BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE AT CHENNAI

Appeal No. 39 of 2022

IN THE MATTER OF:
Telangana State Pollution Control Board,
Represented by its Member Secretary,

...Appellant

AND

M/s. Aadeshwar Aggregates Pvt. Ltd,
Rep by its Authorized Signatory,
Sri D. Sumanth and 2 others

... Respondents

LIST OF DOCUMENTS FILED BY THE RESPONDENT NO. 1

S. No.	Particulars of document	Date of document	Page No.
1.	**Annexure-I** Certificate of Incorporation belonging to Respondent No. 1 Company	25/07/2017	1
2.	**Annexure-II** Copy of TS-iPass Common Application Form belonging to Respondent No. 1 Company and Rejection order	31/12/2019 20/03/2020	2-3
3.	**Annexure-III** MSME Registration belonging to Respondent No. 1 Company.	18/09/2017	4
4.	**Annexure-IV** GST Registration belonging to Respondent No. 1 Company	10/01/2020	5-7
5.	**Annexure-V** Trade License belonging to Respondent No. 21 Company	30/07/2020	8
6.	**Annexure-VI** Mineral Dealer license belonging to Respondent No. 1 Company	06/11/2018	9
7.	**Annexure-VII** Licence to work a Factory belonging to Respondent No. 1 Company	19/10/2020	10

8.	**Annexure-VIII** The Environment (Protection) Rules, 1986		11-15
9.	**Annexure-IX** Copy of Final Document on Revised Classification of Industrial Sectors	29/02/2016	16-18
10.	**Annexure-X** Siting Criteria of Industries provided by the Telangana State Pollution Control Board (Copy of Guidelines of T.S.P.C.B)		19-31
11.	**Annexure-XI** Copy of G.O.MS.No.111, M.A	08/03/1996	32-34
12.	**Annexure-XII** Copy of Watershed Delineation of Vattinagulapalli Village Administrative Area Report by EPTRI to Government of Andhra Pradesh MA&UD Department		35-53
13.	**Annexure-XIII** Copy of Report of EPTRI – Possibility of Establishing Non-pollution Industries within 10 Km radius downstream of Himayat Sagar & Osman Sagar Lakes	06/2006	54-347
14.	**Annexure-XIV** Copy of NGRI – Ecology of Himayat Sagar & Osman Sagar Lakes – Evaluation of permissible Developmental Activities in the Catchment Areas	09/2005	348-455
15.	**Annexure-XV** Copy of Minutes of the 4th Lake Protection Committee Meeting at Conference Hall, Tarnaka, Hyderabad.	29/03/2011	456-460
16.	**Annexure-XVI** Copy of Reply Affidavit filed on behalf of Respondent No.5/ CPCB in O.A .No 06/2022.	22/02/2022	461-463
17.	**Annexure-XVII** Order copy of NGT Principal Bench, New Delhi in O.A No: 739/2018	30.08.2019	464-471
18.	**Annexure-XVIII** Copy of order in Appeal No. 25 of 2020	28/09/2020	472-476
19.	**Annexure-XIX** Copy of order SEIAA Telangana State by Ministry of Environment Forest & Climate	03/11/2016	477-482

	Change.		
20.	**Annexure-XX** Copy of order Consent for Establishment-Orange Category issued by TSPCB in favor of M/s. Vessella Woods.	05/11/2018	483-488
21.	**Annexure-XXI** Letter to the Member Secretary TSPCB sent by Respondent No. 1	16/12/2020	489
22.	**Annexure-XXII** Letter to the Chairman TSPCB sent by Respondent No.1	03/04/2021	490
23.	**Annexure-XXIII** Order copy of High Court in W.P No. 17554/2020	23/11/2021	491-495
24.	**Annexure-XXIV** Copy of order Consent for Establishment issued by TSPCB in favor of M/s. Hyma Developers Pvt. Ltd.		496
25.	**Annexure-XXV** Copy of order Consent for Establishment issued by TSPCB in favor of M/s. Sri Rama Engineering Constructions.	29/01/2020	497-502
26.	**Annexure-XXVI** Copy of order Consent for Establishment issued by TSPCB in favor of M/s. GMR Stone Crusher.	16/04/2018	503-507
27.	**Annexure-XXVII** Copy of order Consent for Establishment issued by TSPCB in favor of M/s. Sri. Srinivasa & Co.	31/07/2018	508-514
28.	**Annexure-XXVIII** Second application made by the 1st respondent before TSPCB	10/12/2021	515-518
29.	**Annexure-XXIX** Rejection order passed by TSPCB rejecting the CFE and CFO in favor of Respondent No.1	09/03/2022	519-535
30.	**Annexure-XXX** Appeal No. 35 of 2022 filed by the 1st respondent before TS Appellate Authority	/03/2022	536-565
31.	**Annexure-XXXI** Order in I.A No: 65/2022 in O.A No:	31/03/2022	566-585

	6/2022		
32.	**Annexure-XXXII** Status report of the TSPCB before TS Appellate Authority	18/04/2022	586-611
33.	**Annexure-XXXIII** Copy of implead petition filed by the P.V. Subrahmanyam Appeal No. 35 of 2022 before TS Appellate Authority	12/04/2022	612-617
34.	**Annexure-XXXIV** Copy of counter to implead petition filed by the P.V. Subrahmanyam Appeal No. 35 of 2022 before TS Appellate Authority	18/04/2022	618-621
35.	**Annexure-XXXV** Copy of counter filed by the P.V. Subrahmanyam Appeal No. 35 of 2022 before TS Appellate Authority	10/05/2022	622-631
36.	**Annexure-XXXVI** Copy of GOMs No. 69	12/04/2022	632-635
37.	**Annexure-XXXVII** Copy of order in Appeal No. 35 of 2022 before TS Appellate Authority	12/05/2022	636-645
38.	**Annexure-XXXVIII** Copy of counter affidavit filed in WP 21582/2022 before the Hon'ble High Court of Telangana	27/04/2022	646-653
39.	**Annexure-XXXIX** Copy of common order in WP 21582/2022 passed by the Hon'ble High Court of Telangana	28/04/2022	654-677
40.	**Annexure-XL** Interim Order in Appeal No: 37 /2022 and 39/2022	04/07/2022	678-682
41.	**Annexure-XLI** Copy of judgment reported in Electrosteel Steels Limited Vs. Union of India reported in 2021 SCC Online SC 1247	09/12/2021	683-699
42.	**Annexure-XLII** Atrocities of rival stone crusher unit owners recorded and inserted in Pen Drive		700-704
43.	**Annexure-XLIV** UNEP REPORT Regarding " Use & sand Resource wisely or Risk Development		705-709

	fallout"		
44.	**Annexure-XLV** UNEP REPORT Regarding Our Use of sand brings us " UP AGAINST THE WALL"		710-713
45.	**Annexure-XLVI** Online Tweet " UN Environment Programme"		714-717
46.	**Annexure-XLVII** UN Environment Programme regarding Sand & Sustainability 10 Strategic Recommendations to avert crisis.		718-807

M/S. UNNAM LAW FIRM
Rep by its Partners and its associates

Counsel for Respondent No.1
 # 6-73, Canara Nagar, Near Uppal Depot,
Hyderabad, State of Telangana – 500 098

1

ANNEXURE -I

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF CORPORATE AFFAIRS

Central Registration Centre

Certificate of Incorporation

[Pursuant to sub-section (2) of section 7 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that AADESHWAR AGGREGATES PRIVATE LIMITED is incorporated on this Twenty fourth day of July Two thousand seventeen under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares

The Corporate Identity Number of the company is U74999TG2017PTC118499.

The Permanent Account Number (PAN) of the company is AAPCA8477P *

Given under my hand at Manesar this Twenty fifth day of July Two thousand seventeen .

MINISTRY OF CORPORATE AFFAIRS 01

Digital Signature Certificate
Mr SUHAS PANDURANG SAWANT

For and on behalf of the Jurisdictional Registrar of Companies
Registrar of Companies
Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on www.mca.gov.in

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Mailing Address as per record available in Registrar of Companies office:

AADESHWAR AGGREGATES PRIVATE LIMITED
H.No.12-7-45/1/5/10/A, Plot No.14,, Bharath Nagar Colony, Moosapet,,
Hyderabad, Rangareddi, Telangana, India, 500018

* as issued by the Income Tax Department

2

Telangana State Industrial Project Approval & Self Certification System (TS-iPASS)
GOVERNMENT OF TELANGANA

ANNEXURE-II

(../../TSHome.aspx)

Query Details

1). Department Name	: Consent For Establishment from Pollutuion Control Board	**2). Query Raised Date**	: 31/12/2019
3). Query	: The location of the industry comes under G:O.Ms.No.111. The Board is not accepting any application in this area.		
4). Query Response Date	: 16/03/2020	**5). No of Days taken**	: 76
6). Query Response	: Clarification Reply by Industry.		

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3

Call us: 04

ANNEXURE-1

Telangana State Industrial Project Approval & Self Certification System (TS-iPASS)
GOVERNMENT OF TELANGANA
(../../TSHome.aspx)

Log on to Industries Portal | Home | aadeshwaraggre | Log out (../../

You are here ! (Home.aspx) / / Admin Page

- Feedback CFO (PassFeedBackFormCFO.aspx?Rtype=...)
- Dashboard (FrmNetDashboard.aspx)
- Loan Application
- Plot Allotment
- CFE
- CFO
- Renewals
- Grievance
- Other Services (FrmOtherServices.aspx)
- Incentives
- Raw Material
- Helpdesk
- Change Password (frmChangePassword.aspx)
- Log out (../../TSHome.aspx)

Rejected Details

1). Department Name	: Consent For Establishment from Pollution Control Board	2). Rejected Date	: 20/03/2020
3). Remarks	: The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area.|http://tsocmms.nic.in/TLNPCB/applicationProcessingDetails/downLoadingCertificateAirGrantedUploadedSW?id=2314749		

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ANNEXURE-III

भारत सरकार
Govt. of India
सूक्ष्म, लघु और मध्यम उद्यम मंत्रालय
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES

उद्योग आधार Udyog Aadhaar

B

Type of Enterprise	Micro	Small	Medium
Manufacturing	A	B	C
Services	D	E	F
UAM No.	TS25B0002888		

Udyog Aadhaar Memorandum

1. Aadhaar Number
2. PAN Number: AAPCA8477P
3. Name of Entrepreneur: DWARSALA SUMANTH KUMAR REDDY
4. Social Category of Entrepreneur: GENERAL
5. Gender: Male
6. Physically Handicapped: No
7. Name of Enterprise: AADESHWAR AGGREGATES PRIVATE LIMITED UNIT - II
8. Type of Organization: Private Limited Company
9. Location of Plant Details

SN	Flat/Door/Block No.	Name of Premises/Building Village	Road/Street/ Lane	Area/Locality	City	Pin	State	District
1	Sy No:246/1 & 246/2	Vattinagulapally	Vattinagulapally	Rajendra Nagar, Gandipet	Gandipet	500075	TELANGANA	RANGA REDDI

10. Official Address of Enterprise: VILLA NO. 21, VESSELLA VILAS BLOCK - C, SRI RAM NAGAR COLONY, KONDAPUR, SERILINGAMPALLY, KOTHAGUDA.
    District: SANGAREDDY | State: TELANGANA | PIN: 500084
    Mobile No: 9494400012 | Email: sumanthreddy1989@gmail.com
11. Date of commencement: 18/09/2017
12. Previous Registration details-if any: ::
13. Bank Details
    IFS Code: KKBK0007469
    Bank Account: 3111980261
14. Major Activity: MANUFACTURING
16.

SN	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit Code	Activity Type
1	08 - Other mining and quarring	0810 - Quarrying of stone, sand and clay	08106 - Operation of sand or gravel pits, basalt / porphyry, clay (ordinary), crushing and breaking of stone for use as a flux or raw material in lime or cement, manufacture or as building material, road metal or ballast and other materials for construction	Manufacturing

17. Persons employed: 20
18. Investment (Plant & Machinery / Equipment's): 200(Rs. In Lakhs)
19. District Industry Centre: SANGAREDDY

Declaration
I hereby declare that information given above is true to the best of my knowledge. Any information, that may be required to be verified, shall be provided immediately before the concerned authority.

MyMsme Mobile App (Beta Version) is available now for download. https://play.google.com/store/apps/details?id=msme.mymsme

PRINT

Click here for Udyog Aadhaar Registration Certificate

5

सत्यमेव जयते

(Amended)

ANNEXURE-IV

Government of India

Form GST REG-06

[See Rule 10(1)]

Registration Certificate

Registration Number :36AAPCA8477P1ZK

1.	Legal Name	AADESHWAR AGGREGATES PRIVATE LIMITED			
2.	Trade Name, if any	AADESHWAR AGGREGATES PRIVATE LIMITED			
3.	Constitution of Business	Private Limited Company			
4.	Address of Principal Place of Business	BLOCK-C, VILLA NO 21,, VESSELLA VILLAS,, PLOT NO. 21, SRI RAM NAGAR COLONY, KONDAPUR, HYDERABAD, Hyderabad, Telangana, 500084			
5.	Date of Liability				
6.	Date of Validity	From	15/09/2017	To	Not Applicable
7.	Type of Registration	Regular			
8.	Particulars of Approving Authority	Telangana Goods and Services Tax Act, 2017			
Signature					
Name		GANGADHAR GUMMADI			
Designation		Deputy State Tax Officer			
Jurisdictional Office		HYDER NAGAR -II			
9. Date of issue of Certificate		10/01/2020			
Note: The registration certificate is required to be prominently displayed at all places of Business/Office(s) in the State.					

This is a system generated digitally signed Registration Certificate issued based on the approval of application granted on 10/01/2020 by the jurisdictional authority.

Annexure A

Details of Additional Place of Business(s)

GSTIN	36AAPCA8477P1ZK
Legal Name	AADESHWAR AGGREGATES PRIVATE LIMITED
Trade Name, if any	AADESHWAR AGGREGATES PRIVATE LIMITED

Total Number of Additional Places of Business(s) in the State 1

Sr. No.	Address
1	sy no 246, Vattinagulapally village, GAndipet Mandal,, Hyderabad, Ranga Reddy Districit, Ranga Reddy, Telangana, 500075

सत्यमेव जयते

Annexure B

GSTIN	36AAPCA8477P1ZK
Legal Name	AADESHWAR AGGREGATES PRIVATE LIMITED
Trade Name, if any	AADESHWAR AGGREGATES PRIVATE LIMITED

Details of Managing / Whole-time Directors and Key Managerial Persons

1

Name	DWARSALA SUMANTH KUMAR REDDY
Designation/Status	Director
Resident of State	Telangana

ANNEXURE-V

GREATER HYDERABAD MUNICIPAL CORPORATION

Provisional Trade License
for the year 2020-21
Issued Under Section 521 & 622 of HMC Act

Date : 30-JUL-2020

Provisional Trade License given to Sri. **Dwarsala Sumanth Kumar Reddy**, to carry on the Trade/Operation of **Aadeshwar Aggregates Private Limited** at premises No: **1-55/195/Vv/21,Kondapur** vide Tran. No: **103681202020** for the year **2020-21**, under the provision of relevant sections of HMC Act 1955, in conformity with terms and conditions set-forth in relevant bye-laws, and subject to the factuality of the particulars furnished in the application / self assessment form / undertaking / documents and subject to the revision and fixing of License fee as per future verification of Yard stick parameter.

License Fee Rs:**900** ,Garbage charges Rs. **0** ,Arrears Rs.**0**,Arrears Penality Rs.**0**,Cheque Bounced Penality Rs.**0** and Advance Rs.**0** ,Fines Rs.**0** ,Total Amount Rs.**900** Paid on Dt **30-JUL-2020** ,pay mode. **ONLINE** , for running New Trade for the financial year **2020-21**

The trader shall fulfill the following conditions, otherwise trade license is deemed to be cancelled:-

1. The trader should submit the following documents with in 3 months.

No	Document Name
1	ID Proof(Id proof for individual can be aadhar and for business PAN or incorporation certificate)
2	Lease Deed/Occupancy Certificate

2. This Provisional Trade License is deemed to be suspended / cancelled if any of the applicable terms and conditions are found to have been contravened or any situation arises out of this trade so as to cause nuisance / damage / harm to property or health of the public or if documents / grounds furnished in the application are found to be false and un-true or if there is a change in GHMC policy of Licensing.

3. If the building structure is un-authorized or used for running the business in other than zones prescribed or effected in the road widening or not fulfilling the provisions or rules of the GHMC Act, the License is deemed to be cancelled.

4. This license is only for **TRADE PURPOSE.** It does not cofer any power of permission for either temporary or permanent exemption from the provisions of any other section of HMC Act bye-laws or rules in force. Mere payment of License fee will not entitle an applicant to the grant of License and such payment shall not be construed as if license has been granted.

5. The regular Trade license will be issued after scruting of documents,field inspection and fulfilment of all requisite conditions.

