

BEFORE HON'BLE NATIONAL GREEN TRIBUNAL

(NEW DELHI)

Original Application No. 170/2022

IN THE MATTER OF:

Anupam Verma

Applicant

VERSUS

The State of Uttar Pradesh

Respondent

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Place: New Delhi

Date: 01/02/2023

Through



(PANSHUL CHANDRA)

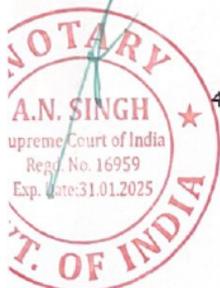
Advocate

ADDITIONAL REPLY ON BEHALF OF UTTAR PRADESH EXPRESSWAY AND INDUSTRIAL DEVELOPMENT AUTHORITY (UPEIDA)

1. That I.....Shri. Hem Pratap Shahi S/O. Rudrareshan Pratap Shahi, working on the post of Addl. Chief Executive Officer, and as such, well conversant with the facts of the case on the basis of records thereof, and duly authorized and competent to swear this affidavit on behalf of Upeida in the above matter.
2. That I have read and understood the original application and filing this as reply thereto.
3. That the deponent craves liberty to raise additional submission or file additional affidavits in case need arises during arguments.

4. **Brief Submissions: -**

1. To comply with the condition of the EC, the plan for installation of 1361 rainwater harvesting structure have been planned and the construction of 176 structures has been started following Appendix 7 of Guidelines for expressways (2010) issued by Ministry of Road Transport and Highways (MoRTH) and published by IRC for rainwater harvesting and artificial recharge along national highways.
2. At the same time the UPEIDA also referred the matter to Ground Water Department, UP Govt for enquiring about the feasibility of groundwater harvesting structures along Purvaanchal Expressway.
3. The Ground Water Department, U. P. informed to concerned Project Engineers that if the groundwater table during post Monsoon period is below 5.00 m, then only the installation of rainwater harvesting system is recommended. In the region of Purvaanchal Expressway the Ground Water Table is shallow at less than 8.00 m.
4. Considering the recommendation of Ground Water Department, the construction of remaining 1 IBS rainwater harvesting structures have been de-scoped from proposed scope of work.



5. Thus, only 176 rainwater harvesting structures have been installed along the Purvanchal Expressway.
6. That groundwater recharge is essentially recommended when the groundwater level is more than 8.00 mbgl during post monsoon period as per state government norms However, water conservation measures are also mandatory in shallow water level areas.
7. Along the periphery of the expressway, the groundwater level in Azamgarh district is shallow but category of three blocks namely Ahirauala, Palhani and Sathiyon are In semi-critical category as per GWRE 2020. The comparison between category of blocks as per GWRE -2017 & 2020 is shown in, Fig 1 and Fig No.2

Fig No 1

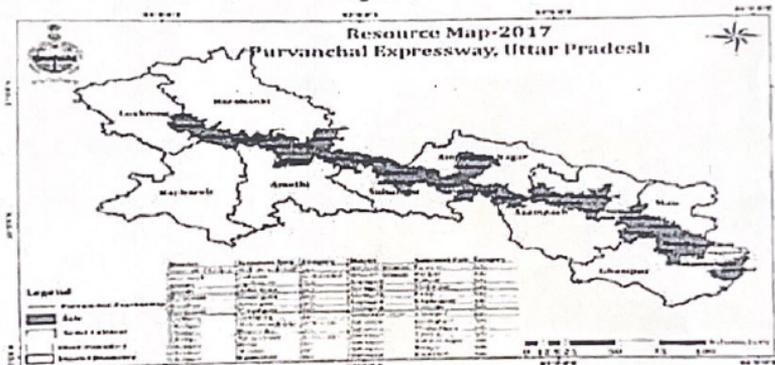
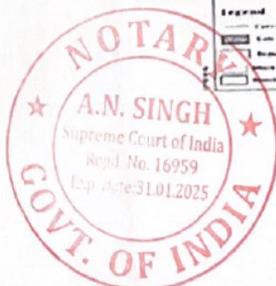
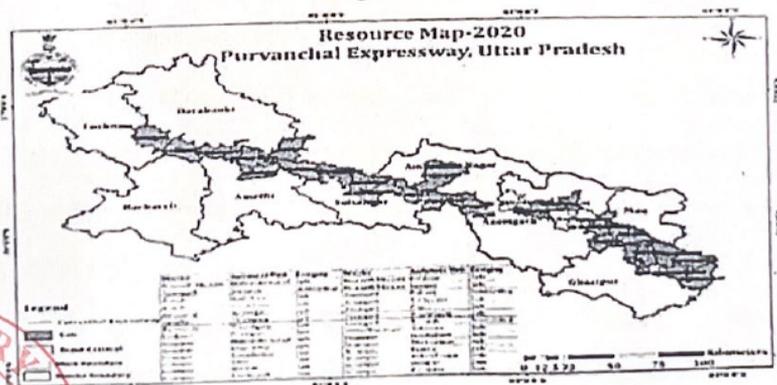


