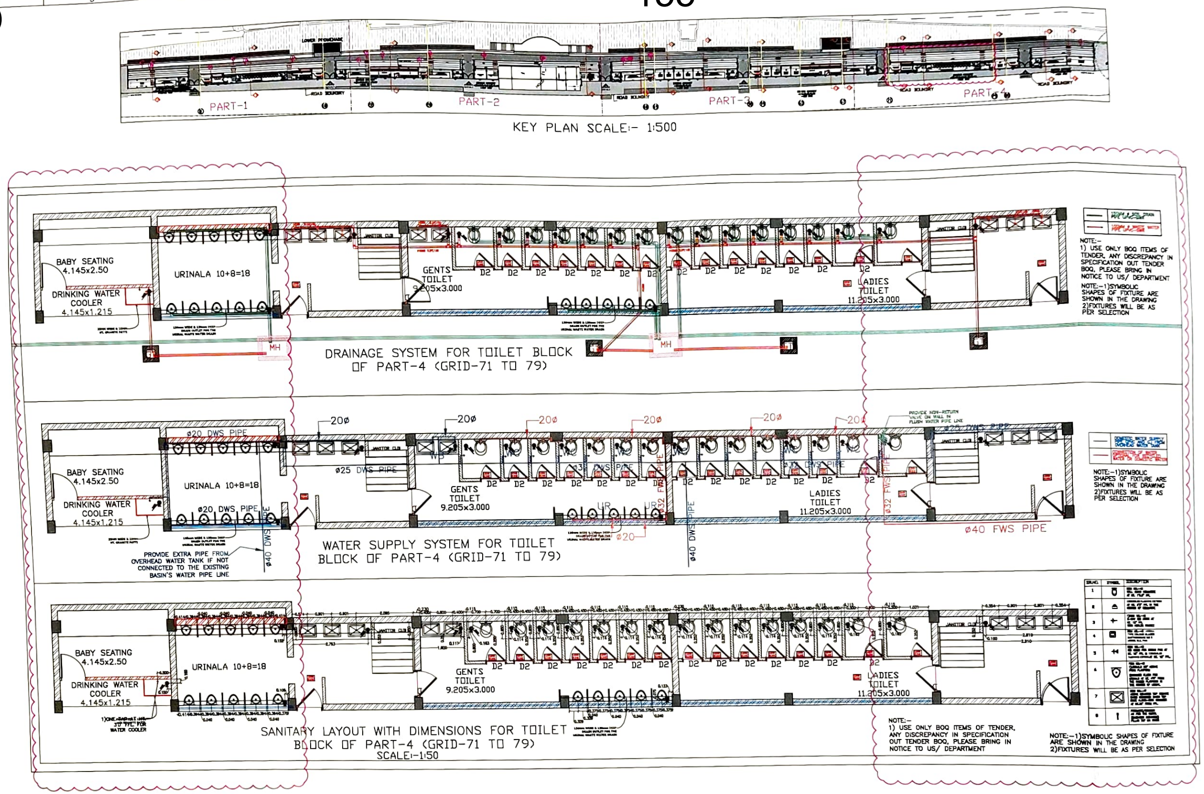

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	03/06/2020		

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SIGN:	SIGN:	SIGN:	SIGN:
DATE: 10/03/2021	DATE: 10/03/2021	DATE: 10/03/2021	DATE: 10/03/2021
NAME: VD	NAME: VD	NAME: MC	NAME: KC

AR. KISHOR CHIDDARWAR
ARCHITECT AND INTERIOR DESIGNER

SUKIR CONSULTING ENGINEERS PVT LTD

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C.P.M C.R.F-II

A.G.M C.R.F-II

PROJECT: FUTALA LAKE PROMENADE DEVELOPMENT FOR PWD, NAGPUR

CLIENT: MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: FUTALA LAKE, NAGPUR

TITLE: FUTALA LAKE VIEWING GALLER
PART-4 TOILET DRAIN, WATER SUPPLY & SANITARY LAYOUT FOR EXTENDED URINALS & TOILETS

SCALE: 1:500, 1:50 DATE: 30/03/2022 STATUS: GOOD FOR CONSTRUCTION

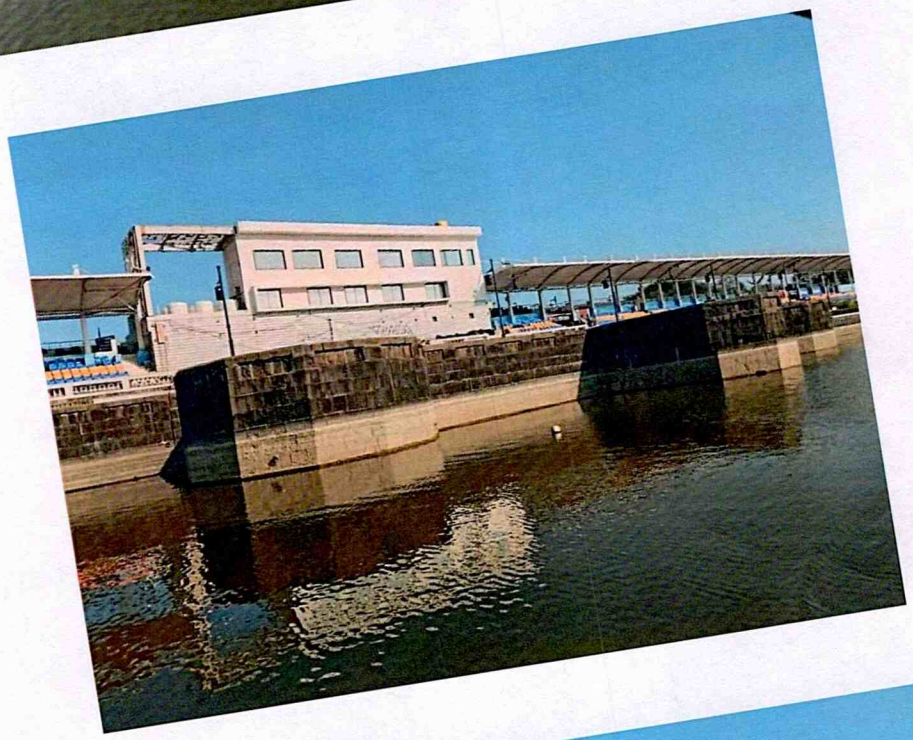
DRG NO: TOILET DRAIN- WATER SUPPLY-SANITARY 0018A