(Issued as per delegation of powers Under Section 119 of HMC Act 1955)

Tran No: **TDF10368120202020200730101647**

Date: **30-JUL-2020**

Circle: **20-Serilingampally**

(Name of Licensing Authority)
for Commissioner
GHMC, Hyderabad.

Note: This certificate is automatically generated. No signature is required

ANNEXURE-VI (7)

GOVERNMENT OF TELANGANA
TELANGANA MINERAL DEALERS RULE - 2000
FORM - D
FORM OF REGISTRATION

pplication No : MDL6300424

Date:06.11.2018

Mineral Dealer Licence is hereby granted to Aadeshwar Aggregates pvtltd of Rough Stone from his/their Mineral Dealer survey No 246 , o/e. 2.830 (Ha) in Vattinagulapally village of Gandipet Mandal of HYDERABAD District.

subject to the following terms & conditions and Mineral Dealer Details:

1. Name of the Dealer is Aadeshwar Aggregates pvtltd
2. Father's Name /Application Type is FIRM
3. Profession of the Dealer is Managing Director
4. Mineral Dealer Licence is granted for Processing, Storing, Selling, Trading
5. Minerals/Ore will be purchased/procured from Lease Holder
6. Payment of Application fee & Security deposit Transaction No. is A032638
7. The Mineral Dealer Licence is valid from this day 06.11.2018 and shall expire on 06.11.2023.
8. Address of Applicant is VILLA NO: 21, SRI RAM NAGAR COLONY, VESSELLA VILLAS BLOCK C, Kondapur (Village), Serilingampally (Mandal), RANGAREDDY (District).
9. Date of Applicantion for this Registration is 12.09.2018

Granted By.
Name : M. Venkateshwarlu
Designation : Deputy Director of Mines & Geology
Office : HYDERABAD

Note : This is a Digitally Signed Certificate, doesn't require physical signature.
This Certificate can be verified at http://www.mines.telangana.gov.in by furnishing the application number mentioned in the certificate

ANNEXURE-VII (8)

GOVERNMENT OF TELANGANA

FORM NO. 4

Prescribed under Rule 4 (4)

Licence to work a Factory

1. Registration Number	**103396**
2. Application Number	**MIC006001690812CFO**
3. Full Name of Factory	**AADESHWAR AGGREGATES PVT LTD**
4. Full Address / Location of Factory	**SY NO : 246/1 & 246/2, VATTINAGULAPALLY, vattinagulapalle, Rajendranagar, Rangareddy - 500075**
5. Full Postal Address for Communications relating to the Factory	**SY N : 246/1 & 246/2,GANDIPET,vattinagulapalle,Rajendranagar,Rangareddy,0**
6. Maximum Horse Power installed Regular / Standby	**1000 HP**
7. Maximum Number of Workers to be Employed	**20**
8. Full Name and Residential Address of the Occupier and his Position in the Company / Firm / Government factory / Local Fund factory	**D SUMANTH KUMAR REDDY VILLA NO : 21, SRI RAM NAGAR COLONY, Kothaguda, Serilingampally, Rangareddy, Telangana - 500084**

Licence is hereby granted to the factory at 3 above for the premises stated at 4 above for use as a factory within the limits stated in 6, and 7 above subject to the provisions of the Factories Act, 1948 and the Rules made thereunder.

This licence shall be valid until it has been duly cancelled.

Date : 19/10/2020

Signature valid

Note:

1) This is a digitally signed certificate and does not require physical signature. This certificate can be verified at https://tsfactories.cgg.gov.in/ by furnishing the registration certificate number mentioned in the certificate.

ANNEXURE-VIII

ANNEXURE-II

(For the purpose of Part-D)

The State Boards shall follow the following guidelines in enforcing the standards specified under Schedule VI:

(a) In case of cement plants, the total dust (from all sections) shall be within 400 mg/Nm^3 and 250 mg/Nm^3 for the plants upto 200 t/d and more than 200 t/d capacities respectively.

(b) In respect of calcinations process (e.g. Aluminum Plants) Kilns. and step Grate Bagasse fired-Boilers. Particulate Matter (PM) emissions shall be within 250 mg/Nm^3.

(c) In case of thermal power plants commissioned prior to 01.01.1982 and having generation capacity less than 62.5 MW, the PM emission shall be within 350 mg/Nm^3.

(d) In case of Lime Kilns of capacity more than 5 t/day and upto 40 t/day, the PM emission shall be within 500 mg/Nm^3.

(e) In case of horse shoe/pulsating Grate and Spreader Stroker Bagasse-fired-Boilders, the PM emission shall be within 500 (12% CO_2) and 800 (12% CO_2) mg/Nm^3 respectively. In respect of these boilers, if more than attached to a single stack, the emission standards shall be fixed, based on added capacity of all the boilers connected with the stack.

(f) In case of asbestos dust, the same shall not exceed 2mg/Nm^3.

(g) In case of the urea plants commissioned after 01.01.92, coke ovens and lead glass units, the PM emission shall be within 50 mg/Nm^3.

(h) In case of small boilers of capacity less than 2 tons/hour and between 2 to 5 tons/ hour, the PM emissions shall be within 1000 and 1200 mg/Nm^3.

(i) In case of integrated Iron and Steel Plants, PM emission upto 400 mg/Nm^3 shall be allowed during oxygen lancing.

(j) In case of stone crushing units, the suspended PM contribution value at a distance of 40 meters from a controlled, isolated as well as from a unit located in cluster should be less than 600 micrograms/Nm^3. [1][* * *] These units must also adopt the following pollution control measures :

(i) Dust containment cum suppression system for the equipment;

(ii) Construction of wind breaking walls;

(iii) Construction of the metalled roads within the premises;

(iv) Regular cleaning and wetting of the ground within the premises;

(v) Growing of a green belt along with periphery.

(k) In case of Ceramic industry, from the other sources of pollution, such as basic raw materials and processing operations, heat recovery dryers, mechanical finishing operation, all possible preventive measures should be taken to control PM emission as far as practicable.

2. The total fluoride emission in respect of Glass and Phosphatic Fertilizers shall not exceed 5 mg/Nm^3 and 25 mg/Nm^3 respectively.

[2]3. [In case of copper, lead and zinc smelting, the off-gases may, as far as possible, be utilized for manufacturing sulphuric acid]

[3]4. [In case of cupolas (Foundries) having capacity (melting rate) less than 3 tonne/hour, the particulate matter emission shall be within 450 mg/Nm^3. In these cases it is essential that stack is constructed over the cupolas beyond the charging door and the emissions are directed through the stack, which should be at least six times the diameter of cupola. In respect of Arc Furnaces and Induction Furnaces, provision has to be made for collecting the fumes before discharging the emissions through the stack].

[No. Q-15017/24/89-CPW]
MUKUL SANWAL, Jt. Secy.

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1 Omitted by Rule 2(i)(iii) of the Environment (Protection) Third Amendment Rules, 1993, vide G.S.R. 801(E) dated 31.12.1993.

2 Substituted by Rule 2(1)(i); Ibid.

3 Added by Rule 2(1)(ii), Ibid.

Sr. No.	Industry	Parameter	Standards
1	2	3	4
#[1]11.	**STONE CRUSHING UNIT**	Suspended Particulate Matter	The suspended particulate matter measured between 3 metres and 10 metres from any process equipment of a stone crushing unit shall not exceed 600 microgrammes per cubic metre.
[2]12.	**COKE OVENS**		Concentration in the effluents when discharged into inland surface waters not be exceed milligramme per litre (except for pH)
		pH	5.5 – 9.0
		Biochemical Oxygen Demand (27°C for 3 days)	30
		Suspended Solids	100
		Phenolic Compounds (as C_6H_5OH)	5
		Cynides (as CN)	0.2
		Oil & Grease	10
		Ammonical Nitrogen (as N)	50
13.	**SYNTHETIC RUBBER**		Concentration in the effluents when discharged into inland surface waters not be exceed milligramme per litre (except for colour and pH)
		Colour	Absent
		pH	5.5 – 9.0
		Biochemical Oxygen Demand [1][BOD (3 days at 27°C]	50
		Chemical Oxygen Demand	250
		Oil and grease	10.0

1 S.No.11 and entries relating thereto inserted vide SO 443(E)dt.18.4.87 published in the Gazette no. 206 dt. 18.4.87.

Standards notified at Sl. No. 37 may also be referred.

2 S.Nos. 12 to 24 and entries relating thereto inserted vide S.O. 64(E) published in the Gazette No. 42 dt. 18.1.88.

Sr. No.	Industry	Parameter	Standards
1	2	3	4

* Separate standards for VSS, HSS, PBSW & PBCW as given in column 4 stands abolished

[1][(c) Standards for forage fluoride

	- Twelve consecutive months average	- 40 ppm
	- Two consecutive months average	- 60 ppm
	- One month average	- 80 ppm]

*37.	**STONE CRUSHING UNIT**	Suspended Particulate Matter (SPM)	The Standards consist of two paras : **(i) Implementation of the following Pollution Control measures:** (a) Dust containment cum suppression system for the equipment. (b) Construction of wind breaking walls. (c) Construction of the metalled roads within the premises. (d) Regular cleaning and wetting of the ground within the premises. (e) Growing of a green belt along the periphery.

[1] Inserted by Rule 2(IV)(b) of the Environment (Protection) First Amendment Rules, 2006 notified by G.S.R.46(E), dated 3.2.2006.

* Standards notified at Sl. No. 11 may also be referred.

Sr. No.	Industry	Parameter	Standards
1	2	3	4
			(ii) Quantitative standard for SPM :
			**[measured between three meters and ten metres from any processes equipment of a stone crushing unit shall not exceed 600 microgrammes per cubic metre] from a controlled isolated as well as from a unit located in a cluster should be less than 600 mg/Nm_3 [1][xxx....]
38.	**PETROCHEMICALS (BASIC & INTERMEDIATES)**	**EFFLUENTS**	
		Ph	6.5 – 8.5
		*BOD [2][(3days at 27°C)]	50
		**Phenol	5
		Sulphide (as S)	2
		COD	
		Cynide (as CN)	250
		*** Fluoride (as F)	
		Total suspended Solids	[3][100]
		Hexavalent Chromium [3][(as Cr)]	0.1
		**** Total Chromium [3][(as Cr)]	2.0

** Corrections have been made as per CORRIGENDUM Notification No. S.O. 8(E) dated 31.12.1990.

1 The sentence 'The measurements are to be conducted at least twice a month for all the 12 month in a year' deleted as per CORRIGENDUM Notification S.O 8(E) dated 31.12.90.

2 Substituted by Rule 2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176(E), dated 2.4.1996 may be read as BOD (3 days at 27°C) wherever BOD 5 days 20°C occurred.

3 Corrected as per CORRIGENDUM Notification S.O. 8(E) dated 31.12.1990.

ANNEXURE IX

Final Document on Revised Classification of Industrial Sectors Under

Red, Orange, Green and White Categories

(February 29, 2016)

Central Pollution Control Board
Delhi

63.	72	Steel and steel products using various furnaces like blast furnace /open hearth furnace/induction furnace/arc furnace/submerged arc furnace /basic oxygen furnace /hot rolling reheated furnace	10	-	10	20	-	20	10	50	R-O	i. Mainly air polluting. In the emissions, oxides of manganese, nickel etc. are also present. ii. Air pollution score is normalized to 100.
64.	73	Stone crushers	-	-	-	20	-	20	-	50	R-O	Mainly air polluting. Air pollution score is normalized to 100.
65.	75	Surgical and medical products including prophylactics and latex	20	-	20	20	-	20	-	50	R-O	Both air as well as water polluting. Air and water pollution scores are normalized to 100.
66.	85	Tephlon based products	0	0	0	20	0	20	0	50	G-O	Due to spraying applications, emissions (HC) are generated
67.	70	Thermocol manufacturing (with boiler)	--	--	--	20	--	20	--	50	O-O	Polystyrene is heated. Mainly air polluting with boiler.
68.	82	Tobacco products including cigarettes and tobacco/opium processes	20	-	20	20	-	20	-	50	R-O	Such industries generate both air as well as water pollution. These scores are normalized to 100.
69.	72	Transformer repairing/ manufacturing (dry process only)	--	--	--	20	--	20	10	50	O-O	Mainly air polluting because of ovens, shot-blasting etc.
70.	73	Tyres and tubes vulcanization/ hot retreating	10	--	10	20	--	20	--	50	O-O	Mainly air polluting . Emissions of PM, VOCs and obnoxious odour are generated.
71.	83	Vegetable oil manufacturing including solvent extraction and refinery /hydrogenated oils	20	-	20	15	5	20	10	50	R-O	i. All sorts of pollution are generated. ii. This score is valid for plants having waste-water generation < 100 KLD. iii. If the waste-water generation is more than 100 KLD, the unit shall be classified as Red.
72.	74	Wire drawing and wire netting	20	--	20	--	--	--	--	50	O-O	Mainly water polluting. WP score is normalized to 100.

27.	50	Lubricating oil, greases or petroleum based products (only blending at normal temperature)	–	–	–	10	–	10	–	25	G-G	Minor fumes at the time of transfers from one container to other.
28.	54	Manufacturing of pasted veneers using gas fired boiler or thermic fluid heater and by sun drying	–	–	–	10	–	10	–	25	G-G	1. Minor fumes due to application of gums / adhesives / pastes etc. 2. This score is valid only for gas fired boiler.3. The units having coal fired boilers shall be categorized as Orange.
29.	59	Oil mill Ghani and extraction (no hydrogenation / refining)	10	–	10	–	–	–	–	25	G-G	Small quantities of floor washings & equipments washings are generated.
30.	48	Packing materials manufacturing from non asbestos fibre, vegetable fibre yarn	–	–	–	10	–	10	–	25	O-G	Some fugitive emissions of PM are expected.
31.	65	Phenyl/toilet cleaner formulation and bottling	–	–	–	10	–	10	–	25	G-G	Minor fumes of VOCs in the work zone
32.	67	Polythene and plastic processed products manufacturing (virgin plastic)	10	–	10	10	–	10	–	25	G-G	Cooling water & emissions due to mixing of raw materials.
33.	68	Poultry, Hatchery and Piggery	–	–	–	10	–	10	–	25	G-G	Obnoxious odour containing H_2S, CH_4 etc. and fugitive PM emissions
34.	69	Power looms (without dye and bleaching)	–	–	–	10	–	10	–	25	G-G	Minor emissions of PM.
35.	71	Puffed rice (muri) (using gas or electrical heating system)	–	–	–	10	–	10	–	25	G-G	Minor emissions of PM.
36.	57	Pulverization of bamboo and scrap wood	–	–	–	10	–	10	–	25	O-G	Some fugitive emissions of PM are expected.
37.	72	Ready mix cement concrete	–	–	–	10	–	10	–	25	G-G	PM emissions.
38.	73	Reprocessing of waste cotton	–	–	–	10	–	10	–	25	G-G	PM emissions.
39.	60	Rice mill (Rice hullers only)	–	–	–	10	–	10	–	25	O-G	PM emissions are generated. Mainly air

SITING CRITERIA OF INDUSTRIES

The TSPCB follows the guidelines for establishment of the industries as mentioned below:

1. Cement Grinding units
2. Stone Crushing units
3. Dairy units
4. LPG Bottling
5. Cashew Processing units
6. Pulverizing units
7. Para boiled Rice mill
8. Pesticide formulation units
9. Sponge Iron Units (CPCB)
10. R & D Units
11. Tyre Pyrolysis units
12. Transportation/Communication system

1. CEMENT GRINDING UNITS (UP TO 50 TPD)

→ The distance between the boundary of the site and boundary of the

i) National Highway shall be -100 m

ii) State High way shall be - 50 m

iii) M.D.R./Village roads shall be - 25 m

→ The minimum distance between the boundary of the site and human habitation (boundary of Town, Village etc.) shall be 500 m as the pollution is anticipated from fugitive emissions only.

→ Green belt of 20 m width shall be developed along the boundary.

→ Total area of land acquired – Ac. 1.5

→ Minimum capacity of the unit shall be 20 TPD.

→ Bag filter for grinding as well as cement silo either combinedly or separately to be provided for units with capacity more than 50 TPD.

2. STONE CRUSHING UNITS

→ The distance between the boundary of the site and boundary of the

i) National Highway shall be -500 m

ii) State High way, MDR and other roads shall be -100 m

→ The distance between the boundary of the site and human habitation (boundary of Town, Village etc.) shall not be less than 800 m .

→ Preferably located near the quarries.

→ There shall be a 5 m width of green belt along the boundary of the site in the 50 m width buffer zone of the stone crushing unit. This green belt shall be developed on outer side of the buffer zone so as to act as a barrier.

→ Total area of land acquired – Ac. 3 to 5.5 depending up on surroundings

3. DAIRY UNITS

→ The distance between the boundary of the site and boundary of the

i) National Highway shall be -100 m

ii) State High way shall be - 50 m

iii) M.D.R./Village roads shall be - 25 m

→ The distance between the boundary of the site and human habitation (boundary of Town, Village etc.) shall be at least 500 m .