Fig No 2



8. The committee visited the random rainwater harvesting structures constructed in the region between Lucknow and Barabanki section the details of which are as follows:

- Total three rainwater harvesting structures are verified during the joint inspection visit by the committee members.
- Rainwater Harvesting structures with two recharge wells are constructed in every 500 m distance along both side of the expressways.
- The RWH designed as settling chamber allowed by the filtration unit in which two recharge wells 200mm (8") dia. have been installed. The length of the pipe is kept as around 15 m as an average.
- The geotextile membrane is surrounded to the *pipe* throughout the length of the pipe for entrapping fine sediments into recharge wells to avoid the clotting enhancing the efficiency of recharge wells.
- It has been informed that, the drawings of the rainwater harvesting system has been approved by the Authority Engineer based on the guidelines of the MoRTH.
- Tube wells have been constructed at every Toll Plazas after getting of NOCs from UP Ground Water department for domestic and horticulture/greenbelt development purposes.

9. Considering the above, the committee was of the considered view that the installation of groundwater recharge structures through recharge well is not required in the region of Purvaanchal Expressway and hence the above recharge structures can instead be converted for collection of rainwater to utilize it for horticulture/ green belt development to minimise the fresh groundwater extraction besides surplus rainwater should be diverted in the natural water bodies viz. Ponds, Lakes,



✓

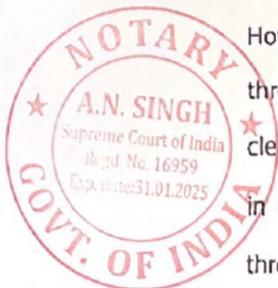
10. The committee also discussed about the possible contaminants in the bituminous road surface runoff which are as follows:

- Bitumen is not soluble in the water. However, with time the surface coating of dust-bitumen matrix is strip-off and accumulated along the roadsides.
- During site visit it found that there is negligible stripping, it might be due to use of quality aggregate having good bitumen adhesion property.

11. Committee referred several documents in this regard which are summarised as below:

- Central Road Research Institute (CRRI) has studied the metals contaminants of bituminous mix with aggregates and found that there is no such observed contamination.
- Indian Institute of Technology, Kharagpur (IIT Kharagpur) has studied the leaching effects of Gap Graded Rubberised Bituminous Mix (GGRB) which having 20-25% Crumb Rubber (result given below) and found that there is no such observed contamination of ground water.
- BITS, Hyderabad has studied the leaching effects of Bituminous Concrete Mix (8C) with CRMB&O, generally having 12-14% crumb rubber (which is also being used as wearing course of the Purvanchal Expressway) and found that there is no such observed contamination of ground water.