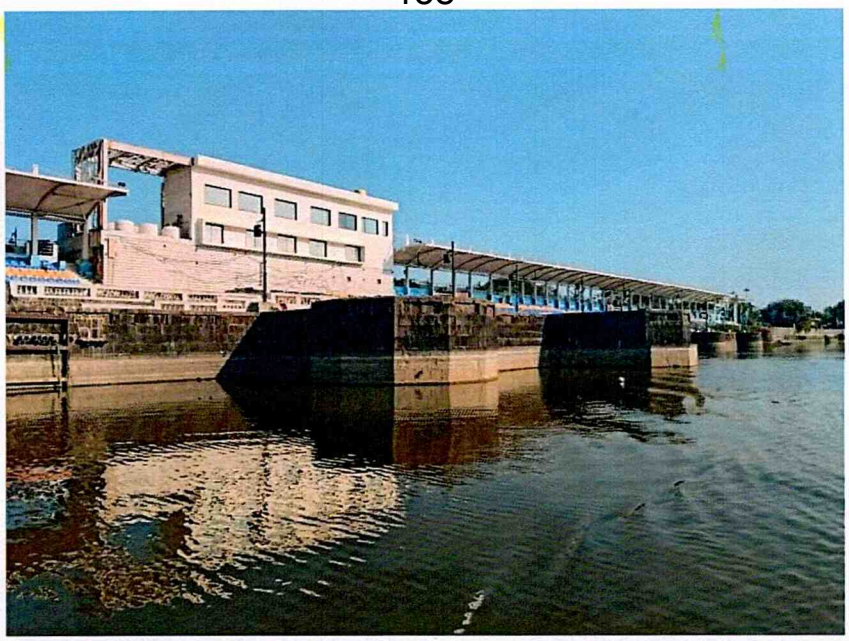
REVISION NO: R1

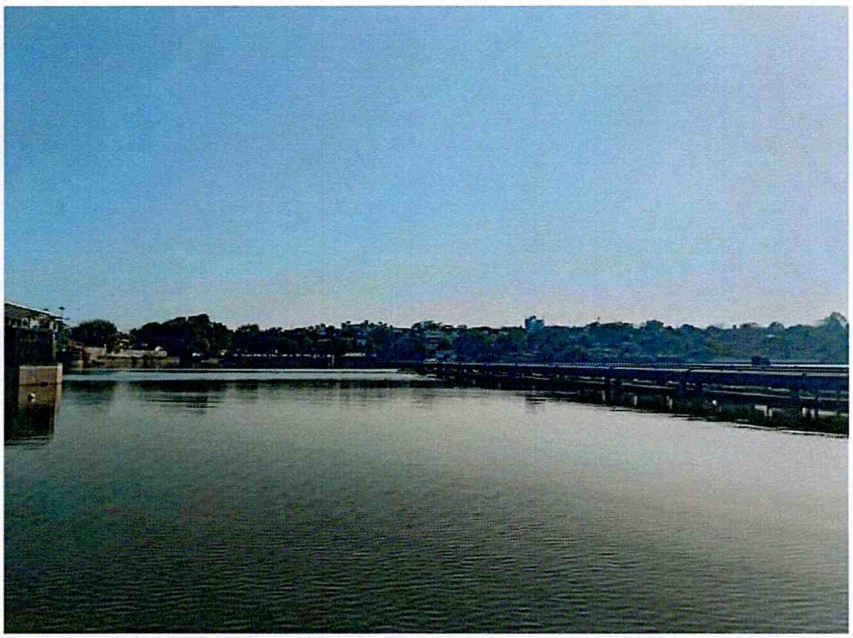
NAGPUR METRO

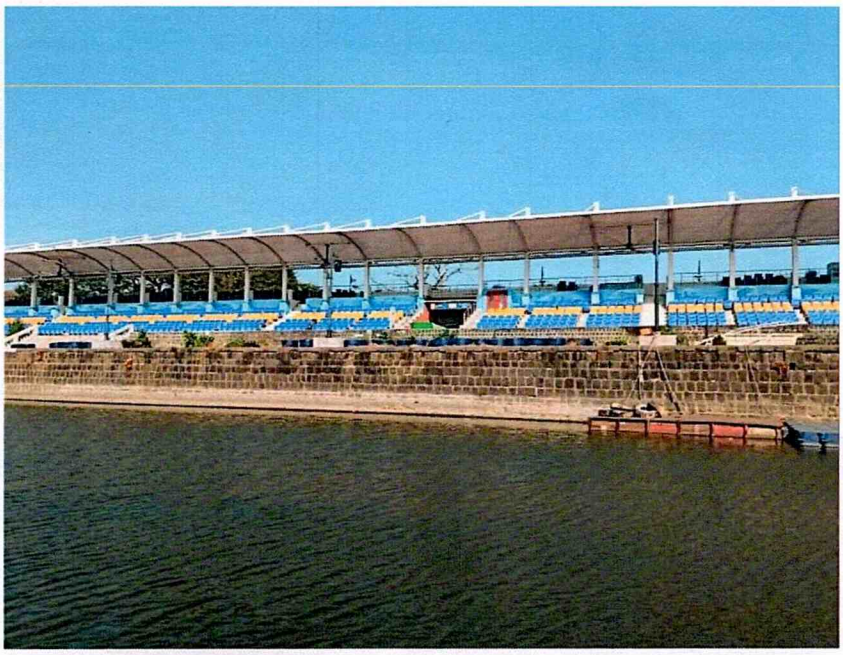
ARCHITECTURAL

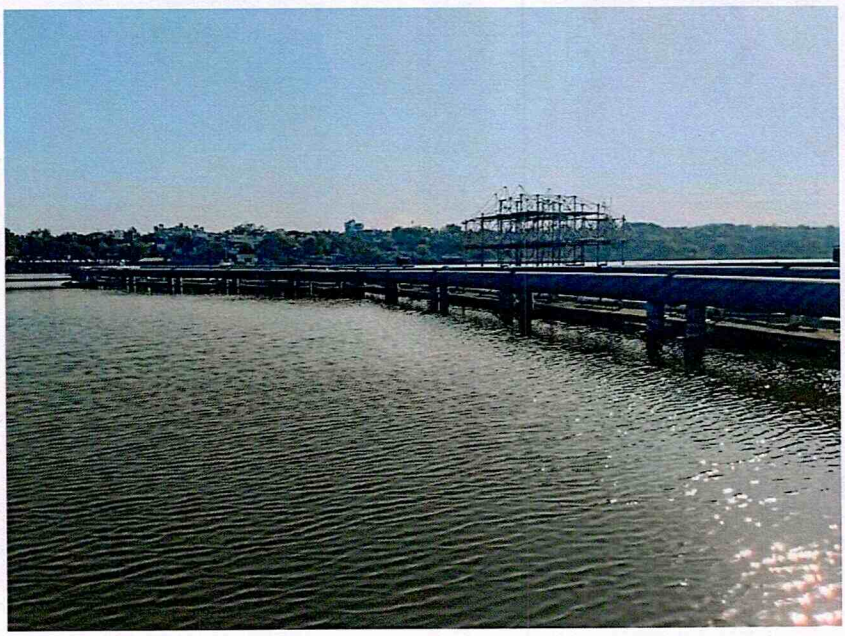
Present status of cleanliness of Water body near Musical Fountain, Banyan Tree, Proposed floating banquet hall and floating restaurant at Futala Lake, Nagpur. Dt. 10.03.2026