→ Total area of land acquired – Ac. 3.0

→ Minimum capacity of the plant shall not be less than 5 KLD

4. LPG BOTTLING (UP TO 100 TONNES STORAGE)

→ The distance between the boundary of the site and boundary of any road shall be at least 100 m

→ The minimum distance between the boundary of the site and human habitation (boundary of Town, Village etc.) shall be 1 km

→ Total area of land acquired – Ac. 5.0

→ On site emergency plan to be prepared before the activity is commenced i.e. before the trial production.

5. CASHEW PROCESSING UNITS

Drum Process:-

a) To be located 1 km away from habitation

b) No new units to be allowed in Palasa, Kasibugga & Mogilipadu.

c) Distance between 2 units shall be 500 m.

d) A distance of 500 m shall be maintained between the boundary of site and the Edge of National & State Highway.

e) A distance of 100 m shall be maintained from boundary of site and Edge of B.T. Roads in the Districts.

10. Guidelines for R & D Units

a) The R & D units shall not be located in the residential and commercial areas.

b) The R&D units shall be located at least 0.50 km away from boundary of nearest human habitation.

c) If the R& D unit proposes for up-scaling the process/technology validation, developed on laboratory scale, boiler(s) of maximum total capacity 0.5 T/hr shall be allowed.

d) The R & D units shall not go for commercial production.

11. Guidelines to establish the Tyre Pyrolysis units

a. Pyrolysis units may be located atleast 500 m away from habitations.

b. Burners shall be installed to flare up excess non condensable gases with safety arrangements.

c. Air pollution control equipment shall be provided to control the flue gas emissions generated during the heating of the pyrolysis reactor.

d. No further distillation of oil shall be carried out.

e. The by products, carbon black shall be collected properly and stored in closed shed without causing any spillages before selling to outside parties.

12. SITING GUIDELINES FROM TRANSPORTATION / COMMUNICATION SYSTEM :

The following width of buffer zone shall be maintained from the Road Land Boundary*:

1. National Highways – 50 Mts.
2. State Highways – 40 Mts.
3. MDR / Village Road – 20 Mts.

*Road Land Boundary means the boundary of the road upto which land is acquired for road purposes.

These guidelines will be applicable to industries other than 11 category of industries for which specific guidelines are formulated by the Board.

The buffer zone may be permitted to be utilized for the following:

i) Paved Vehicle parking.

ii) Administrative guiding and security office.

iii) Green belt.

iv) Electrical Substation / transformers.

v) Fuel Station.

vi) Water supply sumps.

These guidelines shall be applicable to individual industries & industrial estates, but not to the plots located within industrial estates.

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

CPCB/IPC-V/RTI/2022

March14, 2022

To

Ms. SS
Begumpet . Hyderabad-500016
Telangana
Email- samskaarasiddhi@gmail.com

Sub: Information sought under Right to Information Act, 2005, seeking information regarding Telangana State Pollution Control Board Rules, Regulations, Guidelines/report w.r.t. Ready Mix Concrete Plants and Stone Crushers.

Sir,

This has reference to your RTI application received through RTI Portal vide Registration No. CPCBD/R/E/22/00117 dated 02/03/2022 seeking information regarding Telangana State Pollution Control Board Rules, Regulations, Guidelines/report w.r.t. Ready Mix Concrete Plants and Stone Crushers. In this regard, point wise information is furnished as below:

Point No 1: You may seek the desired information regarding Guidelines, Rules and Regulations of Telangana State Pollution Control Board regarding the establishment for Ready Mix Concrete Plants and Stone Crushing Plants.

Point No. 2: No, there is no guidelines of Central Pollution Control Board w.r.t. Ready Mix Concrete Plants.

Point No. 3: The Central Pollution Control Board report dated 30.08.2019 Original Application No. 739/2018 is enclosed for ready reference.

Yours faithfully,

(S.K.Gupta)
AD & CPIO (IPC-V)

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 739/2018

IN THE MATTER OF:-

RESIDENTS OF GRAM PANCHAYAT VARAHIYA — APPLICANT

VERSUS

STATE OF MADHYA PRADESH — RESPONDENTS

INDEX

SL. NO.	PARTICULARS	PAGE NO.
1.	REPORT ON MECHANISM FOR "ASSESSMENT OF DAMAGE TO AIR QUALITY", "DAMAGE ASSESSMENT OF HEALTH ISSUES" AND "AGRICULTURE PRODUCTION LOSS" w.r.t STONE CRUSHERS IN COMPLIANCE OF ORDER DATED 30.05.2019 OF HON'BLE NGT IN THE MATTER OF OA NO. 739/2018 (RESIDENTS OF GRAM PANCHAYAT VARAHIYA VS. STATE OF MP).	
2.	ANNEXURE-I HON'BLE NGT ORDER DATED 30.05.2019.	

AJAY AGGARWAL

SCIENTIST 'E'

CENTRAL POLLUTION CONTROL BOARD,

PARIVESH BHAWAN, EAST ARJUN NAGAR,

DELHI-110032.

DATE: 30.08.2019

PLACE: DELHI

Mechanism for "Assessment of Damage to Air Quality", "Damage Assessment of Health Issues" and "Agricultural Production Loss" w.r.t Stone Crushers, in compliance of Hon'ble NGT Order dated 30.05.2019, in the matter of O.A. No. 739/2018; Residents of Gram Panchayat Varahiya versus State of MP

Background:

CPCB was directed by Hon'ble NGT vide its order dated 30/5/2019 in the matter of OA No. 739/2019; Residents of Gram Panchayat Varahiya Versus State of MP, related to dust pollution by illegal operation of stone crushers, to develop the requisite mechanism to study: i) Damage to the Air Quality; ii) Damage Assessment of Health Issues and iii) Agricultural Production Loss.

Accordingly, literature survey was conducted to access the reference documents prepared by various agencies, for assessment of damages to Environment on account of emission of pollutants from various sources.

Stones crushers are known for dust emissions if not operated as per requisite environmental guidelines to achieve prescribed norms, thus contributing towards increase in the concentration of Ambient Air and consequently affecting air quality and public health substantially and agriculture production loss to some extent.

The following mechanism has been developed by CPCB for assessment of damage to the air quality, public health and agriculture production loss based on a 'Box Model' by referring to the relevant reference documents and developing formula/equations to assess the damage in monetary terms, which may be recovered from stone crushers operating illegally and/or without complying with the prescribed norms.

Mechanism for Assessment of Damage:

The requisite mechanism has been developed for the following parameters relevant to stone crushers:

1. Damage to the Air Quality
2. Damage Assessment of Health Issues
3. Agricultural Production Loss.

29/8/19

1. Damage to the Air Quality:

For calculating the damage to air quality, the following details are needed:

i. Total Load of particulate Emissions (PM_{10} and $PM_{2.5}$) beyond prescribed limits i.e. **Load $_{PM10}$** and **Load $_{PM\ 2.5}$**
ii. Environmental Price of Particulate Emissions (PM_{10} and $PM_{2.5}$) i.e. EP_{PM10} and $EP_{PM2.5}$
iii. A Formula to calculate Damage to air quality in monetary terms i.e. $Damage_{AQ}$

1.1 Calculation of Total Load of Particulate Emissions ($Load_{PM10}$ and $Load_{PM\ 2.5}$) beyond prescribed standard:

1.1.1 Calculations for Load of PM_{10} Emissions (Load $_{PM10}$):

The load of PM10 emissions may be calculated by using the following details and methodology:

Limit of PM_{10} as per prescribed standard (A): a µg /m3

Average measured Concentration of PM_{10} in the ambient Air in the affected site (B): b µg /m^3. The sampling and analysis of ambient air will be required at various distances from the stone crushers, to determine the affected area and average concentration.

Concentration of PM_{10} emissions in excess of prescribed limit (C): B-A = c µg /m3

Concentration of PM_{10} emissions in excess of prescribed limit in Kg/m3 (D): d Kg/m3
(e.g. if the Concentration in mg/l i.e C is c µg /m3, the concentration in Kg/m3 is: cE-9)

Mixing height of air in the affected Site (E): e meters

Area of the affected site (F): f m2

Volume of Ambient air in Affected area (G): = E x F = g m3

Total Load of PM_{10} in excess of the prescribed limit in the affected site (H): D x G= h Kg

Since depending on the wind speed, the air in a particular area is being replaced continuously with the new air. Since we, need to calculate the total Load of PM_{10} Emissions per day, a replacement factor needs to be derived as follows:

Let's suppose:

Radius covered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

Then, Air replacement factor (I) : 1/2 x 24 =12

Total Load of PM_{10} in excess of the prescribed site in the affected site (**Load $_{PM10}$**): H x I = i kg/day

As an alternative to the above method, the load of particulate emissions from the different stone crushers may also be calculated by using emission factor for stone crushers.

1.1.2 Calculations for Load of $PM_{2.5}$ Emissions:

Limit of $PM_{2.5}$ as per prescribed standard (K): j µg /m3

Average measured Concentration of $PM_{2.5}$ in the ambient Air in the affected site (L): k µg /m3. The sampling and analysis of ambient air will be required at various distances from the stone crushers, to know the affected area and average concentration.

Concentration of $PM_{2.5}$ emissions in excess of prescribed limit (M): L-K = l µg /m3

Concentration of $PM_{2.5}$ emissions in excess of prescribed limit in Kg/m3 (N): m Kg/m3
(e.g. if the Concentration in mg/l i.e M is l µg /m3, the concentration in Kg/m3 is: lE-9)

Mixing height of air in the affected Site (O): n meters

Area of the affected site (P): o m2

Volume of Ambient air in Affected area (Q): = O x P = p m3

Total Load of $PM_{2.5}$ in excess of the prescribed limit in the affected site (R): M x Q= q Kg

Since depending on the wind speed, the air in a particular area is being replaced continuously with the new air. Since we, need to calculate the total Load of $PM_{2.5}$ Emissions per day, a replacement factor needs to be derived as follows:

Let's suppose:

Radius covered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

Then, Air replacement factor (S): 1/2 x 24 =12

Total Load of $PM_{2.5}$ in excess of the prescribed site in the affected site (Load $_{PM\ 2.5}$): R x S = j Kg/day

As an alternative to the above method, the load of particulate emissions from the different stone crushers may also be calculated by using emission factor for stone crushers.

29/8/19

1.2. Environmental Price of Particulate Emissions (EPPM$_{10}$ and EP$_{PM2.5}$):

To calculate the environmental prices of particulate emissions i.e. PM_{10} and $PM_{2.5}$, **"Environmental Prices Handbook EU28 version" Methods and numbers for valuation of environmental impacts, Bruym, S.T. et al, 2018, Delft, CE Delft** was referred. The environmental prices are the constructed prices for pollution or social cost per Kg Emissions. In other words, environmental prices represent the loss of economic welfare that one additional Kg. of the Pollutant (PM_{10} and $PM_{2.5}$ in the present case) is introduced into the environment. The Environmental Prices Handbook EU28 version and the associated webtool provide environmental prices for over 2500 pollutants. The value for environmental price given for pollutant level i.e value for emissions on environmentally damaging substances (PM_{10} and $PM_{2.5}$ in the present case) have been considered in the proposed mechanism.

The values for the Environmental Prices for average particulate Emissions (PM_{10} and $PM_{2.5}$) as reported in the above hand book are as follows:

Pollutant	Environmental Price for average atmospheric Emissions (€/kg Emissions, 2015)		
	Lower	Central	Upper
Particulate Matter (PM_{10})	19	26.6	41
Particulate Matter ($PM_{2.5}$)	27.7	38.7	59.5

The values per Kg of average particulate emissions were recalculated specific to India by considering the Central values, Exchange rates and inflation factor (2015 to 2019) as follows:

Environmental Price for Average Particulate Emissions (Rs./Kg. Emission) = Environmental Price per Kg Emission x Exchange Rate x inflation factor

1. Environmental Price for Average Particulate Emissions, PM_{10} (EP_{PM10}): 26.6 x 79.59 x 1.19= Rs. 2519.34/Kg Emission
2. Environmental Price for Average Particulate Emissions, $PM_{2.5}$ ($EP_{PM2.5}$): 38.7 x 79.59 x 1.19= Rs. 3665.36/Kg Emission

1.3. Formula to calculate the damage to Air Quality /day (Damage$_{AQ}$)in monetary terms:

The formula/equation for calculating the damage to the air quality (Damage$_{AQ}$) is derived by using the following values:

i. Total Load of PM_{10} in excess of the prescribed site in the affected site in Kg/day ($Load_{PM10}$)
ii. Total Load of PM2.5 in excess of the prescribed site in the affected site in Kg/day ($Load_{PM2.5}$)
iii. Environmental Price for Average Particulate Emissions, PM_{10} (EP_{PM10}): Rs. 2519.34/kg Emission
iv. Environmental Price for Average Particulate Emissions, PM 2.5 i.e. ($EP_{PM2.5}$):Rs. 3665.36 /kg Emission

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Damage to Air Quality in Monetary Terms /Environmental Price Rs. /day:

$$Damage_{AQ}\ (Rs/day) = (Load_{PM10} \times EP_{PM10}) + (Load_{PM10} \times EP_{PM10}) \qquad Eq\ (1)$$

Note:

a) The value obtained from this formula should be multiplied by the number of days depending on the time period for which environmental damage is to be calculated.

b) The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for PM_{10} and $PM_{2.5}$ in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the Damage AQ with the contribution factor for stone Crushers.

2. Damage Assessment of Health Issues:

The major health issues associated with the pollution caused by stone crushers are respiratory infections such as aggravation of asthma, respiratory symptoms and increase in hospital admissions. PM_{10} and $PM_{2.5}$ emissions have high risk of mortality and morbidity impacts on the human population in the vicinity of stone crushers.

For assessing the damage caused to health by the stone crushers, the data with respect to respiratory illness/symptoms in the affected area, needs to be obtained from the Health Centres serving the affected sites. Since, all the cases of these health impacts are not reported to medical facilities, health survey of the affected area with the help of questionnaire needs to done simultaneously to have realistic data of the affected people.

Once the above data is obtained the damage assessment may be done based on the cost of illness approach. The reference document used for developing the mechanism for damage assessment of health issues is **Srivastava, A and Kumar, R (2002).**

29/8/19

"Economic Valuation of health impacts of Air Pollution in Mumbai". Environ. Monit. Assess. 75: 135-143.

The cost of Illness due to respiratory illness/diseases in the affected area is estimated by considering the base estimate reported in the reference study, by using per capita income of both the cities i.e. Mumbai as reported in the reference document and the affected area in question, by using the following details:

No. of cases of respiratory illness/diseases reported based on the data obtained from Medical facilities serving the affected area and health survey: X

Cost of Illness per person in Mumbai area (COI_{Mumbai}) in Rs.: Rs. 14378 as of 1997

*Per capita income of the affected area for the year 1997 in Rs. ($Inc_{Affected\ area}$)

*Per capita income of Mumbai for the year 1997 in Rs. (Inc_{Mumbai})

Cost of Illness per person in the affected area ($COI_{Affected\ area}$) in Rs:

$$COI_{Affected\ area} = COI_{Mumbai} \times \frac{Inc_{Affected\ area}}{Inc_{Mumbai}}$$

(Note: if per capita income of both the cities for 1997 is not available, the values of any year having per capita income for both the cities may be taken and the COIMumbai may also be inflated to that year to calculate COI affected area)

The cost of illness determined from the above formula may be inflated to required year.

Damage to the health due to respiratory diseases may be calculated with the following formula/Equation:

Damage to Health due to Respiratory diseases ($Damage_H$) in Rupees:

$$Damage_H\ (Rs) = No.\ of\ cases\ Reported\ (X) \times COI_{Affected\ area} \qquad Eq\ (2)$$

Note:

The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for Particulate matter in the ambient air, may be calculated based on source apportionment studies . In such cases, the contribution of the stone crusher may be calculated by multiplying the $Damage_H$ with the contribution factor for stone Crushers.

29/8/15

3. Agriculture Production Loss:

Model sensitivity studies carried out in India has identified NOx as the key pollutant causing as much as 93% of the crop loss. Since, NOx emissions are not directly related to stone crusher operation, it is proposed to attribute 100-93 = 7% (say 10%) of total yield loss to particulate matter emissions (PM_{10} and $PM_{2.5}$) to start with. The formula/equation for calculating the agricultural production loss is calculated by using the following details:

Average production yield for Crop A in Tonnes/Acre ($Yield_{AvgCrop\ A}$)

Actual Yield of Crop A in the Affected area in Tonnes/Acre ($Yield_{ActCropA}$)

Affected Area in Acres ($Area_{Acr}$)

Total Yield Loss ($Loss_{Yld}$)= ($Yield_{ActCropA}$ - $Yield_{AvgCrop\ A}$) x $Area_{Acr}$

Minimum Sale Price of Crop A in Rs/Tonne ($MSP_{Crop\ A}$)

Agriculture Production Loss of Crop A (APL_{CropA}) in Rs.:

$APL_{CropA} = Loss_{Yld} \times MSP_{Crop\ A}$ Eq (3)

Estimated Percentage Contribution of Stone Crushers in Yield Loss: 10%

Agriculture Production Loss of Crop A by PM_{10} and $PM_{2.5}$ ($APL_{PMCropA}$) in Rs.:

$APL_{PMCropA} = APL_{CropA} \times 10\%$ Eq (4)

Note:
The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the $APL_{PMCropA}$ with the contribution factor for stone Crushers.