12. The committee also referred the BIS Code 15797 which is indicated in the Hon'ble NGT order. The said code related to Roof Top Rainwater Harvesting. The said code mainly gives the designs of Roof Top Rainwater Harvesting in the buildings and recommends for discarding the first rain of runoff. However, in case of the expressways regular cleaning of dust and dirt through tractor/truck mounted vacuum cleaning machine and brush cleaning machine is being practiced. At least one such machine is deputed in each patch of the expressway. And in that way the road dust flowing through the first surface runoff can be minimized. ↓



13. The committee also interacted with Additional Chief Secretary, UP Govt, and CEO of UPEIDA. He appraised the committee that the Purvanchal Expressway has been built in the record time and that too during the Period of COVID. The committee expressed their views regarding rainwater conservation by converting the 176 structures constructed for groundwater recharge, massive afforestation along the expressway and water conservation by adopting at least 10 Hectare existing ponds with the depth of 3 meter to create additional storage of rain water in three blocks namely Ahirauala, Palhani and Sathiyaon of Azamgarh district which fall in the semi-critical category. He expressed his concurrence for execution of these works if concurred by Hon'ble NGT.

Identify the deponent who has Signed/Put T.I. in my presence

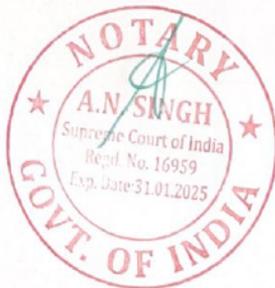

DEPONENT

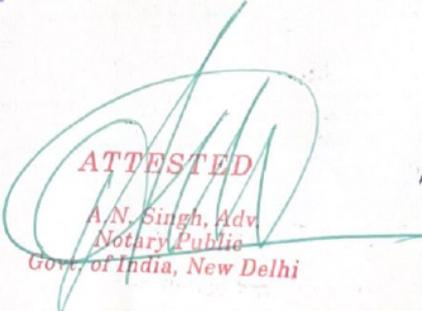
(Shrinani Pratap Shukla)
Addl. Chief Executive Officer
UPEIDA, Lucknow

VERIFICATION:

I, the above named deponent do hereby verify that I have read and understood the contents of the above counter affidavit and that the same are true and correct to the best of my knowledge and belief. No part of the same is false and nothing material has been concealed therefrom. Verified at New Delhi on 12th day of February, 2024

13 FEB 2024




ATTESTED
A.N. Singh, Adv
Notary Public
Govt. of India, New Delhi


DEPONENT

(Shrinani Pratap Shukla)
Addl. Chief Executive Officer
UPEIDA, Lucknow

13 FEB 2024

ANNEXURE P/1

1. Central Road Research Institute (CRRI) has studied the metals contaminants of bituminous mix with aggregates (result given below) and found that there is no such observed contamination.

Test Results of Leaching of Bituminous Mix-CRRI Study

| PARAMETERS | Bitumen Coated with Natural Aggregate | Unit |
|------------------------------------|---------------------------------------|------|
| Antimony and antimony compounds | <003 | mg/l |
| Arsenic and arsenic compounds | <003 | mg/l |
| Cadmium and cadmium compounds mg/l | <0.1 | mg/l |
| Mercury and mercury compounds | <001 | mg/l |
| Selenium and selenium compounds | <0.03 | mg/l |
| Total chromium compounds | <0.1 | mg/l |
| Cobalt compounds | <0.1 | mg/l |
| Lead and lead compounds | <0.1 | mg/l |
| Molybdenum compounds | <0.1 | mg/l |
| Nickel compounds | <0.1 | mg/l |

2. Indian Institute of Technology, Kharagpur (IIT Kharagpur) has studied the leaching effects of Gap Graded Rubberised Bituminous Mix (GGRB) which having 20-25% Crumb Rubber (result given below) and found that there is no such observed contamination of ground water. Test Results of Leaching of GGRB Mix with 20.0% Crumb Rubber-IIT Kharagpur Study Leaching