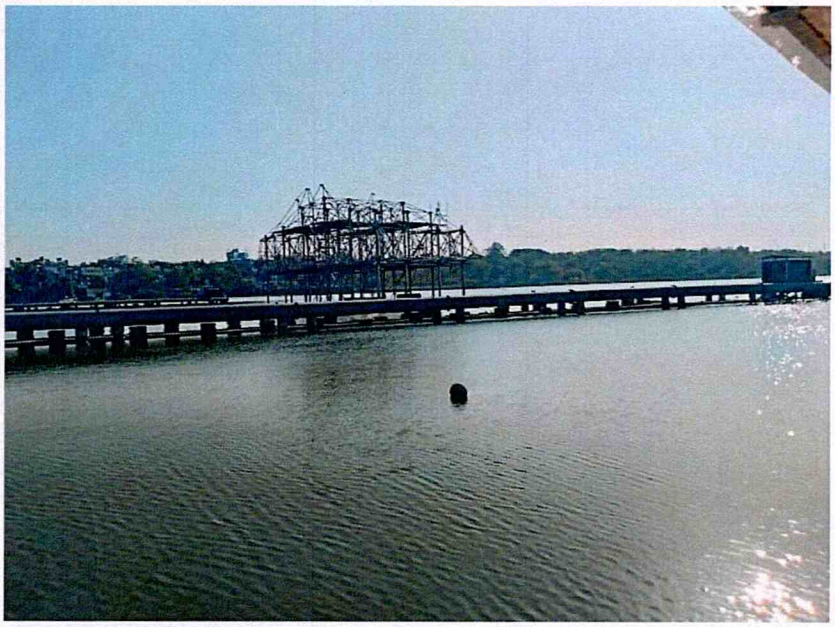


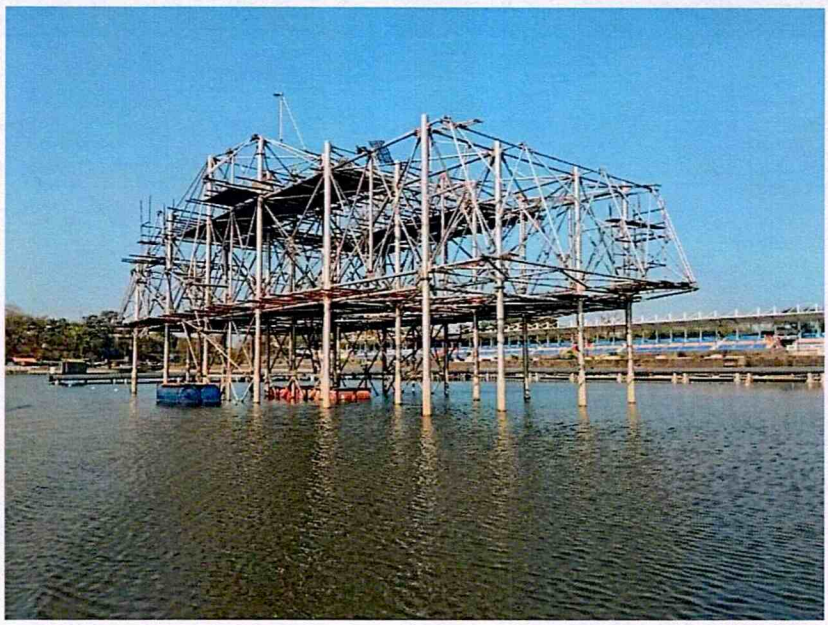


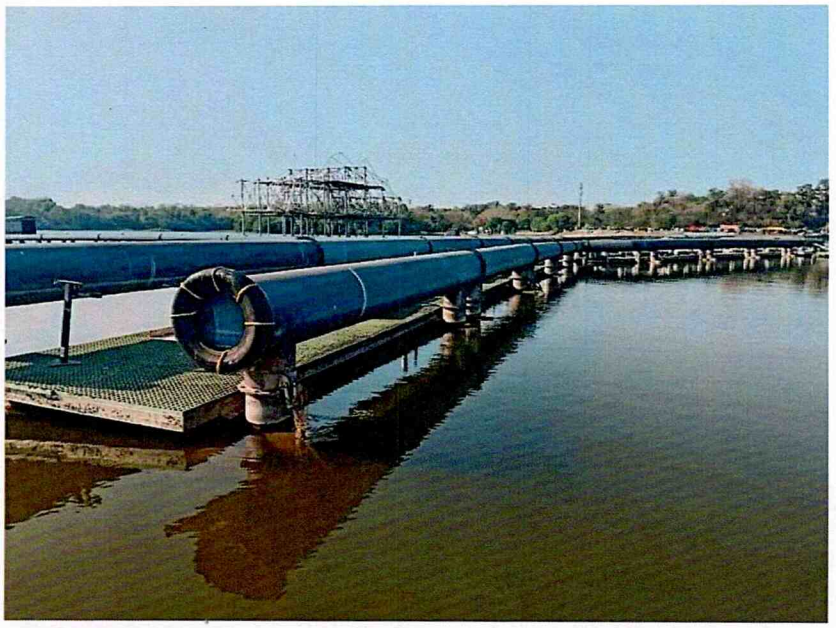


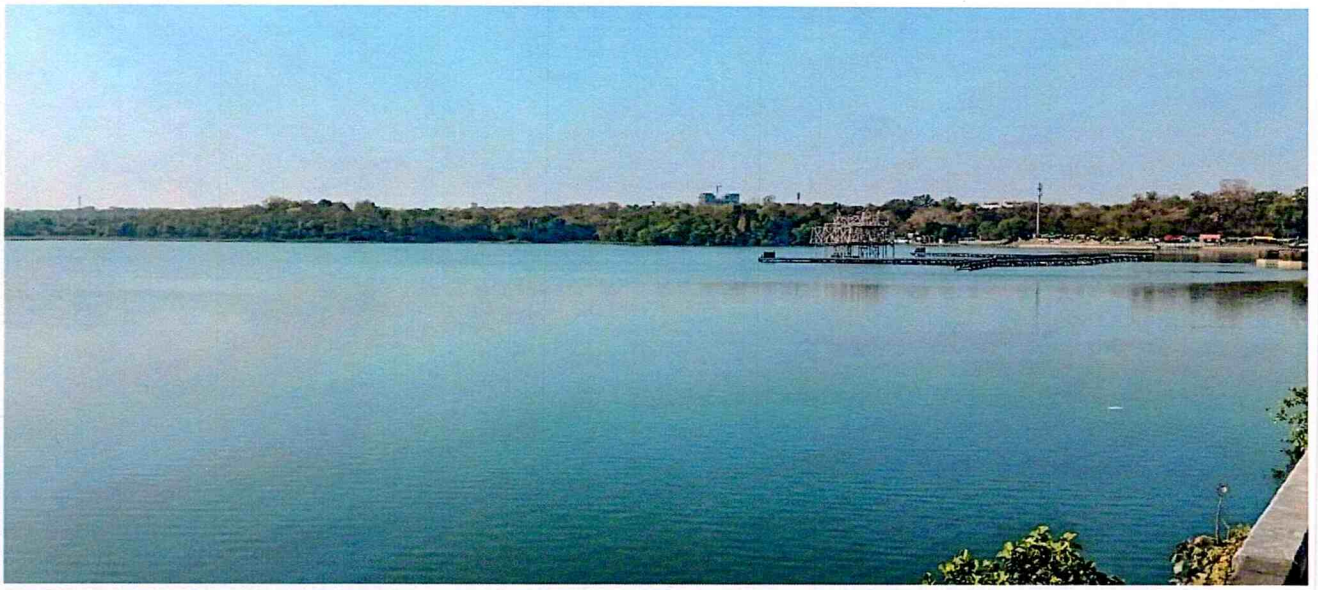






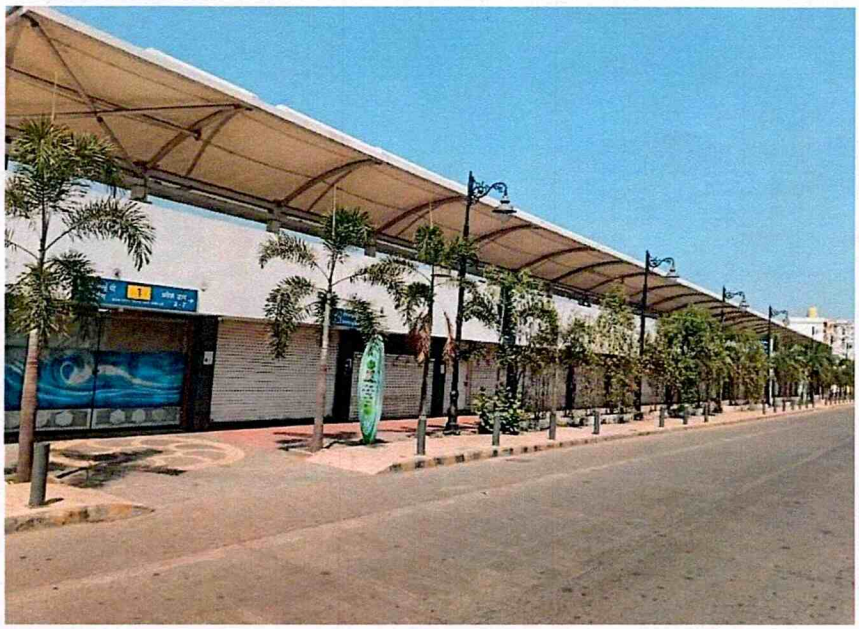


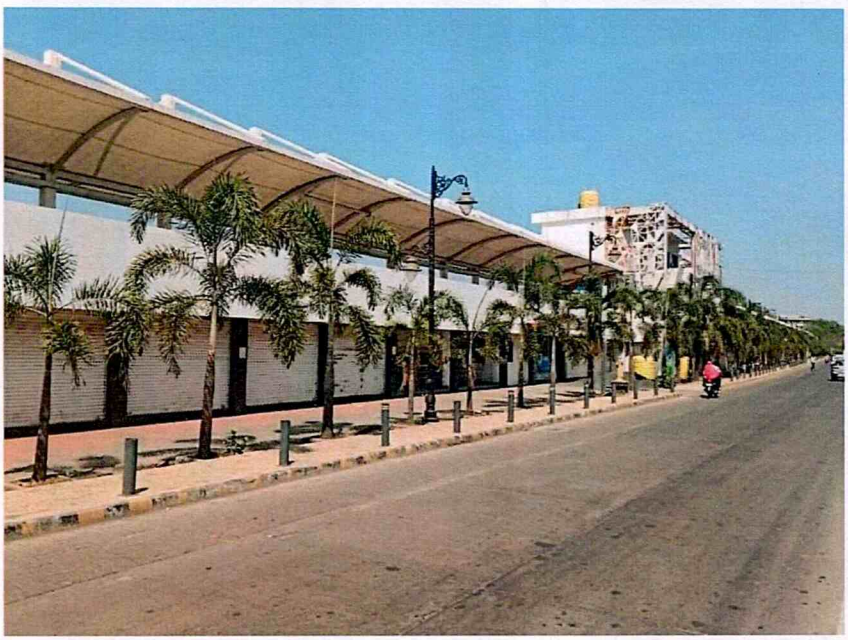