With the help of the following three equations derived in the above mechanism developed by CPCB and the calculations explained in the present document, it is possible to assess the damage caused to Air, public Health and agricultural crops in an affected site/ area by the stone crushers operating illegally or without complying with the prescribed norms.

Damage to Air Quality ($Damage_{AQ}$) in Rs.:

$Damage_{AQ} = (Load_{PM10} \times EP_{PM10}) + (Load_{PM10} \times EP_{PM10})$

Damage to Health due to Respiratory diseases ($Damage_H$) in Rs.:

$Damage_H$: *No. of cases Reported (X) x* $COI_{Affected\ area}$

Agriculture Production Loss of Crop A by PM_{10} and $PM_{2.5}$ ($APL_{PMCropA}$) in Rs.:

$APL_{PMCropA} = APL_{CropA} \times 10\%$

If accepted and approved by Hon'ble NGT, the above mechanism developed by CPCB may be used to assess the damage caused by the stone crushers in the matter O.A. No. 739/2018; Residents of Gram Panchayat Varahiya versus State of MP, by the Joint Committee constituted in this matter.

CPCB will keep on updating the mechanism for assessment of the damage caused to the environment, health and agriculture based on the new findings from time to time, to make it relevant and realistic all the time.

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29/8/15

ANNEXURE-II

GOVERNMENT OF ANDHRA PRADESH

ABSTRACT

H.M.W.S. & S.B – Protection of catchment Areas of Himayatsagar and Osmansagar Lakes – Recommendations of the Committee Constituted by the H.M.W.S. & S.B – Amendment to G.O.Ms.No.192, M.A., Dt.31.3.1994 – Orders – Issued.

MUNICIPAL ADMINISTRATION AND URBAN DEVELOPMENT (II) DEPARTMENT

G.O.Ms.No.111, M.A. **Dated the 8th March, 1996.**

Read the following:-

1. G.O.Ms.No.192, M.A, dated 31.3.1994.
2. From the Vice Chairman, HUDA, letter No.3811/P8/94, dated 6.6.94.
3. From the Director, Town and Country Planning, Hyderabad letter Roc.No.11914/94/P1, dated 9.8.94.
4. From Managing Director, H.M.W.S. & S. Board, letter No.1220/CE/T1-S1/92/2030; dated 3.1.95 and 21.4.95.
5. Govt. D.O. Lr.No.31222/11/95-1, M.A, Dt. 25.10.95 and 4.11.1995
6. From the ManagingDirector, H.M.W.S & .Board, Hyderabad, D.O.Lr.No.MDP/ HMWS&SB/ 95-1637, dated 26.12.1995.

ORDER:

1. In the G.O., 1st read above, orders were issued prohibiting various developments within 10 km radius of Himayatsagar and Osmansagar lake areas which are main sources of drinking water supply as per the recommendation of the Expert Committee constituted by Hyderabad Metropolitan Water Supply and Sewerage Board to suggest ways and means to monitor the quality of water in these reservoirs.

2. In the D.O. Letter 6th read above, the Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board has furnished second interim report of the committee prepared after detailed discussions and field visit to Osmansagar pipelines, making certain recommendations for the protection of the lakes.

3. Government after careful examination of the recommendations of the Committee, have decided to issue the following orders in modification of the earlier orders issued in G.O.Ms.No.192, M.A., dated 31.3.1994.

(i) To prohibit polluting industries, major hotels, residential colonies or other establishments that generate pollution, in the catchment of the lakes upto 10 kms from full tank level of the lakes as per list in Annexure –I.

However, residential developments in residential use zone may be permitted. The following measures shall be taken to protect water flowing into the lakes.

(a) 60% of the total area shall be kept as open space and roads in all layouts in the villages of catchment area.

(b) The land use of about 90% of the area is classified as recreational and conservation use in the Master Plan. The Hyderabad Urban Development Authority should take action for the classification of this 90% of the area as agriculture which is inclusive of horticulture and floriculture.

(c) To restrict the F.S.I to 1:0.5 in the catchment area. This measure will ensure that 90% of the area remains under agriculture as is the practice now and ensure protection of the lakes.

(d) To monitor periodically the level of difference pesticides, fertilizer residues carried into the lakes. The Hyderabad Metropolitan Water Supply and Sewerage Board shall conduct such studies through J.N.T.U/ Central University or any other reputed agency at regular intervals and review the results once in 6 months.

(e) To prohibit polluting industries within 10 kms radius (i.e. both on upstream and down stream side of the lakes) to prevent acidification of lakes due to air pollution.

(f) There shall be total prohibition of location of industries in the prohibited zone.

(g) Andhra Pradesh Pollution Control Board shall make further study of the existing industries in the upstream and down stream of the lakes and take action under their Act.

(ii) For the protection of raw water channel from Osmansagar to Asifnagar no layout or building permission should be granted by Municipal Corporation of Hyderabad / Hyderabad Urban Development Authority / Director of Town and Country Planning up to a maximum of 100 ft from the conduit site boundary. While approving the layouts along the conduit, a minimum of 9 mtrs wide road plus green belt to a maximum width of 100ft should be insisted to act as buffer on either side of conduit and the green belt shall be accounted as part of mandatory open space to be left the layout. Drainage pipe lines must be laid parallel to the conduit and no sewerage/sullage water discharged shall be allowed from the layouts towards the conduit.

(iii) Orders issued in G.O.Ms.No.50, M.A., dated 18.1.1989 shall be effectively implemented by concerned Departments i.e., (1) Zilla Parishad Ranga Reddy, Mahabubnagar and Medak districts. (2) Panchayat Raj Department (3) Irrigation Department (4) Social Welfare Department are directed not to takeup any building works / check dams / lift irrigation works / storage reservoirs across vagus flowing in the catchment areas.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

C. ARJUN RAO
Principal Secretary to Government

To
The Managing Director, Hyderabad Metro Water Supply & Sewerage Board, Hyderabad.
The A.P. Pollution Control Board, Hyderabad.
The Vice-Chairman, Hyderabad Urban Development Authority, Hyderabad.
The Director of Town and Country Planning, Hyderabad.
The Panchayat Raj and Rural Development Dept.
The Industries and Commerce Department
The Energy, Science and Technology Department
The Collector, Mahabubnagar / Rangareddy / Medak / Hyderabad district.

Copy to:
Secretary to C. M.
P.S. to M (MA) / C.S.
A/W Section, MA & UD Department.

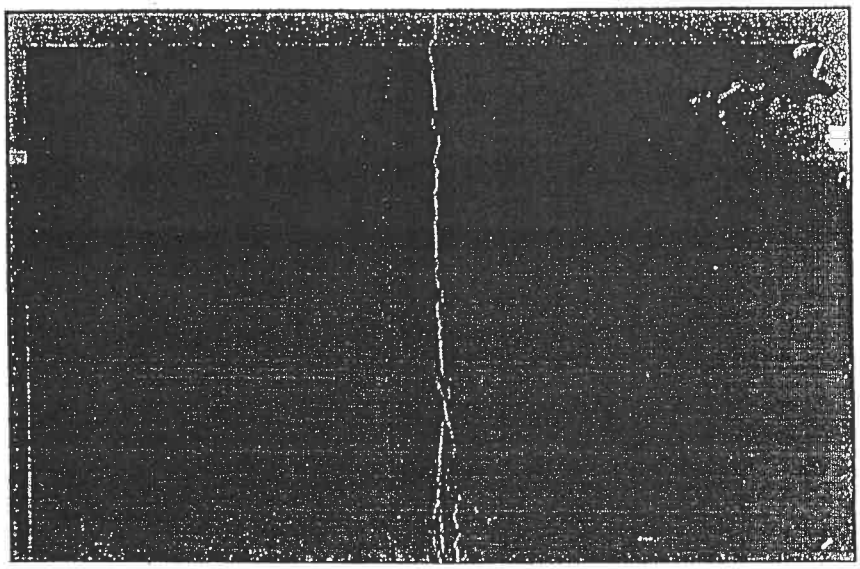
// forwarded by order//

Sd/-
SECTION OFFICER

ANNEXURE-XII

Watershed Delineation of Vattinagulapalli Village Administrative Area.

Report



Submitted to

Municipal Administration & Urban Development Department, Government of Andhra Pradesh

EPTRI

Centre of Excellence
[Spatial Environmental Planning]
Environment Protection Training & Research Institute
Survey No: 91/4, Gachibowli, Hyderabad - 500 032
Tel: +91-40-2300 1241 / 1242 Fax: 2300 0361
E.mail: info@eptri.com URL: www.eptri.com

1.1 Study Background

Lakes serve variety of purposes. However, because of their socio-economic significance they have been quite often over exploited leading to qualitative and quantitative deterioration. Growing human interference in the catchment further aggravates the situation increasing the number of problems of the lake. This has posed a serious threat to their survival and lakes have been reported to have undergone quantitative and qualitative deterioration and even untimely extinction.

Since the introduction of protected water supply schemes, protection of the catchment area of the lakes, which serve as drinking water sources, has become a well-established practice world over. This practice has been evolved based on the fact that most of the pollutants, which are generated due to developmental activities in the catchment area, are not removed during the conventional treatment for drinking water supply. Even after evolving advanced water treatment processes now, this practice is being continued mainly on three grounds.

1. Analytical techniques to find out the presence of some of the pollutants involves use of very sophisticated equipment, highly qualified and experienced technical manpower and huge expenditure and time
2. Treatment of water for removal of these pollutants is so costly that it is beyond the reach of most of the local bodies.
3. Treatment cost raises the cost of water supplied to the citizens

From the available records that came across till 1989 no regulatory order was issued preventing developmental activities with pollution potential in Himayath Sagar and Osman Sagar catchment areas, such as industries, agriculture, farmhouses, recreation centres are taking place, since designating Hyderabad as the state capital of Andhra Pradesh. From 1989

Watershed [illegible] nistrative Area

till 1996, three G.Os were issued restricting some of the activities totally, and some partially in these two catchment areas.

Based on the representations received by the Government to relax the restrictions imposed in G.O. Ms. No. 111 of M.A 1996 with regard to areas which is not Catchment area Watershed of Osman Sagar Lake, the Government desired EPTRI to examine "the extent of administrative area of Vattinagulapalli village, Ranga Reddy district which falls outside the watershed after delineating the watershed boundary".

1.2 Terms of Reference

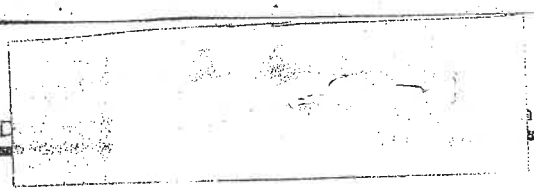
The Municipal Administration & Urban Development Department, Government of Andhra Pradesh has asked EPTRI to conduct study with the following terms of reference:

(a) To delineate the watershed of the catchment area of Osman Sagar Lake covering Vattinagulapalli Village administrative area and assess the area outside the Catchment area.

1.3 Methodology

It is essential to delineate the directly draining catchment area of the proposed project to identify the study area. To carry out this exercise, the following steps are to be adopted and the flow sheet of the methodology is presented in figure 1.

i. Necessary hard copy maps are to be obtained from various agencies like Survey of India, State Revenue Department and Hyderabad Urban Development Authority (HUDA).



ii. The hard copy maps are to be scanned at high resolution and brought into raster format. The raster data has to be geo-referenced using the Ground Control Points.

iii. Necessary thematic features namely the drainage pattern and elevation information in the study area is to be digitised and brought onto the GIS platform. Similarly, the administrative boundary of the village land parcel information is to be brought into GIS platform.

iv. Using the Digital Elevation Model, topographic features of the area are derived from the above digital data and brought into 3D view.

v. Using the 3D view and drainage pattern, the watershed boundary is delineated. The village boundary is overlaid to assess the areas which are falling within the watershed and out side the watershed.

2.1. Osman Sagar Catchment Area

The Osman Sagar Lake was constructed on the River Musi between 1912 and 1920. The catchment area is extended from West to East and falls in Rangareddy district. The catchment area of Osman Sagar Lake is 736 sq.km. The drainage pattern and watersheds in the Osman Sagar Catchment area are presented in figure 2 and 3 and settlements are presented in figure 4.

2.2. Study Area

Keeping in view the objective of the present study, the study area is identified covering the over and above Osman Sagar catchment area which forms part of the drainage area of Nakka Vagu Catchment i.e. part of Manjera catchment area and down stream of Osman Sagar Lake i.e. part of Musi catchment area. The total extent of study area is 300 sq.km. The extent of the study with reference to the Osman Sagar Lake catchment area is presented in figure 5.

As detailed in the methodology, the digital data is prepared covering the identified study area.

2.3. Drainage Pattern in the Study Area

The drainage pattern in the study area is presented in figure 6. The stream orders are also delineated considering the flow contributions from one order to another order of stream.

2.4. Vattinagulapalli Village Administrative Area

Vattinagulapalli village is located Rajandranagar mandal, Ranga Reddy district. The hard copy map of Vattinagulapalli village administrative map as provided by HUDA is considered as basis of this digital data generation. As detailed in methodology, the geo-rectified village administrative area with land parcel information is presented in figure 7.

2.5. Topographic Profile of the Study Area

Using the digital data pertaining to the drainage & direction of flow, elevation information, and DEM model was used. ARC TIN software is used for this purpose. The topographic profile of the study area is presented in figure 8.