effect on Crumb Rubber Bitumen Mixture

| S.no | Characteristic | XG30 Bitumen | CH MB 20% CR GGR.V | Required (acceptable limit) | Permissible limits (alternate source) |
|------|---------------------------|--------------|--------------------|-----------------------------|---------------------------------------|
| 1. | Odour | Agreeable | Agreeable | Agreeable | Agreeable |
| 2. | pH value | 8.2 | 8.2 | 65.85 | No relaxation |
| 3 | Total dissolve solids PPM | 257 | 270 | < 500 | 2000 |
| 4. | Turbidity, NTU | 1.24 | 1.24 | < 1 | 5 |
| 5 | Electrical Conductivity | 541 | ... | <800 | No relaxation |
| 6 | Total Hardness, mg/l | 142 | 153 | < 200 | 600 |
| 7. | Iron (Fc), mg/l | 0.05 | 0.05 | <0.3 | No relaxation |
| 8. | Fluoride (F) mg/l | 0.60 | 0.62 | < 1.0 | 1.5 |
| 9 | Sulphate (SO) mg/l | 37 | 54 | <200 | 400 |
| 10. | Nitrate (NO), mg/l | 10.7 | 16.4 | < 45 | No relaxation |
| 11. | Sulphide (ILS), mg/l | < 0.05 | < 0.05 | < 0.05 | No Relaxation |
| 12. | Phosphate mg/l | 0.01 | 0.03 | <0.1 | 0.1 |

There is no BIS standard permissible limit for Phosphate for drinking water, while WHO (1993) has fixed it to be 0.1 mg/l GGRA -Gap graded rubber asphalt mixture with 20% Crumb Rubber (425 pm) passing.

3. BITS. Hyderabad has studied the leaching effects of Bituminous Concrete Mix (BC) with CRMB60, generally having 12-14% crumb rubber which is also being used as wearing course of the Paranuchal Expressway (result given below) and found that there is no such observed contamination of ground water.

Leaching effect for BC mix with CRMB60 and VG30 bitumen (with potable/filter water)- after 24 hours soaking

| Sl. No. | Characteristic | Normal Potable (filter) water | BC with VG30 Bitumen | BC with CRMB60 Bitumen | Required (acceptable limit) | Permissible limits (alternate source) |
|---------|--|-------------------------------|----------------------|------------------------|-----------------------------|---------------------------------------|
| 1 | Odour | Agreeable | Agreeable | Agreeable | Agreeable | Agreeable |
| 2 | pH value | 8.2 | 8.43 | 8.48 | 6.5-8.5 | No relaxation |
| 3 | Total dissolve solids, PPM | 257 | 257 | 270 | ≤ 500 | 2000 |
| 4 | Turbidity, NTU | 1.24 | 1.24 | 1.24 | ≤ 1 | 5 |
| 5 | Electrical Conductivity, $\mu\text{mhos/cm}$ | 540 | 541 | 545 | ≤ 800 | No relaxation |
| 6 | Total Hardness, mg/l | 142 | 142 | 148 | ≤ 200 | 600 |
| 7 | Iron (Fe), mg/l | 0.05 | 0.05 | 0.05 | ≤ 0.3 | No relaxation |
| 8 | Fluoride (F) mg/l | 0.60 | 0.60 | 0.60 | ≤ 1.0 | 1.5 |
| 9 | Sulphate (SO_4) mg/l | 37 | 42 | 50 | ≤ 200 | 400 |
| 10 | Nitrate (NO_3), mg/l | 10.7 | 11.0 | 14.4 | ≤ 45 | No relaxation |
| 11 | Sulphide (H_2S), mg/l | < 0.05 | < 0.05 | < 0.05 | ≤ 0.05 | No Relaxation |
| 12 | *Phosphate (PO_4^{3-}), mg/l | 0.01 | 0.01 | 0.03 | ≤ 0.1 | 0.1 |