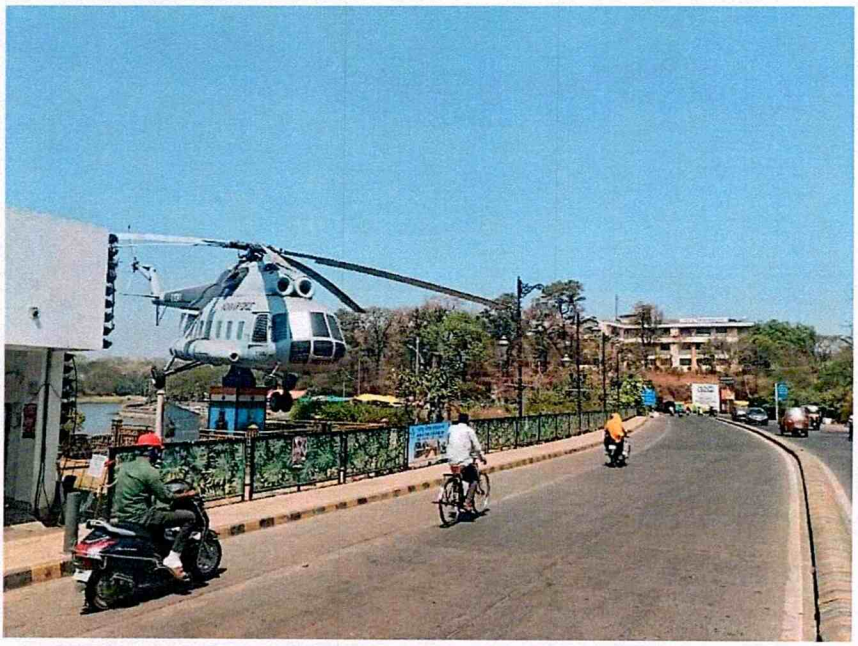


FUTALA POLICE STATION TO FUTALA VAYUSENA NAGAR T-POINT

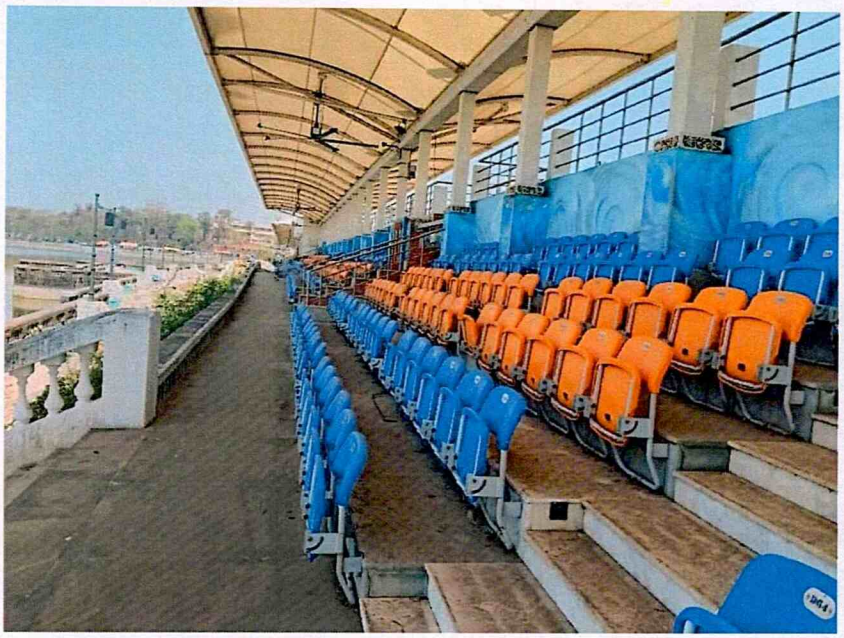
Present status of Cleanliness at Futala Musical Fountain Premises Dt. 10.03.2026