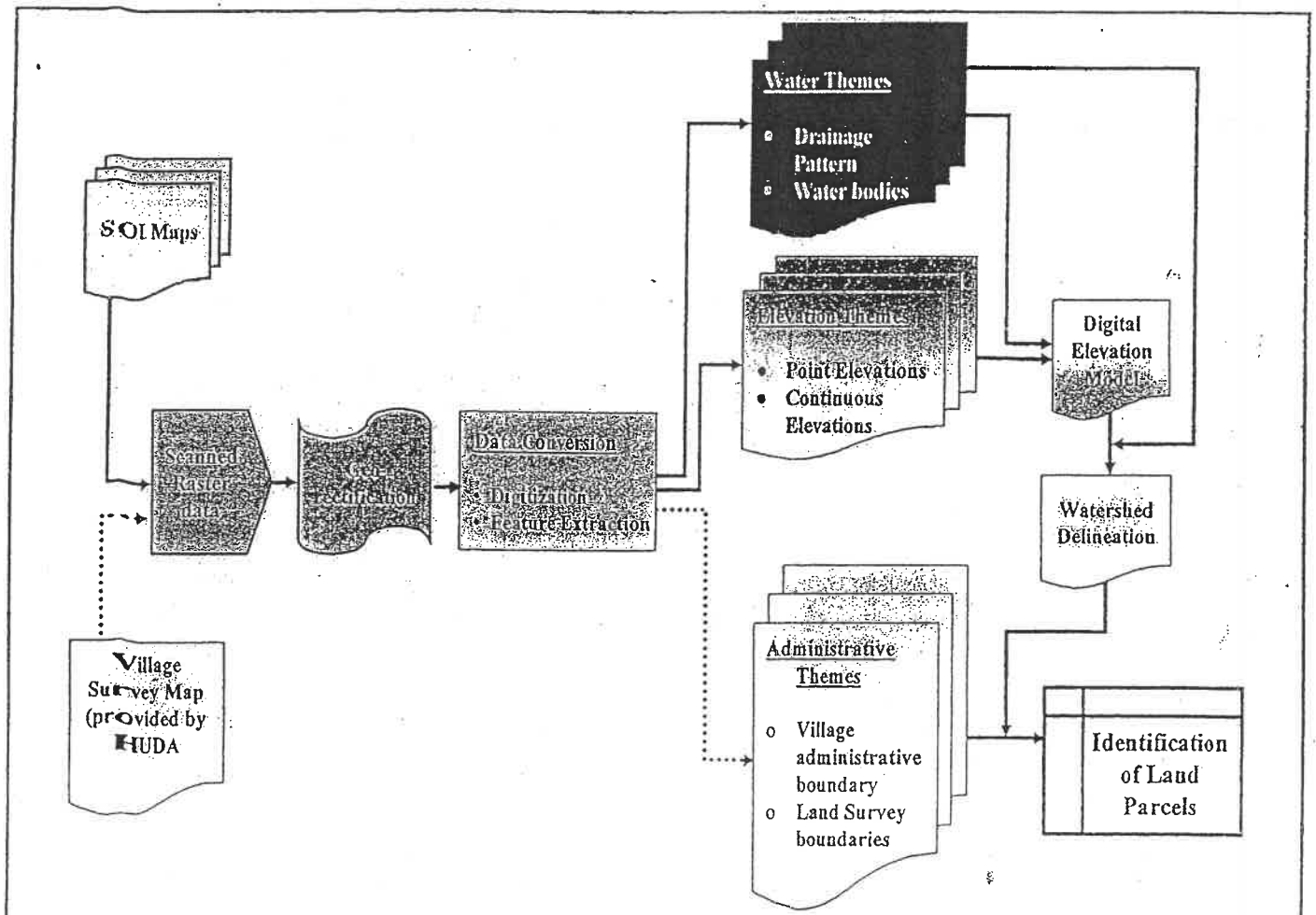


Figure 1 showing Flow sheet of Methodology

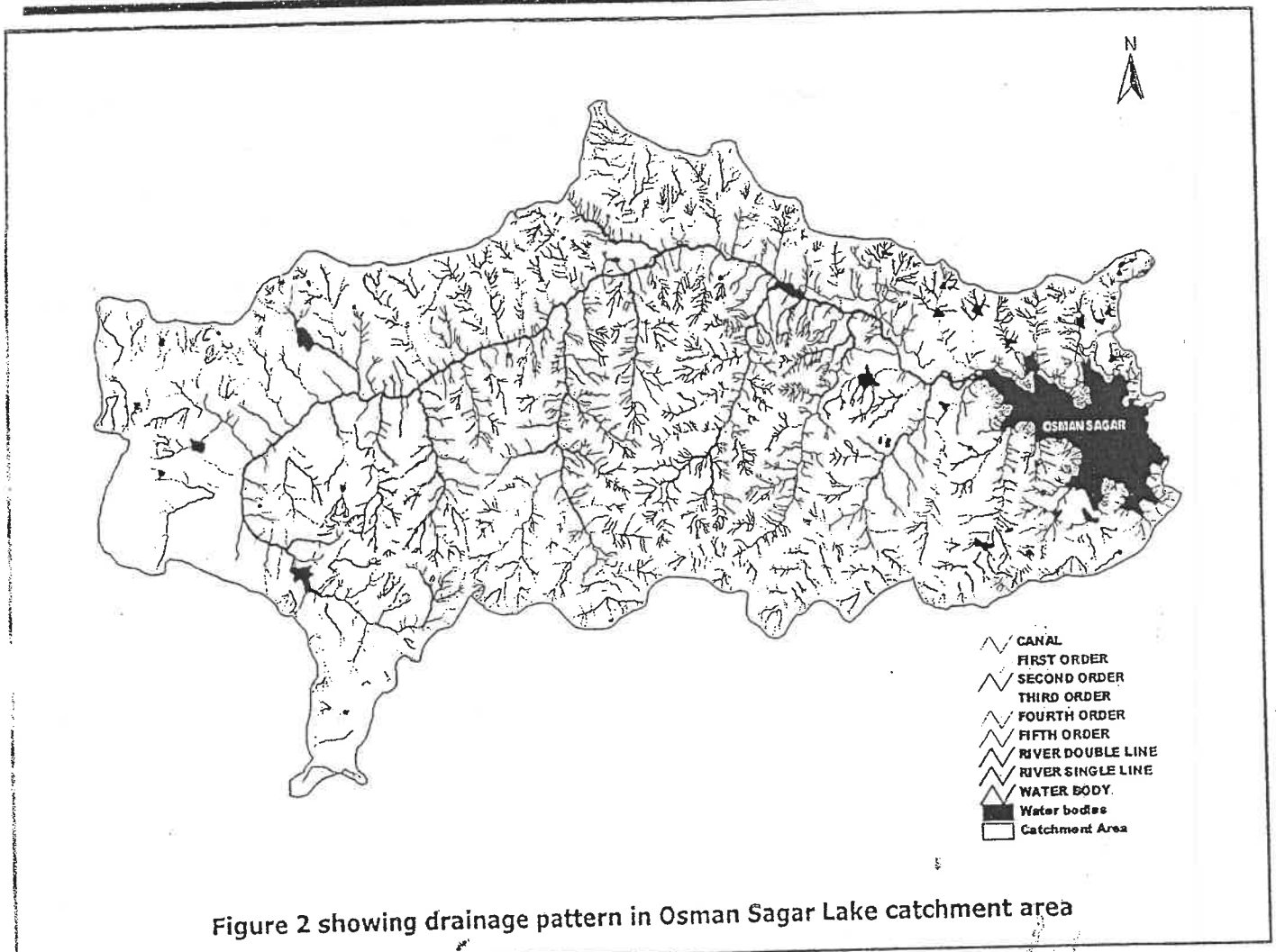


Figure 2 showing drainage pattern in Osman Sagar Lake catchment area

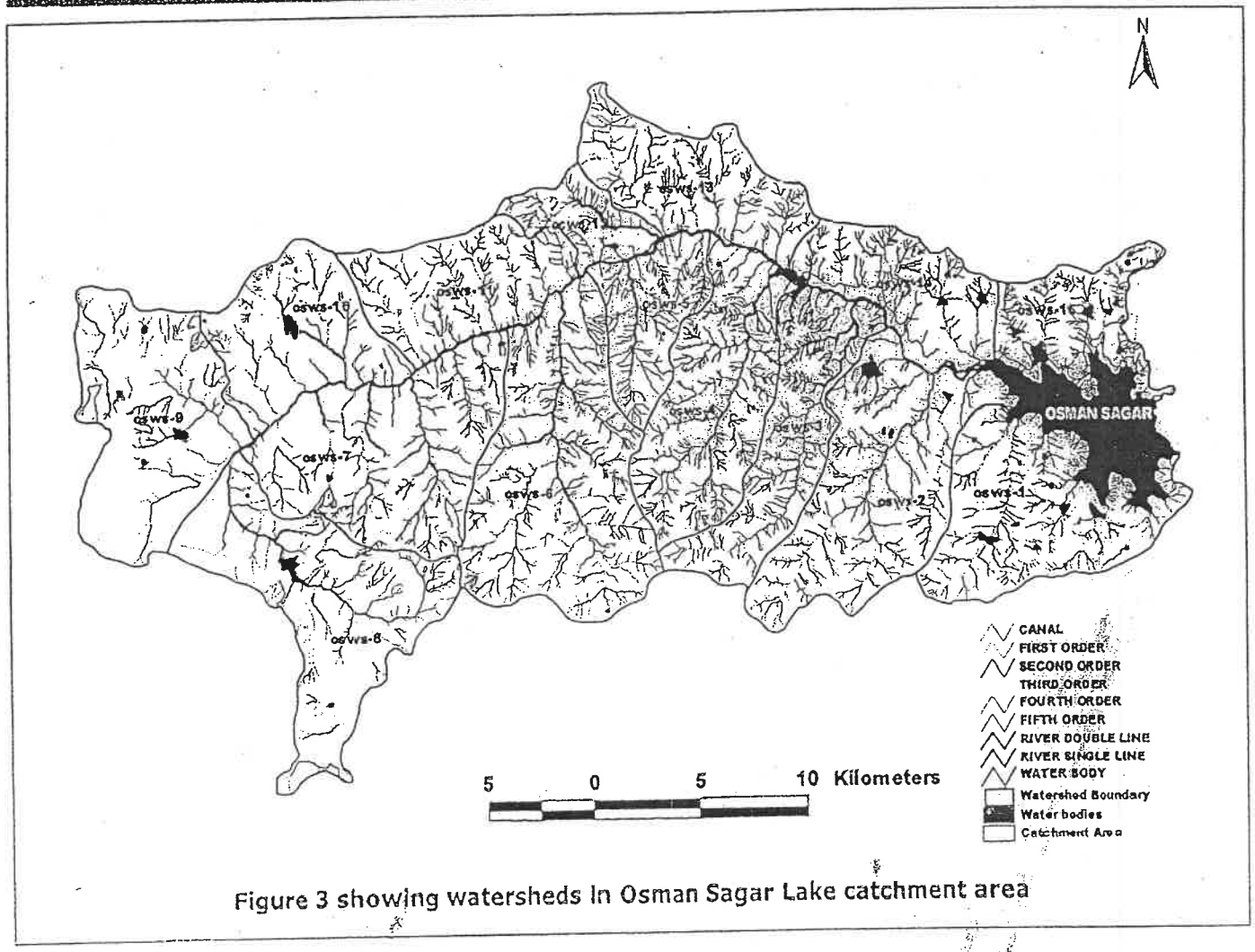


Figure 3 showing watersheds In Osman Sagar Lake catchment area

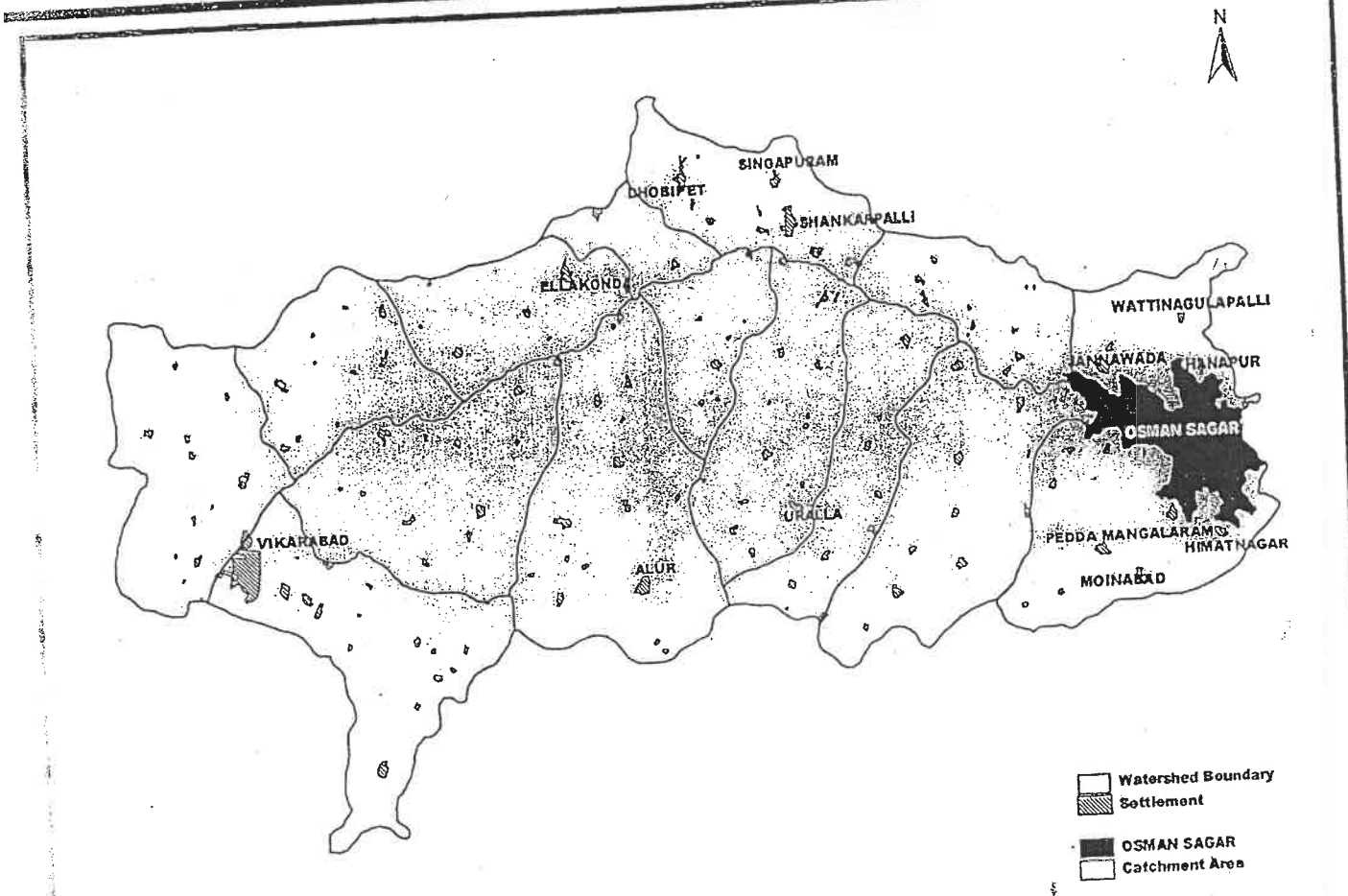


Figure 4 showing settlements in the Osman Sagar catchment area

EPTRI

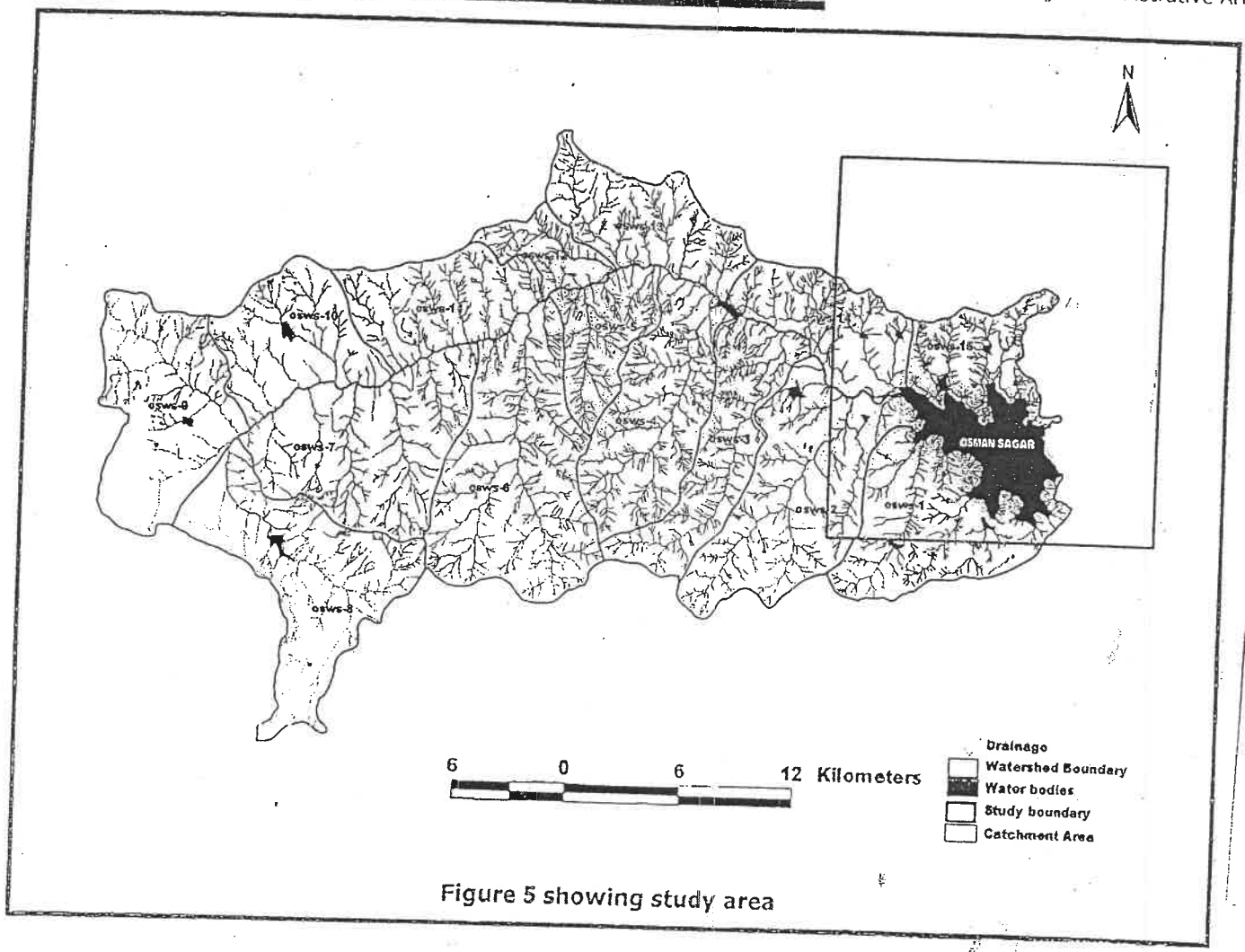


Figure 5 showing study area

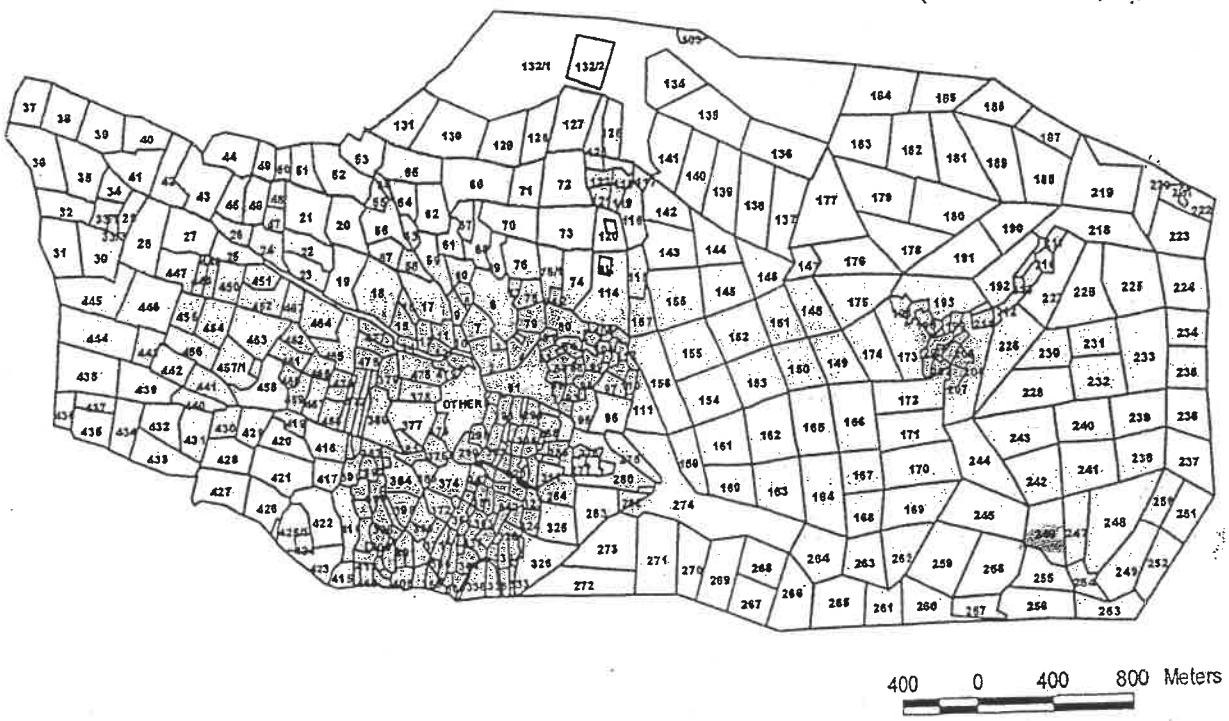
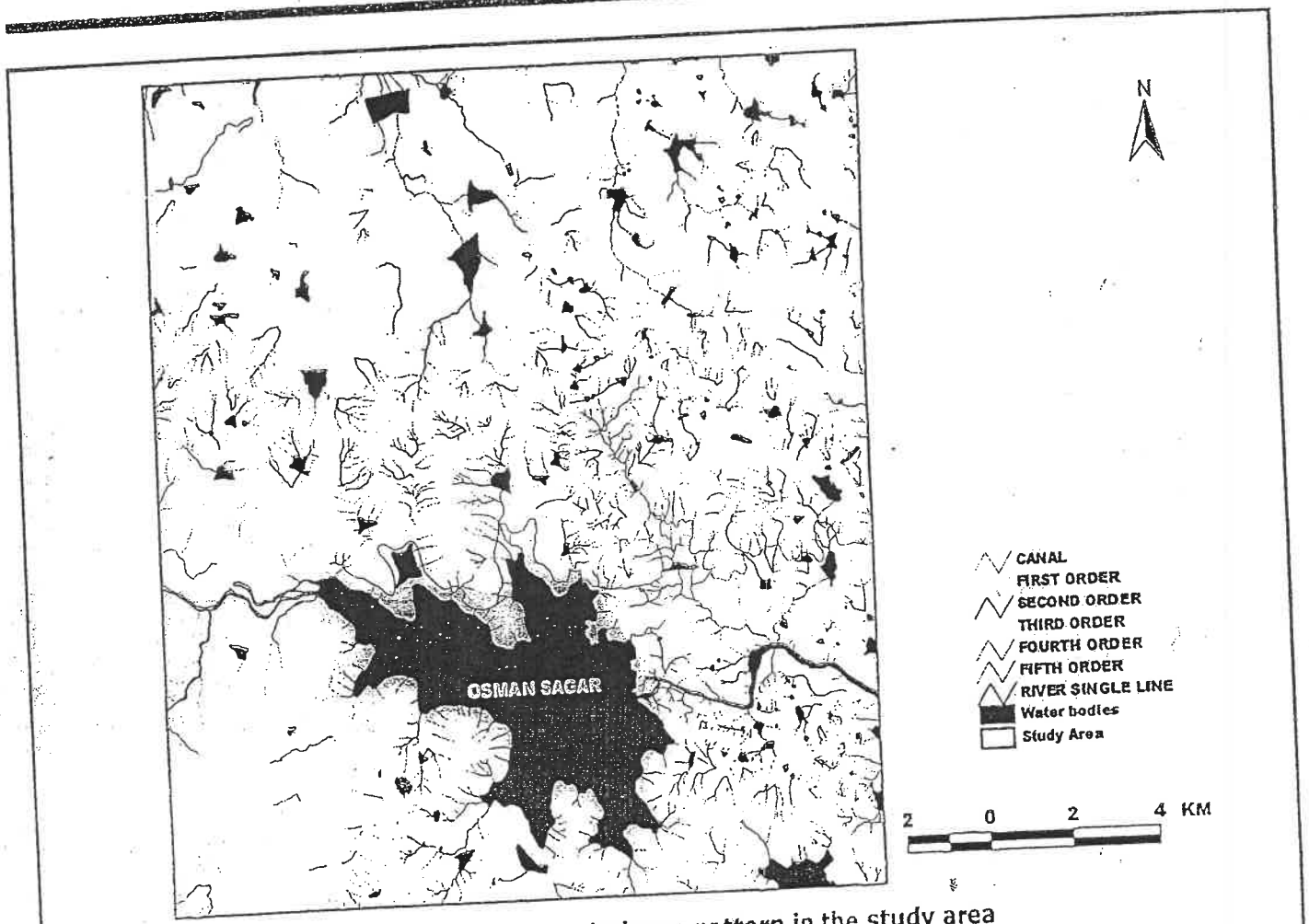


Figure 6 showing Vattinagulapalli administrative area and land parcels



Figures 7 showing drainage pattern in the study area

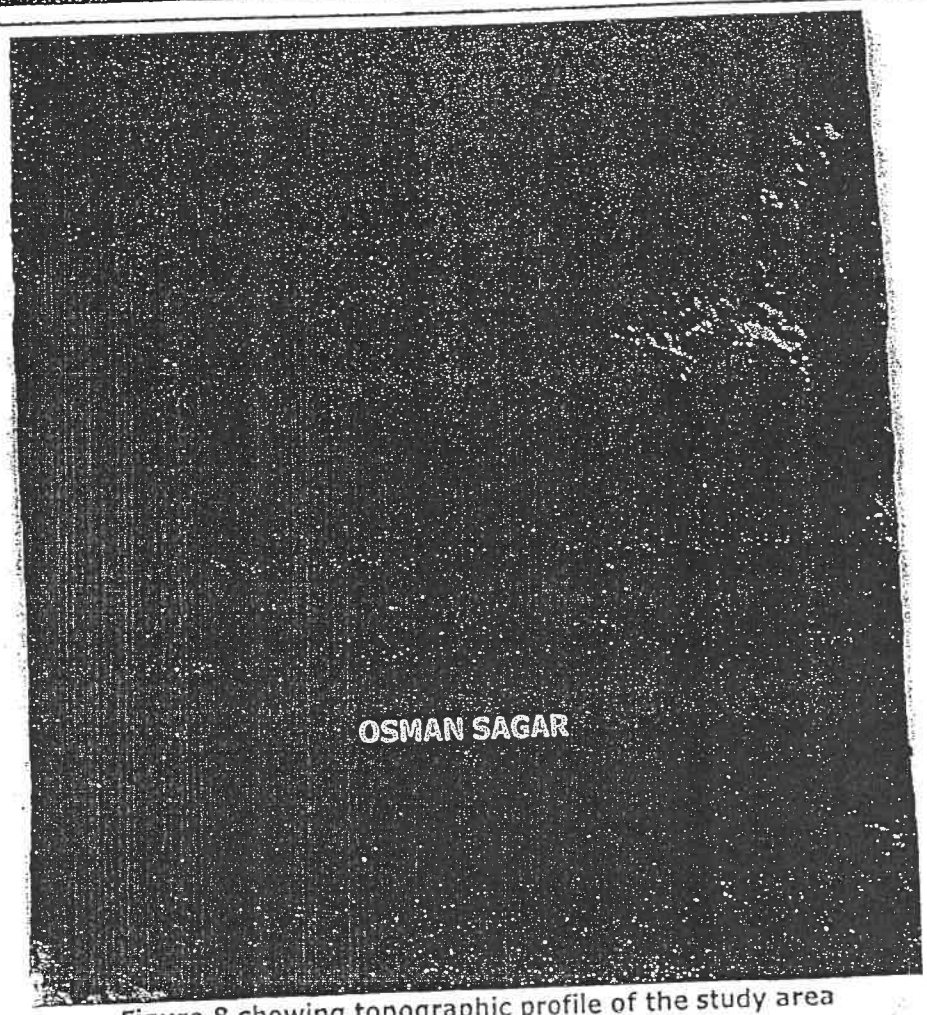


Figure 8 showing topographic profile of the study area

2.6. Project Findings

The drainage pattern in the study area, Vattinagulapalli village administrative area with land parcel information and topographic profile of the study are now in GIS layer form. Keeping the direction of the flow, topography, the watershed boundary is now delineated. The delineated watershed boundary is presented in figure 9.

The land parcel boundaries are now overlayed on the topographic features and as well on delineated watershed boundary. A small hill range is subdividing the drainage area in the study area wherein the southern flows are joining Osman Sagar Lake and Northern flows are draining into