10 BIS standard permissible limit for Phosphate for drinking water, while WHO (1993) has fixed it to be 0.1 mg/l

Leaching effect for BC mix with CRMB60 and VG30 bitumen (with alternate water source) - after 24 hours soaking

| Sl. No. | Characteristic | Normal Municipal water | BC with VG30 Bitumen | BC with CRMB60 Bitumen | Required (acceptable limit) | Permissible limits (alternate source) |
|---------|---|------------------------|----------------------|------------------------|-----------------------------|---------------------------------------|
| 1 | Odour | Agreeable | Agreeable | Agreeable | Agreeable | Agreeable |
| 2 | pH value | 8.2 | 8.43 | 8.48 | 6.5-8.5 | No relaxation |
| 3 | Total dissolve solids, PPM | 307 | 295 | 305 | ≤ 500 | 2000 |
| 4 | Turbidity, NTU | 1.68 | 1.59 | 1.72 | ≤ 1 | 5 |
| 5 | Electrical Conductivity, $\mu\text{mhos/cm}$ | 611 | 590 | 611 | ≤ 800 | No relaxation |
| 6 | Total Hardness, mg/l | 530 | 550 | 570 | ≤ 200 | 600 |
| 7 | Iron (Fe), mg/l | 0.13 | 0.18 | 0.20 | ≤ 0.3 | No relaxation |
| 8 | Fluoride (F), mg/l | 0.32 | 0.36 | 0.39 | ≤ 1.0 | 1.5 |
| 9 | Sulphate (SO ₄), mg/l | 38 | 43 | 54 | ≤ 200 | 400 |
| 10 | Nitrate (NO ₃), mg/l | 12.2 | 11.9 | 9.5 | ≤ 45 | No relaxation |
| 11 | Sulphide (H ₂ S), mg/l | < 0.05 | < 0.05 | < 0.05 | ≤ 0.05 | No Relaxation |
| 12 | *Phosphate (PO ₄ ³⁻), mg/l | 0.08 | 0.09 | 0.09 | ≤ 0.1 | 0.1 |

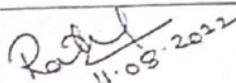
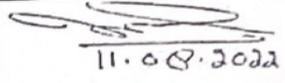
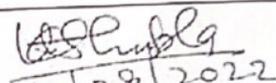
*There is no BIS standard permissible limit for Phosphate for drinking water, while WHO (1993) has fixed it to be 0.1 mg/l

RECOMMENDATIONS

- Considering the data of the UP-Groundwater Department, the installation of groundwater recharge structures through recharge well is not required in the region of Purvaanchal Expressway as artificial recharge to ground water is mandatory when the groundwater level is more than 8.00 mbgl during post monsoon period as per state government norms, whereas the area along the Expressway observed less than 8.00 mbgl during post monsoon period.
- The existing 176 recharge structures can be converted for storing the collection of rainwater to utilize it for horticulture/green belt development to minimise the fresh Groundwater extraction besides surplus rainwater should be diverted in the natural water bodies viz. Ponds, lakes, etc.
- The NHAI/UPEIDA can be asked to monitor the water level data of Pro & Post monsoon period of every year through the borewell/piezometer installed at the toll plazas.
- NHAI/UPEIDA can be asked to adopt at least 10 Hectare natural pond/lake in each semi-critical category blocks namely Ahirauala, Palhani and Sathiyaon in Azamgarh district and ensure that it is recharging of groundwater through natural ponding and its annual maintenance before onset of monsoon.
- NHAI/UPEIDA can be asked for intensive afforestation with consultation of forest department suitable varieties of plant trees in appropriate places on the highway, which can be helpful in enhancing ground water recharge.
- Detailed Characterisation study of the surface runoff from the bitumen roads throughout the country can be conducted through the reputed

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- organization having expertise in the relevant field
- The name and designation of the committee members are as follows:-

| Name of the Committee member | Signature |
|--|--|
| Shri Rajendra D Patil, Sci - D CPCB Regional Directorate, Lucknow |  11.08.2022 |
| Shri Jagdamba Prasad, Sci - D CGWB, NR, Lucknow |  11.08.2022 |
| Shri Bidur Kant Jha, Member Secretary(H-2) IRC, Delhi | Bidur Kant Jha 12/08/2022 |
| Shri U. C. Shukla, Regional Officer UPPCB, R.O. Lucknow |  11/08/2022 |
| Date: 11.08.2022 | |