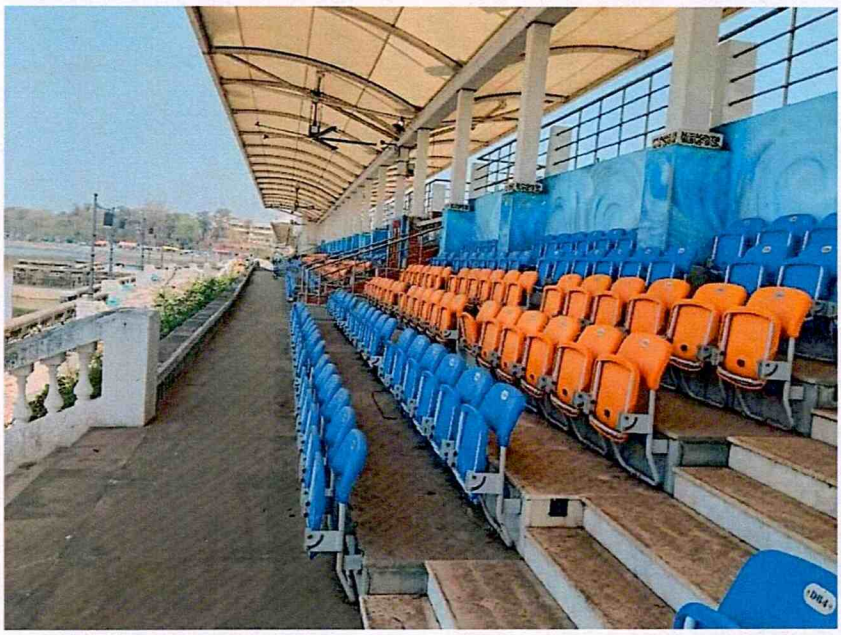


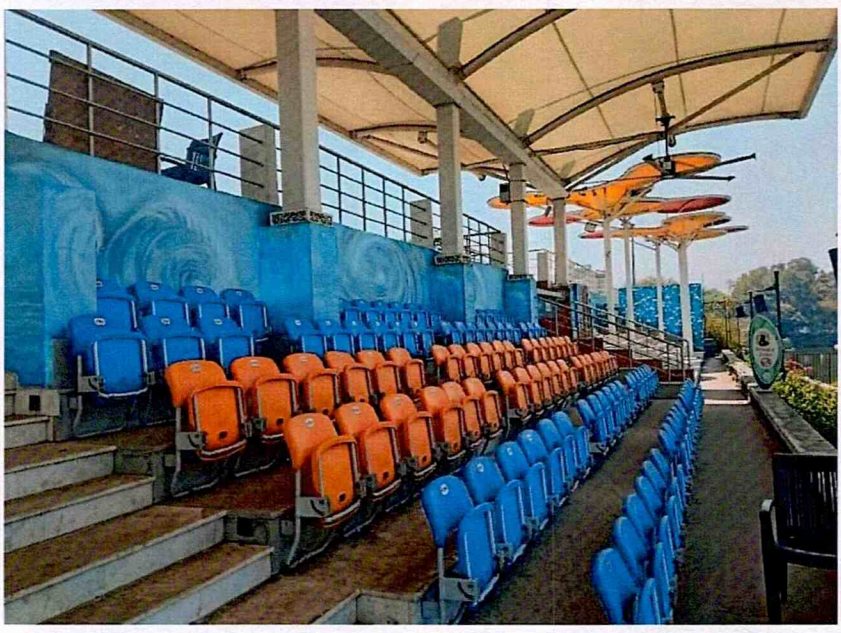




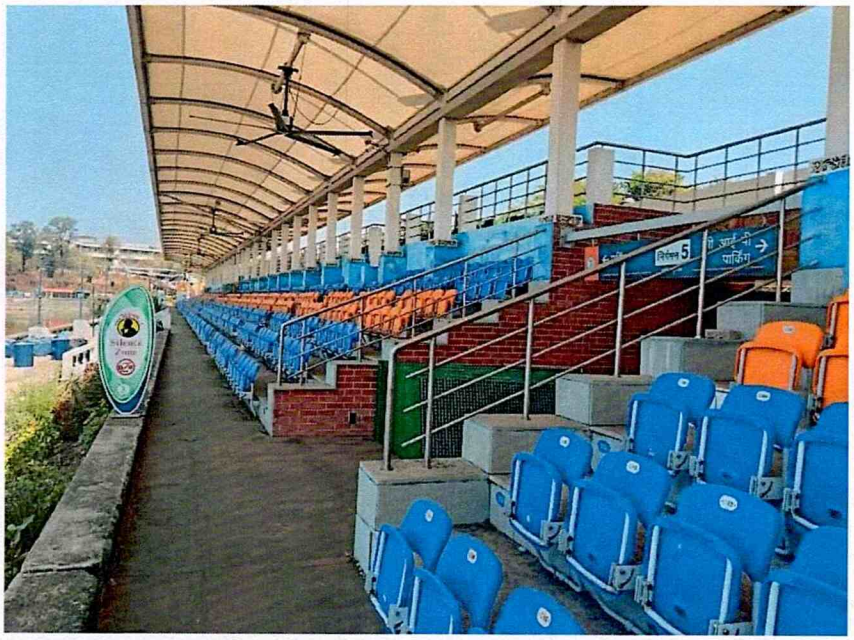

निर्गमन 2
वी आई पी

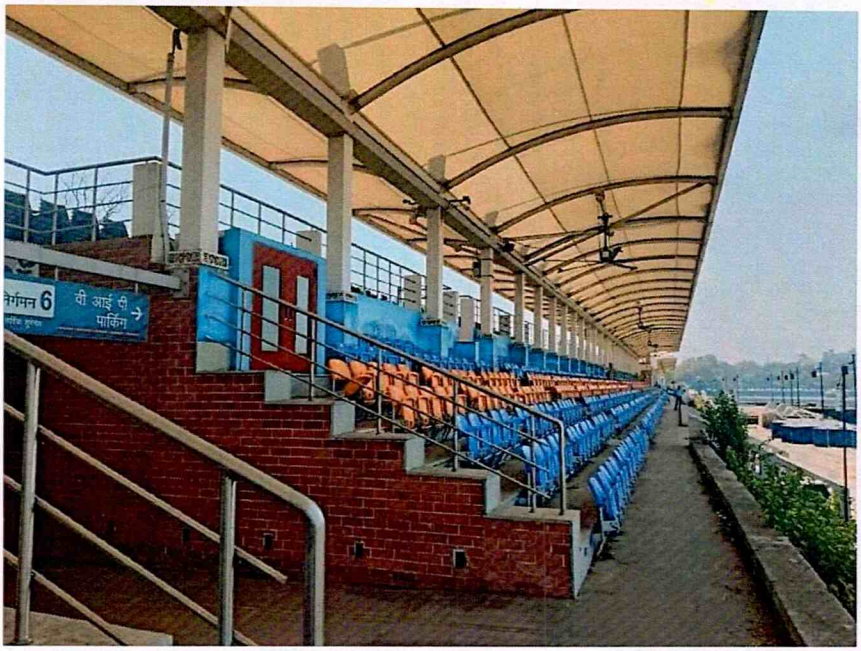


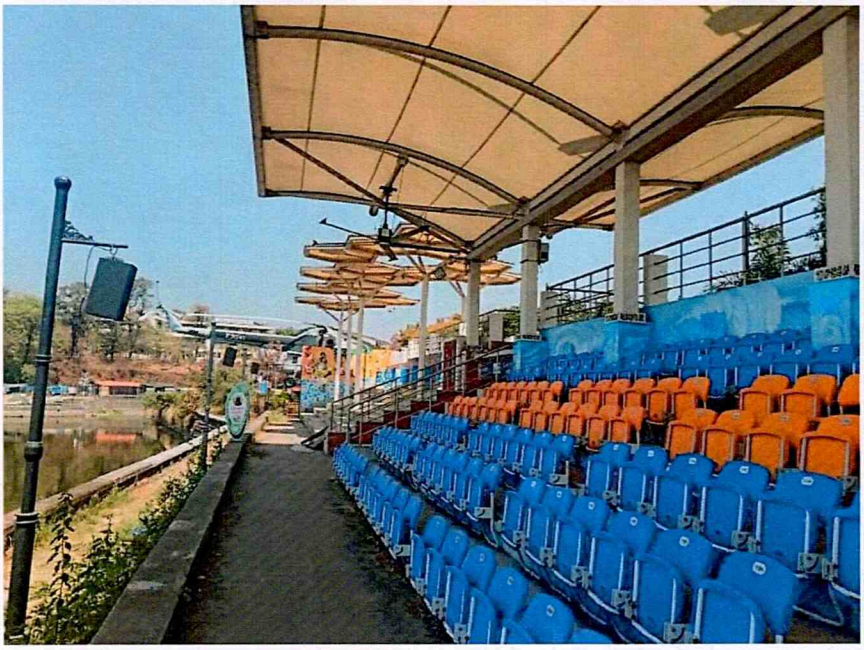


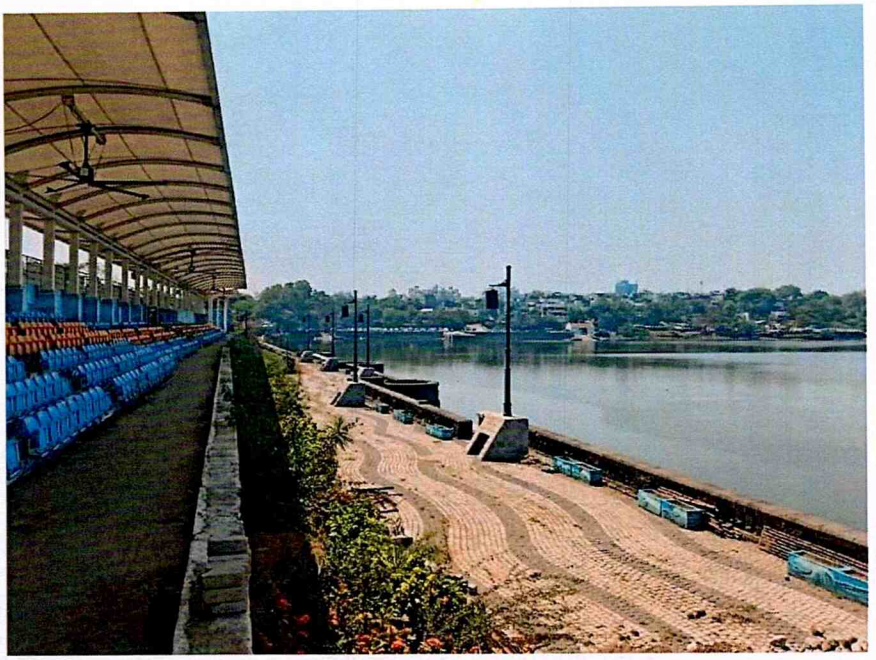



निर्गमन 2
वी आई पी
पार्किंग

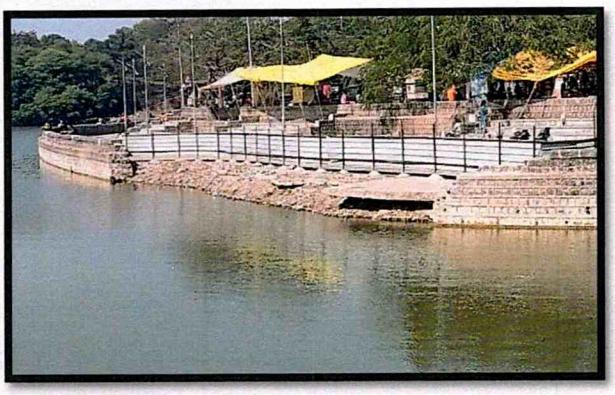

निर्गमन 5
वी आई पी
पार्किंग


6
पार्किंग



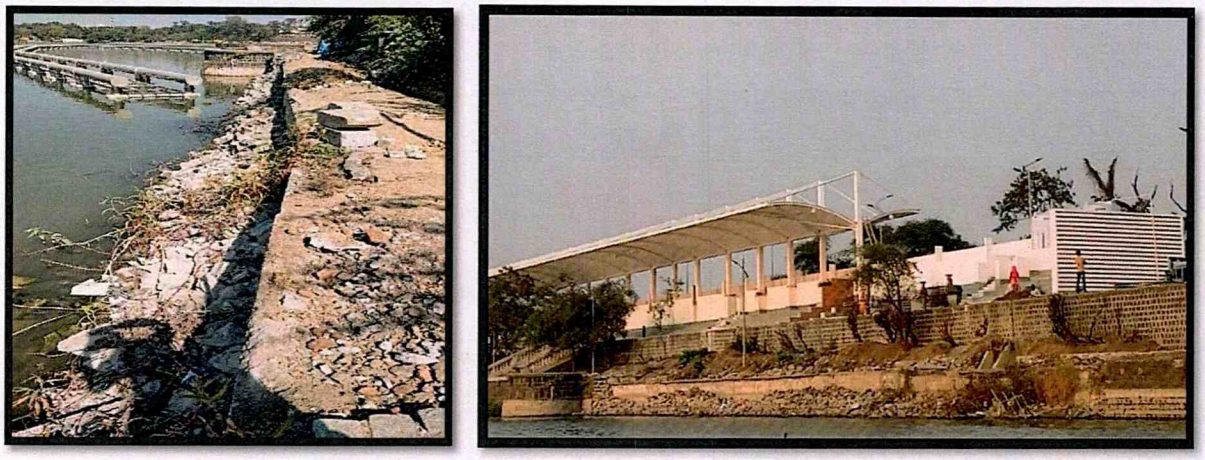


Heritage Wall Rectification



North Bank in dilapidated condition

North Bank after Restoration