Nakka vagu catchment and drainage after the hill range is draining down in to Musi River i.e. down Stream of Osman Sagar Lake. The delineated watershed boundary with land parcel information is presented in figure 10.

The satellite data as captured by Quick Bird Satellite and presented by Google Earth agency on web covering Vattinagulapalli village area is presented in figure 11. As seen from the image, mining activity is taking place this small hill range. This has greater impact on the drainage pattern in the study area. Any damage to this ridge will facilitate the movement of surface flows into the Osman Sagar Lake which results into environmental impact on the water quality of the lake. This ridge area has to be protected.

From the above overlay analysis, it is found that the following land parcels listed in table 1 (other than the ridge area) in Vattinagulapalli village falls in the drainage area that drains into Musi river i.e. down stream of Osman Sagar Lake and same is presented in figure 12.

Watershed

Inistrative Area

Table 1

PARCEL NO	PARCEL NO	PARCEL NO
173	205	233
178	206	234
179	207	235
180	208	236
181	209	237
182	209	238
183	210	239
184	211	240
185	212	241
186	213	242
187	213	243
188	214	244
189	216	245
190	217	246
191	218	247
192	219	248
193	220	249
194	221	250
195	222	251
196	223	252
197	224	253
198	225	254
198	226	255
199	227	256
200	228	257
201	229	258
202	230	259
203	231	260
204	232	512