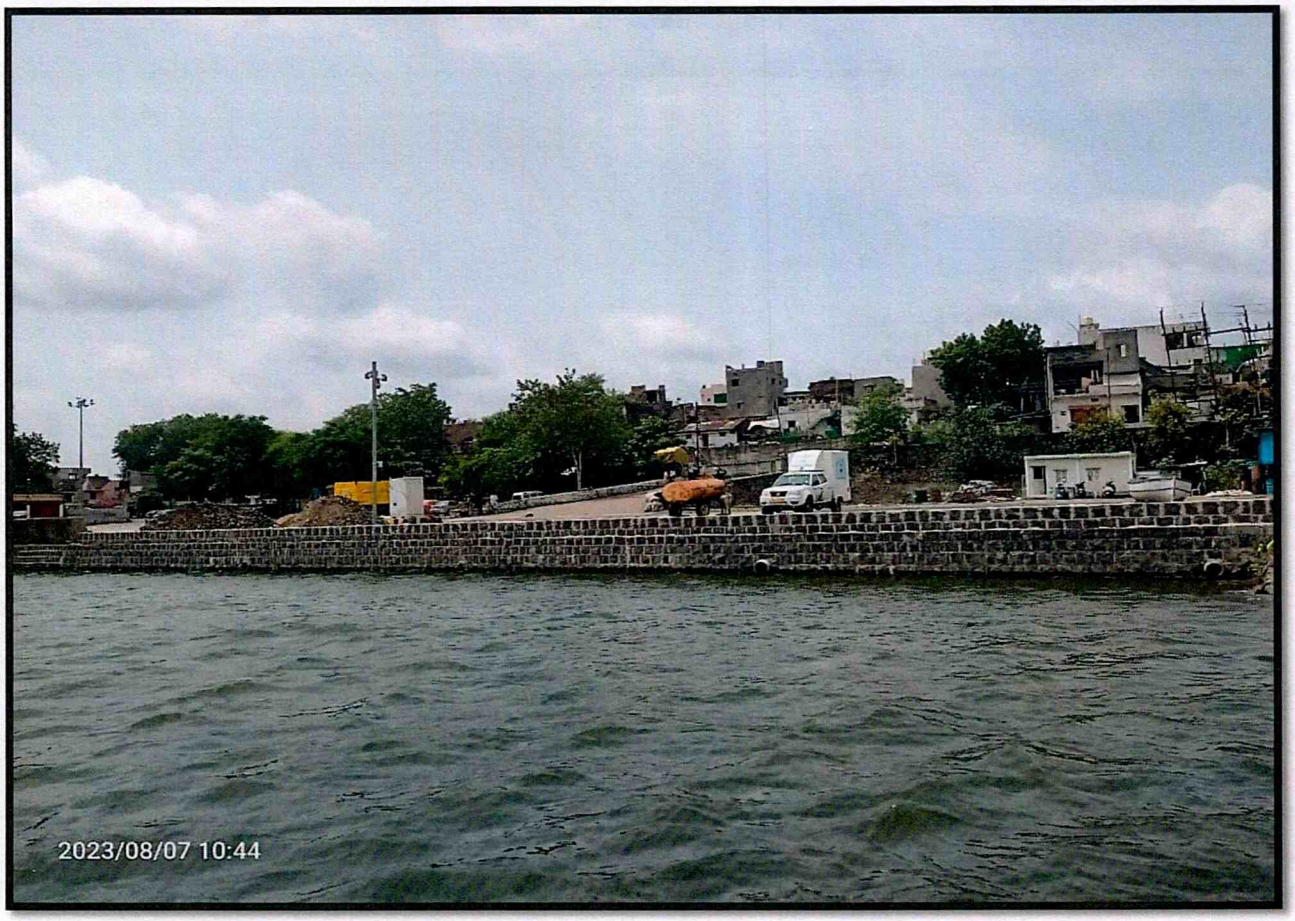
East Bank in dilapidated condition

East Bank after after Restoration

South Bank Part 1

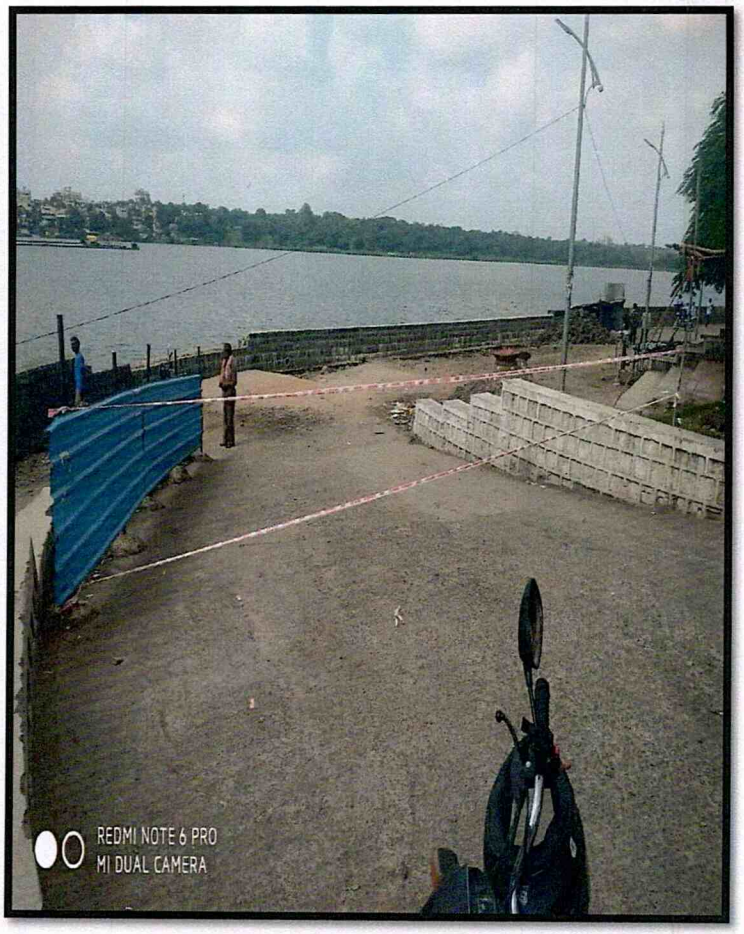
South Bank Part 1 after Restoration

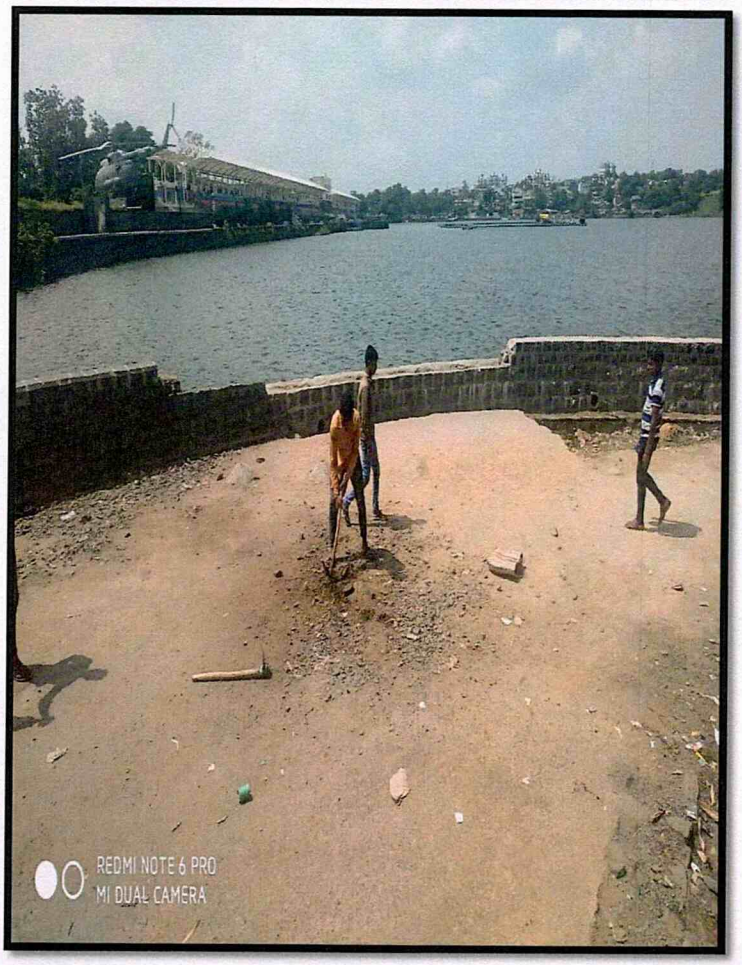
South Bank Part 2

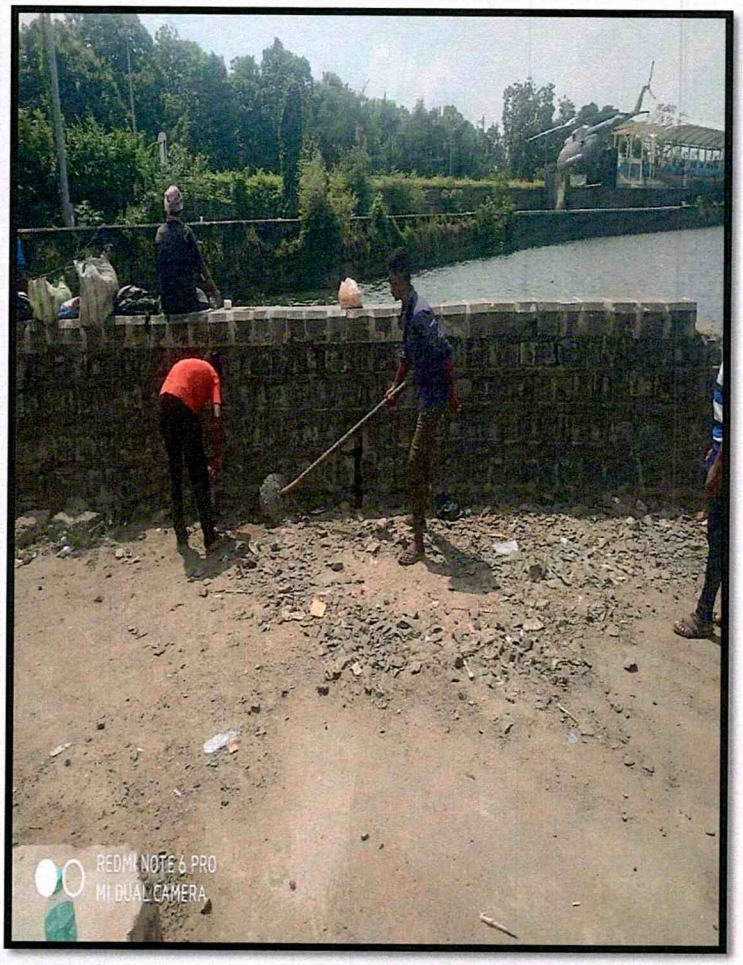


South Bank Part 2 after Restoration

Cleaning Work at North Bank







Cleaning Work at South Bank

भूमापन क्रमांक	भूमापन क्रमांकाचा उपविभाग	भू-धारणा पद्धती
3	अ	--

गावाचे स्थानिक नाव: पाच्छापूरवाली (तख)

लागवडीयोग्य क्षेत्र	हेक्टर	आर
....		
....		
....		
एकूण		
पोटखराब (लागवडीयोग्य नसलेले)—		
वर्ग (अ)		
वर्ग (ब)	२५	३९
एकूण	२५	३९
आकारणी	रुपये	पैसे
जुडी किंवा विशेष आकारणी		

भोगवटादाराचे नाव

मिलिटिअन सरकार

जे. ई. लोकनिर्माण विभाग

(१२७)

इतर अधिकार

निस्तार पत्रकांतील नोंदीप्रमाणे गांवचे रहिवासी आपला निस्तार विनारोक टोक मुक्त करीतात. व गुरे पाणी मुक्त पितात. व धुतात आतात.

सीमा व भूमापन चिन्हे

गाव नमुना बारा

पिकांची नोंदवही

[महाराष्ट्र जमीन महसूल अधिकार अभिलेख व नोंदवह्या (तयार करणे व सुस्थितीत ठेवणे) नियम, १९७१ यातील नियम २९]

वर्ष	हंगाम	पिकांखालील क्षेत्राचा तपशील										लागवडीसाठी उपलब्ध नसलेली जमीन		जल सिंचनाचे साधन	जमीन कसणाऱ्याचे नाव	शेरा
		मिश्र पिकाखालील क्षेत्र							निर्भेळ पिकाखालील क्षेत्र							
		मिश्रणाचा संकेत क्रमांक	जल सिंचित	अजल सिंचित	घटक पिके व प्रत्येकाखालील क्षेत्र				पिकाचे नाव	जल सिंचित	अजल सिंचित	स्वरूप	क्षेत्र			
					पिकाचे नाव	[illegible]	जल सिंचित	अजल सिंचित								
१	२	३	४	५	६	७	८	[illegible]	९	१०	११	१२	१३	१४	१५	१६
			हे.	आर		हे.	आर			हे.	आर		हे. आर			
		—	—	—	—	—	—		—	—	—	पडीक	२५-३९	—		ड्रोन लाग ६८-६९ प्रमाणे