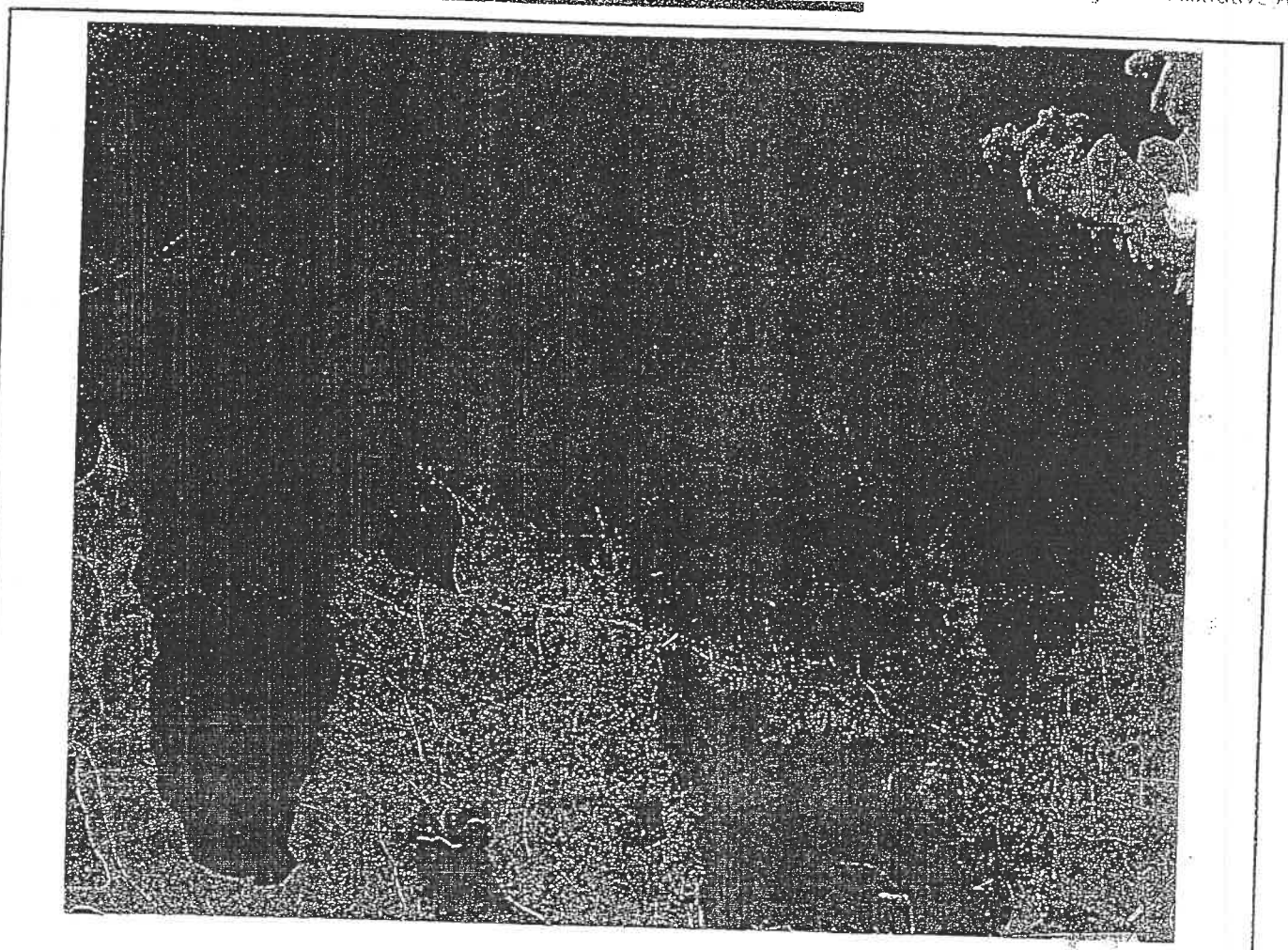


Figure 9 showing the watershed delineation

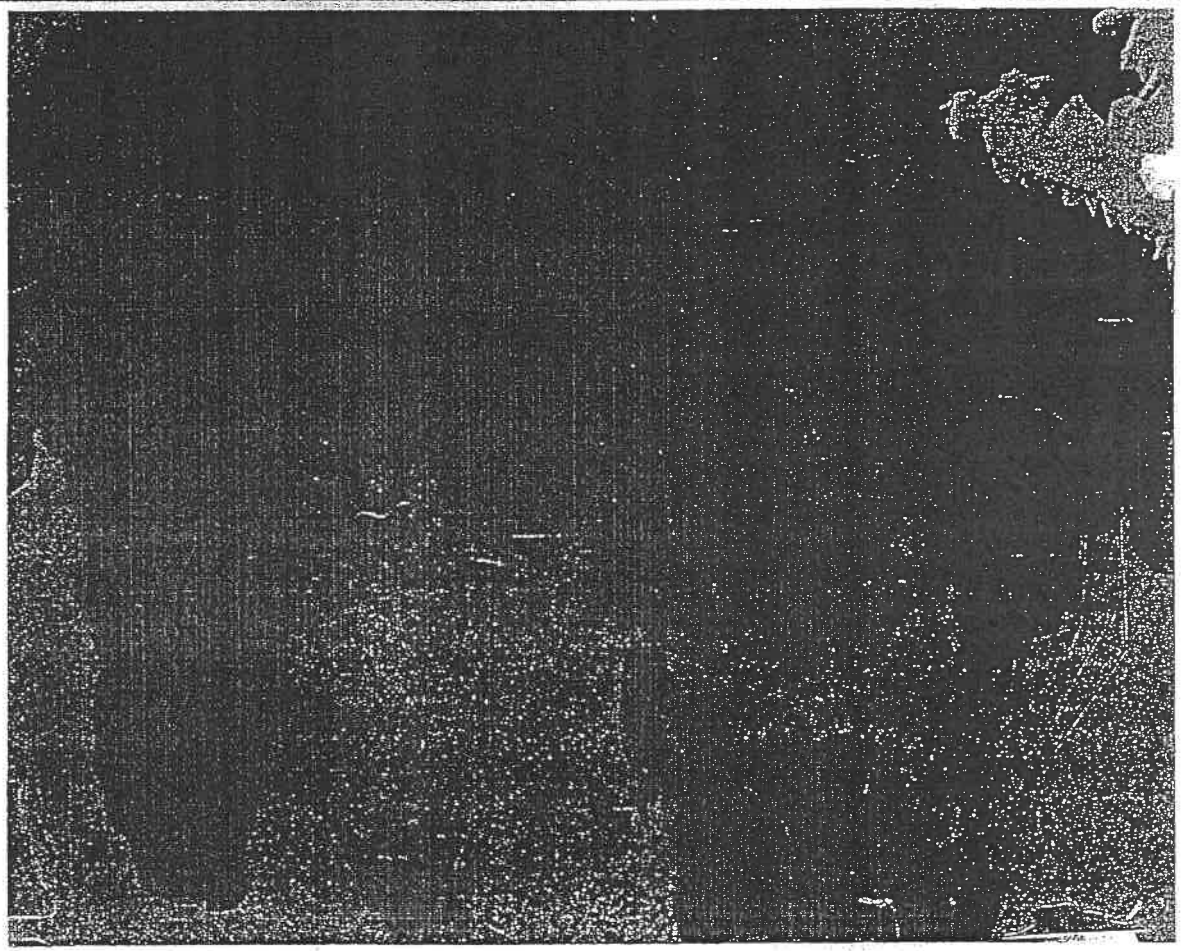


Figure 10 showing the watershed delineation

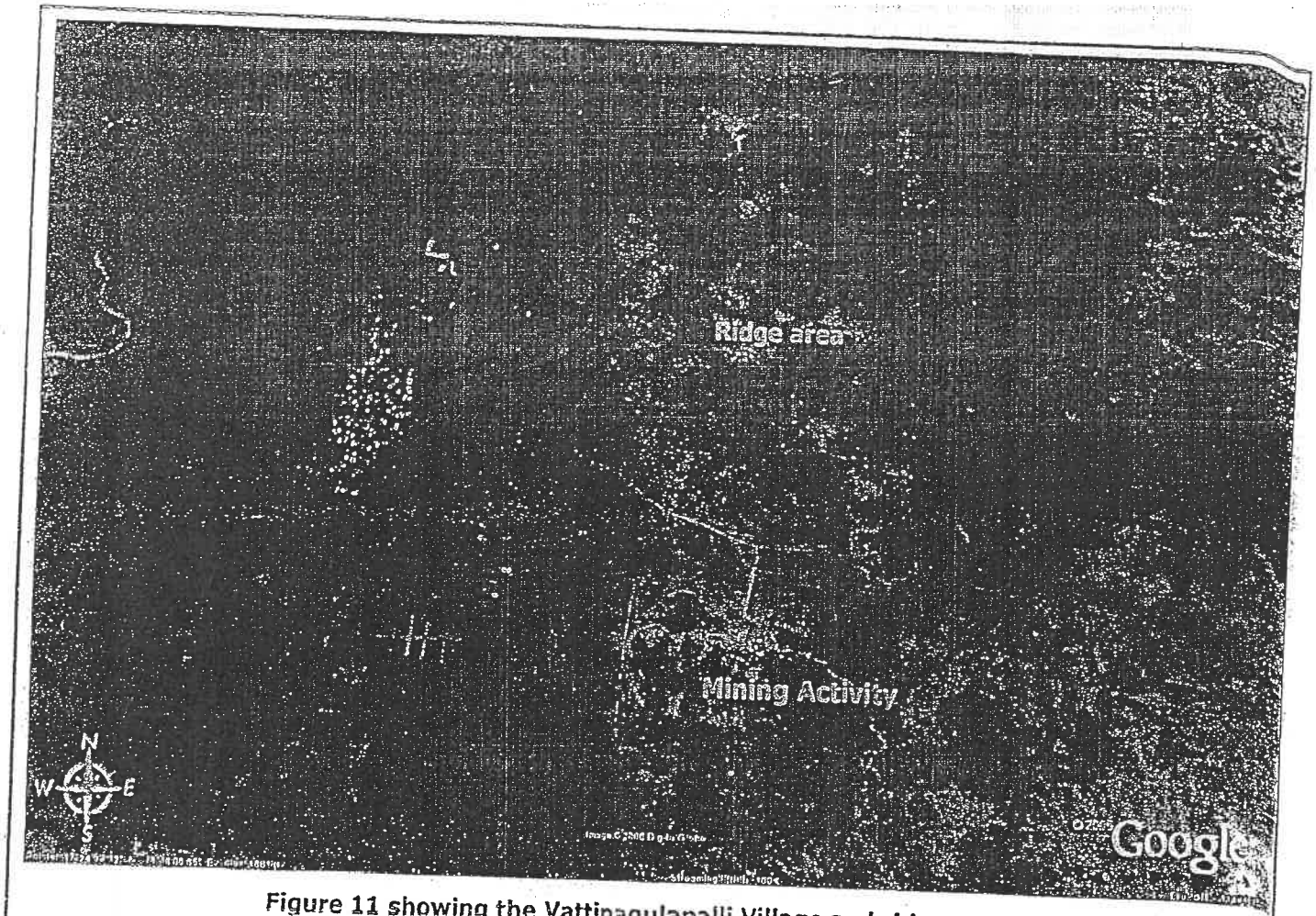


Figure 11 showing the Vattinagulapalli Village and ridge area

EPTRI

52

Figure 12 showing the land parcels outside ridge area

ANNEXURE-XIII

UNDER CERTIFICATE POST

GOVERNMNET OF ANDHRA PRADESH
OFFICE OF THE COMMISSIONER OF INDUSTRIES

From	To
The Commissioner of Industries, Government of Andhra Pradesh, Chirag Ali Lane, HYDERABAD	The Authorises Signatory, M/s. Bhagyanagar India Limited, Plot No. P-9/13/1 & P-9/14, Road No. 6, IDA, Nacharam, Hyderabad 500 076

Lr. No. 37/2/2012/6432/6432/ID, Dated 04/07/2012.

Sir,

Sub:- RTI Act, 2005 – Application of Authorises Signatory, M/s. Bhagyanagar India Limited, Plot No. P-9/13/1 & P-9/14, Road No. 6, IDA, Nacharam, Hyderabad 500 076 - Furnishing information pertaining to report prepared by NINE plus consortium (EPTRI, IICT, NGRI and NRSA) under RTI Act, 2005 – Regarding.

Ref:- Your Lr. No. BIL/Admn/2012, dated 19/04/2012 & 07/06/2012.

* * *

With reference to your letter cited, it is to inform that a copy of the report prepared by NINE plus consortium (EPTRI, IICT, NGRI and NRSA) on the possibilities of establishing non polluting industries within 10 KMs radius downstream of Himayatsagar and Osmansagar Lakes is enclosed herewith as sought by you under RTI Act, 2005.

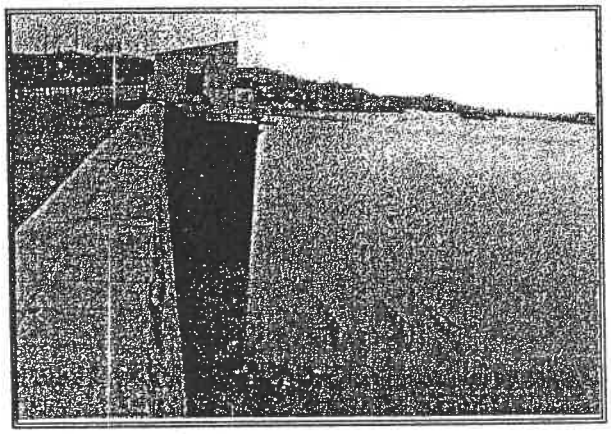
Yours faithfully,
SD/- R. MADHUSUDHAN RAO
PUBLIC INFORMATION OFFICER,
O/o. THE COMMISSIONER OF INDUSTRIES

Encl. : as above

// ATTESTED //

JOINT DIRECTOR (HRD)

POSSIBILITIES OF ESTABLISHING NON- POLLUTING INDUSTRIES WITHIN 10 KM RADIUS DOWN STREAM OF HIMAYATH SAGAR AND OSMAN SAGAR LAKES



PROJECT REPORT SUBMITTED TO

COMMISSIONER OF INDUSTRIES,
GOVERNMENT OF ANDHRA PRADESH

PREPARED BY

ENVIRONMENT PROTECTION TRAINING AND RESEARCH INSTITUTE, &

NATIONAL GEOPHYSICAL RESEARCH INSTITUTE,

HYDERABAD, ANDHRA PRADESH

APRIL, 2005

Designed by: Mohd. Khader, EPTRI

FOREWORD

The intense competition for water between various sectors that results from population growth, area expansion and life style changes may effect various decisions associated with water body conservation, water allocation and long term investment. Concerns for environmental pollution an account of various developmental activities have been debated at various forums.

Based on the representation received by the Government to relax the restrictions imposed in G.O. Ms. No. 111 of M.A 1996 with regard to allowing non polluting industries , the Government desired EPTRI to examine **"Possibilities of Establishing Non Polluting Industries with in 10 KM Radius of Himayath Sagar and Osman Sagar"** without damaging the lakes and their ecology.

The study has been under taken keeping focus on environment on one side and developmental activities on the other side. The study extensively covered wide range of issues- effect of existing industries, movement / flow direction of surface water and ground water etc. and also scope of setting up non polluting industries in the area.

I am confident that the well documented report would help the policy makers in addressing the twin facets of the issue promoting developmental activity with out detriment to the ecology of the two magnificent lakes.

Director General

Acknowledgements

We express our sincere thanks to the Commissioner of Industries, Government of Andhra Pradesh for entrusting this study to EPTRI.

We sincerely thank Andhra Pradesh Pollution Control Board and Hyderabad Metro Water supply and Sewerage Board for Board Providing secondary data.

Our thanks to Capt .J.Rama Rao and his associates for providing information on the water bodies.

We thank all those who directly and indirectly extended their support either by discussion or by providing information for the successful completion of the project

STUDY TEAM

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Mr.. N.S Vatcha	Air Component Specialist
Dr. V.Srinivas	Air Component Specialist
Mr. .G.Suryanarayana	GIS Specialist
Mr. Mohammed Ismail	GIS Specialist
Mr. .B.A.Patrudu	Remote Sensing Specialist
Dr. B.N.Murthy	Lab in charge
Mr. Mrinal Gaur	Team Member
Mr. A.S.Rao	Team Member
Ms. K.Samatha	Team Member
Mr. Mohammed Khader	Team Member
Mr. Hameed ali	Team Member

NGRI Members

Dr. V.V.S.Gurunadha	Ground Water Specialist
Mr. B.A.Prakash	Participating Scientist
Mr. K.Mahesh Kumar	Participating Scientist
Mr. M.Ramesh	Participating Scientist
Mr. N.Pavan kumar	Team Member
Mr. K.Krishna Kumar	Team Member
Mr. G.Siva Prasad	Team Member

CONTENTS

		PAGE
Executive Summary		1
1.	Introduction	9
2.	Terms of Reference	12
3.	Analysis of problem	13
4.	Basic Scientific issues	14
5.	Methodology	
5.1	Preparation of Thematic Maps in the study Region	16
5.2	Inventorization of existing Industries	16
5.3	Identifying the list of Non polluting Industries	16
5.4	Assessment of Surface Water Quality	16
5.5	Ground Water Quality	17
5.6	Air Quality	17
6.	Study Area	18
6.1	Drainage pattern in the study area	19
6.2	Land use/ Land cover in the Study area	20
6.3	Hydro geomorphology in the Study area	21
6.4	Industrial Activities in the Study area	22
6.4.1	Kattedan Industrial Estate	22
6.4.2	Gaganpahad Industrial Estate	23
6.5	Surface water Bodies	35
6.5.1	Osman Sagar	35
6.5.2	Himayat sagar	39
6.5.3	Noor Mohammed Kunta	43
6.5.4	Sivarampally Cheruvu	46
6.5.5	Meer Alam Tank	50

6.5.6 Bio-monitoring of water bodies-Biomap of water bodies 56

6.6 Ground Water 65

6.6.1 Ground water conditions 66

6.6.2 Ground Water withdrawal 68

6.6.3 Aquifer system 68

6.6.4 Interpretation of VES data 71

6.6.5 Aquifer Parameters 84

6.6.6 Ground Water quality 84

6.6.7 Resistivity Tomography 89

6.7 Air Environment 113

7. Conclusion and Recommendation 120

7.1 Environmental and Study area

7.2 Action plan

List of Figures

1. Existing water supply scheme 11
2. Water Partitioning of soil and Ground Surface 15
3. Villages in the Study Area 26
4 Settlements in the Study Area 27
5. Topography of Study Area 28
6. Delineation of Watershed 29
7. Drainage Pattern 30
8 Land Use Land Cover 31
9. Hydro geo-morphology 32

10.	I D A Location	33
11.	Location of Sampling points Of Osman sagar and Himayath sagar	34
12.	Percentage of Land use and Land cover of Sivarampally Cheruvu	48
13.	Percentage of Land use and Land cover of Meer Alam Tank	53
14.	Sampling Location of Meer Alam Tank	
15.	Bio Map of Osman Sagar & Himayath Sagar	61
16.	Bio Map of Noor Mohammed Kunta	62
17.	Bio Map of Sivarampally Cheruvu	64
18.	Bio Map Of Meer Alam Tank	63
19.	Village Well inventory –Observatory Wells	75
20.	Depth of Ground Water Level-November 2005	76
21.	Ground Water Level Contour map	77
22.	VES Location and Profiles A,B,C,D and E,F	78
23.	Inferred hydrologic section along AB,CD,EF, from VES	82
23.a	Inferred hydrologic section along AB from VES	79
23.b	Inferred hydrologic section CD from VES	80
23.c	Inferred hydrologic section EF from VES	81
24.	Spatial variation of TDS concentration	90
25.	Spatial variation of Chloride concentration	91
26	Spatial variation of Sulphates concentration	92
27.	Spatial variation of Nitrate concentration	93
28.	Spatial variation of Fluorides concentration	94
29.	Spatial variation of Sodium concentration	95
30.	Ground water quality,Piper and Wilcox diagram	96
31.	Observation wells in Durgam Cheruvu	97
32.a	Concentration in Ground water-Durgam Cheruvu	98
32.b	Concentration in Ground water-Durgam Cheruvu –Chlorides	99
32.c	Concentration in Ground water-Durgam Cheruvu –Nitrates	100
32.d	Concentration in Ground water-Durgam Cheruvu –Sulfates	101
33.	Location of VES Durgam Cheruvu	102

34.	Geo electric cross section of Durgam Cheruvu AA&BB	103
35.	Geo electric cross section of Durgam Cheruvu CC&D	104
36.	Observation wells in Meer Alam Tank	105
37.a	Concentration in Ground water-Meer Alam Tank-TDS	106
37.b	Concentration in Ground water-Meer Alam Tank-Chlorides	107
37.c	Concentration in Ground water-Meer Alam Tank-Sulfates	108
37.d	Concentration in Ground water-Meer Alam Tank-Nitrates	109
37.e	Concentration in Ground water-Meer Alam Tank-Fluorides	110
38.	Geo electric cross section of Meer Alam Tank AA&BB	111
39.	Geo electric cross section of Meer Alam Tank CC&DD	112
40.	Resitivity tomography of Weathered fracture zone(<100 ohm.m) at manikonda.	112.a
41.	Resitivity tomography of Weathered fracture zone(<100 ohm.m) at Popalguda	112.b
42.	Resitivity tomography of Weathered fracture zone(<100 ohm.m) at Narsingi	112.c
43.	Resitivity tomography of Weathered fracture zone(<100 ohm.m) at Mancherevula	112.d
44.	Resitivity tomography of Weathered fracture zone(<100 ohm.m) at Gaganpahad	112.e

List of tables PAGE

I.	Water supply from Different Sources	10
II.	Type Wise and Category Wise Units of Katedan Industrial Estate	23
III.	Type Wise and Category Wise Units of Gaganpahad Estate	25
IV.	Physico-Chemical Analysis of Osman Sagar	38
V.	Bacteriological Analysis of Osman Sagar	39
VI.	Physico-Chemical Analysis of Himayath Sagar	41
VII.	Bacteriological Analysis of Himayath Sagar	43
VIII.	Physico-Chemical Analysis of Noor Mohammed Kunta	44
IX.	Physico-Chemical Analysis of Noor Mohammed Kunta(data 1997)	45
X.	Hydrological Features of Sivarampally Cheruvu	47
XI.	Land use/ Land cover in Sivarampally Cheruvu	47
XII.	Physico-Chemical Analysis of Sivarampally Cheruvu	49
XIII.	Hydrological Features of Meer Alam Tank	52
XIV.	Land use/ Land cover in Meer Alam Tank catchment area	52
XV.	Physico-Chemical Analysis of Meer Alam Tank	54
XVI.	Benthic Macro Invertebrate Taxa	56
XVII.	Criteria for Biological Water Quality Evaluation	57
XVIII.	Taxanomic Group-Saprobic and Diversity Score of Osman sagar	58
XIX.	Taxanomic Group-Saprobic and Diversity Score of Himayath sagar	58
XX.	Taxanomic Group-Saprobic and Diversity Score of Noor Mohammed Kunta	59
XXI.	Taxanomic Group-Saprobic and Diversity Score of Sivarampally Cheruvu	59
XXII.	Taxanomic Group-Saprobic and Diversity Score of Meer Alam Tank	60
XXIII.	Well Inventory of the Samples Collected During November 2005	69
XXIV.	Interpreted Layer Parameters From Geoelectric Resistivity	73
XXV.	Anaiytical Results of Ground Water Samples	88

XXVI.	Total Suspended Particulate Matter (TSPM)	117
XXVII.	Respirable Suspended Particulate(RSPM)	117
XXVIII.	Sulphur dioxide (SO2)	118
XXVIII.	Oxides of Nitrogen(NOx)	118
XXIX.	Daily Average values of TSPM	119
XXX.	Daily Average values of RSPM.	119
XXXI.	Daily Average values of Sulphur dioxide(SO2)	120
XXXII.	Daily Average values of Nitrogen dioxide(NOx)	120

List of Annex

I.	Industrial Acitivities at Kattedan IDA	133
II.	Industrial Activities at Gaganpahad IDA	157
III.	List of Industries under Green Category (Non polluting)	187
IV.	Technical Note on Chemical Characteristics of Rain Water at an Urban Site of South-Central India	190

EXECUTIVE SUMMARY

Keeping the focus on protection of environment with respect to developmental activities and based on the representation received by the Government to relax the restrictions imposed in G.O. Ms. No. 111 of M.A 1996 with regard to allowing non polluting industries, the Industries Department requested EPTRI to examine **"Possibilities of Establishing Non Polluting Industries with in 10 KM Radius of Himayath Sagar and Osman Sagar"** without damaging the lakes and their ecology.

A summary of the regulations imposed by Government of Andhra Pradesh through Government Orders from time to time is as follows.

I. G.O. Ms. No 50 M.A. dated 28.01.1989 – deals mainly with protection of hydrological regime of the catchment areas. For this purpose, the G.O.

- prohibits the interception of any inflows of water into the rivers in the catchment areas of the two lakes, including the removal of unauthorized check dams.
- prohibits tapping of ground water in these catchment areas.
- prevents unauthorized occupation of land.

II. G.O. Ms. No 192 M.A. dated 31.03.1994 – deals with sources of pollution

- prohibits within 10 km. from full tank level contour in the catchment areas of the two lakes, activities such as industries, major hotels, residential colonies, or other establishments and permits beyond 10 km. and within the catchment areas with approval (NOC) from HMWSSB, APPCB, Directorate T&CP, HUDA and Industries Department.

III. G.O. Ms. No 111 M.A. dated 08.03.1996 – deals with both hydrological Regime and prevention of pollution All the restrictions imposed in G.Os under item I) and II) have been reiterated.

A critical study of the recommendations based on which the above Government Orders have been issued clearly indicates that demarcating line of 10 km. radius all

round the lakes from FTL in the catchment areas is not based on any well planned scientific study. It would appear that it is based on expert opinion and general perceptions. In view of this, there is need for scientific evaluation for developmental activities in the area and to develop various scenarios/ options.

The study area is identified as 10 Km down stream of Osman Sagar and Himayath Sagar lakes. The Osman Sagar was constructed on the River Musi between 1912 and 1920, formed on a sixth order stream. Later on Himayath Sagar was constructed between 1920 and 1927 on the stream Musa a tributary of Musi, formed on fifth order stream. They are located in Ranga Reddy District on western side of Hyderabad. The present supply for drinking water purposes is 27 MGD from Osman sagar and 18 MGD from Himayath sagar. These two lakes are situated at a distance of about 10 km. from each other. Osman Sagar lake has a total catchment area of 736 sq.km. and Himayath Sagar lake 1340 sq.km. Osman sagar is 2287 hectars in area and Himayat sagar 1836 hectars. The storage capacity is 110.436 MCM and 84.016 MCM of Osman sagar and Himayath sagar respectively. The FTL of Osman sagar and Himayath sagar are 1790ft. and 1763.5 ft respectively.

The study area falls in Rangareddy, Medak, Mahaboobnagar and Hyderabad Districts covering the mandals of Chevella, Maheswaram, Rajendernagar, Saroornagar, Serilingampalli, Shabad, Kothur, Patencheru and Ramchandrapuram.

Two major industrial estates namely Katedan and Gaganpahad Industrial Estates exist in the study area hosting around 183 units as per APPCB records. There are around 104 industrial units in Katedan IDA which include textile mills, edible oil refineries, lead extraction units, plastic, rubber and biscuits factories. Category wise there are 63 red, 3 orange and 24 green industries. There are about 79 industrial units in Gaganpahad IDA of which 60 are red and 11are green category industries.

Surface Water

The major water bodies such as Musi and Musa river, Noor Mohammed Kunta, Agriculture University Cheruvu, Shivrampally Cheruvu and Meer Alam Tank fall under the 10Km radius down stream of Osman Sagar and Himayath Sagar. Field

investigations were undertaken to collect information influencing the quality of surface and ground water and ambient air quality. EPTRI and NGRI teams had conducted extensive surveys in this regard and contacted a number of agencies and also obtained the secondary data available with them. To assess the surface water quality of water bodies as well as ground water quality, samples have been collected for physico chemical, and biological parameters.

In **Osman sagar** as per IS 10500: 1991, the Iron concentration exceeds the limit of 0.3 mg/l and Total coliform is not meeting the standard. As per the IS:2296, Classification of Inland Surface Water (Drinking water source with conventional treatment and after disinfection) Iron and total coliform are with in the standard but BOD limit has been exceeded in one place. As regards bio monitoring, Osman Sagar has shown the tendency of moderate to severe pollution. This result is based on one time sampling. It is localized, because near the peripheral areas people are dumping garbage / immersing idols. Algal blooms were also observed.

In **Himayath sagar** Fluoride, Iron and total coliform have crossed the standard as per IS 10500:1991. As regards IS: 2296 Classification of Inland Surface Water (Drinking Water source with conventional treatment and after disinfection) Iron and total coliform are with in the standard. BOD is exceeding the limit of 3 mg/l in all locations. As regards bio monitoring, it has been shown that in few pockets there is moderate to high pollution and in few places there is no pollution . This result is based on one time sampling. It is localized because near the peripheral areas people throw garbage / immerse idols. Algal blooms were also observed. Man made activities in the catchment area contribute to organic pollution.

If the **Noor Mohammed Kunta** is to be used for controlled waste disposal purpose, as per the Classification of Inland Surface Water IS 2296 , pH, Total Dissolved Solids, Chlorides and Sodium exceed the limits. As regards bio monitoring, Noor Mohammed Kunta shows heavy to severe pollution. This is because it receives treated / partially treated / untreated waste water from Katedan Industrial Estate.

The analytical results of **Sivarampally Cheruvu** show that the water is not suitable for irrigation purpose as the total dissolved Solid ranges from 4000 mg / l to 6000 mg / l , Chloride is between 1000 mg / l to 1300 mg /l and sulphate is 1000 mg / l to 2200 mg / l. The permissible levels of Total dissolved Solids, Chlorides and Sulphates for surface waters to be used for irrigation purpose are 2100 mg / l, 600 mg / l and 1000 mg / l respectively. Bio monitoring analysis shows variation from slight, heavy to severe pollution.

The quality of water in **Mir Alam Tank** has been compared to IS 2296 standards for out bathing organized / recreational purpose. DO is well with in the standard, but BOD, pH and Fluoride are exceeding the limits. As regards bio monitoring, status is in the range of slight to severe pollution.

As regards the surface water / effluents flow , from the studies it is clear that the waste water / effluent from Katedan and Gaganpahad IDAs do not move upstream and enter into Osman Sagar and Himayath Sagar (no back flow of effluents); hence there is no possibility of polluting the Osman Sagar and Himayath Sagar lakes from effluents in these areas. The surface water flow / migration of pollutants follow a definite route depending on the hydraulic gradient in the water shed and catchment area. As per the contours the surface elevations of Noor mohammed Kunta , Sivarampally Cheruvu and Meer Alam Tank falls are under 540,525and 510 m(amsl) respectively. Sivarampally Cheruvu and Meer alam Tank form the down stream of Noor Mohammed Kunta. The Noor Mohammed Kunta receives untreated industrial waste from

Katedan Industrial area, over flows and then enters into Sivarampally Cheruvu via ANGRAU campus and there after drains into Meer Alam Tank.

Ground Water

The downstream area comprises predominantly the Granitic terrain. In granitic terrain, groundwater occurs in inter-granular pore spaces of unconsolidated weathered material and in the porous secondary structures (mostly sheet fractures) under semi-confined conditions. The average depth of water level ranges from 10-20 m in

recharge areas (uplands) and from ground level to about 3 m in valley bottoms. The recharge areas constitute about 70 per cent of the drainage basin in granitic terrain. The productive aquifers in granitic terrain are found at depths of 15 to 50 m below land surface, depending on topography.

The groundwater use has been increased in the area by 300% over the last three decades. Due to over exploitation of groundwater, the groundwater levels have declined. In hard rock areas, the occurrence and movement of groundwater mainly depend on the secondary porosity and permeability resulting from faults, fractures, joints etc. and associated weathering. The depth of weathering and nature of weathered material depend upon the landform conditions. The weathered zones act as storage reservoirs for holding groundwater, whereas the fractures below them help movement of groundwater by acting as conduits.

Groundwater database developed in the downstream area of Osmansagar and Himayatsagar lakes suggests that there could be possibility of establishment of some non-polluting industries (Green and orange Category). The developmental activities around the Hyderabad International Airport have to be closely monitored so that likely impact of waste discharges may be minimized to reduce groundwater contamination. The groundwater potential in the down stream area is poor and hence no water intensive industries should be allowed in the absence of sustainable water source.

Ambient Air Quality

Among the measured Gaseous pollutants, Sulphur dioxide levels are low in the study area. All the monitored pollutants are well with in the standards.

Lake Acidification

With regard to the possibility of acidification of lake waters due to acid rain, a study was conducted by Indian Institute of Chemical Technology, Hyderabad for three monsoon seasons from 1999 to 2001 to review such possibility. The study focused on

chemical characterization of rain water and investigation of neutralization potential of rain water at Hyderabad. From the investigation, it was concluded that pH of rain water varies from 5.5 to 7.2 with an average of 6.4, which is in the alkaline range, considering the interaction of rainwater with carbon dioxide in air. **It may be assumed, therefore, that acid rain is not of concern in the Hyderabad region.**

Recommendations

Based on the above surface water and ground water observations, the following points and action plan are recommended / suggested.

1. Based on these studies, it is recommended that there is possibility of establishing non polluting industries in the study region that is 10 Km down stream of Osman sagar and Himayath sagar lakes since there is no possibility of polluting of these two lakes due to any accidental discharges (as described in the report).

2. There is possibility of establishing non polluting industries / green category of industries in Katedan and Gaganpahad Industrial Estates. However other lakes in the area may get effected. The action plan to take remedial measures is presented at serial number five below.

3. Green and Orange category of industries may be permitted if the industries strictly adopt cleaner production/ waste minimization/ recycling/ reuse and forced evaporation systems, there by ensuring zero discharge from their premises.

4. All the industries have been examined and grouped into red, orange and green categories. All the green category of industries can be permitted. Regarding orange category, these also can be permitted provided they follow the item numbers three and five.

5. Action plan to be carried out by the industries/ plan that could be implemented by Government / Urban bodies is as follows.

Re locating of Red category of industries from Katedan and Gaganpahad industrial estates. Or if this is not possible, the textiles and other highly polluting industries should install Reverse Osmosis Plants . The other small scale industries may join and treat their effluents in a Common Effluent Treatment Plant, which should have compatible units (physical, chemical and biological). All the industries to have dedicated pipe lines to reach the CETP. Fresh inventory of all the industries to be made specifically in their environment management plans. (Responsibility: APIIC, Commr. of Industries, APPCB & Industrial Units)

Non polluting industries / green and orange category of industries may be allowed to come up in the Katedan and Gagan Pahad industrial estates. The STP should degrade the waste to the desired quality and be disposed off in Noor Mohammed Kunta. All these non polluting industries should either curtail waste water generation or should adopt cleaner production / waste minimization. The industries should be zero discharge industries . (Responsibility: Commr. of Industries and Industrial Units)

The water bodies to be declared as per designated best use as per 'Classification of Inland Surface Water IS: 2296 depending on their usage and quality. If the quality is not meeting the specified standards , remedial measures should be taken to make the

water fit for the designated purpose. **Osman Sagar and Himayath Sagar** should be declared as Class A or C **(drinking water source)**. **Noor Mohammed Kunta** should be declared as Class E (irrigation, industrial cooling and **controlled waste disposal)**, **Sivarampally cheruvu** as Class E for **irrigation purpose and Meer alam Tank** as Class B **(Out door bathing organized / recreational)** . Appropriate lake management plan for regeneration of these lakes, may be taken up. (Responsibility : The authority which has been constituted under Water , Land and Trees Act 2002 may declare the designated best use for all the water bodies).

The thickness of weathered and fracture zone does not exceed 5-8 m in the down stream area except around Gaganpahad water shed. In view of this buildings not possess sustainable ground water back up supplies. In the case of break down of surface water system (Krishna water supply, piped system), there is very meager ground water availability which may affect the sustainable sanitary function of the building. In view of this, the high rise buildings may be restricted to 10 floors. It is also suggested to provide ample space for installation of water harvesting structures. (Responsibility: State Ground Water Dept., APSIDC).

Zonation of the IDAs to be planned. No residential area to come up with in 500 m around the IDAs. MCH/ HUDA / concerned Authority to take the responsibility of observing that no residential zone to be declared within a vicinity of 500 m of the IDAs.

Environment awareness campaigns are to be organized for the industries and residential colonies near water bodies. All the Government plans regarding lake restoration plans etc. are to be announced. NGOs and EPTRI can play vital role in creating awareness.

1.0 INTRODUCTION

Lakes, especially, urban lakes, have become the predominant victims of urbanization and have been converted into waste sinks. Siltation, garbage, weed infestation, discharge of domestic sewage and industrial effluents, oil & grease and encroachments has caused the degradation and disappearance of urban lakes. The valuable loss of flora and fauna, and the poor aesthetic value has resulted in reduction of the lake's tourism potential and has resulted in severe economic losses to society. The impact of these lesser water bodies came into focus as alternate habitats for migrating waterfowl when their traditional wetland homes or winter sojourns were devastated during natural calamities.

Rivers, lakes, marshes and swamps offer enormous variety of habitats but are losing their ecological stability due to incorrect land use options, indiscriminate discharge of effluents and influx of toxic chemicals in environment. Aquatic system constitutes the life support system for all. Yet, the demands on aquatic systems are high and the momentum for change ever present. Loss of aquatic system or their ability to function naturally means loss of opportunities for sustainable development. Most of the wetlands in India are directly or indirectly associated with river systems such as the Ganges, Brahmaputra, Narmada, Tapi, Godavari, Krishna and Cauvery.

Water is essential to human life and to the health of the environment. Water quality in a body of water influences the way in which communities use the water for activities such as drinking, swimming, industrial, agriculture or commercial purposes. Water quality is closely linked to the surrounding environment and land use. Any activity involved in use of water results in discharge of liquid wastes, which differ in quality and quantity. Both point and non-point sources should be considered while planning conservation measures. Groundwater is an integral part of water supply. Unplanned human activities have detrimental effects on the environment. Due to indiscriminate use of natural resources, the absorbing capacities of our eco-systems has suffered damage with the extinction of species, and has now reached a limit where it threatens the growth and development of Human beings. Hence, it is imperative to limit the

deleterious impacts of human activities to a level, as low as possible, to achieve sustainable utilization of natural resources through planned developmental strategies.

The water supply sources and systems of an urban area are one of the most important infrastructure features in establishing a healthy environment. In Hyderabad, since 1894 filtered water was supplied for the whole city from reservoirs at Miralam tank and Hussain sagar. After a short period, the water from Hussain sagar was not used for drinking due to increase in pollution .In 1908, the PWD and the city Improvement board (1913),took up construction work for two new reservoirs at Osman sagar and Himayat sagar .These two are the major water resource sources in Hyderabad, along with the Manjira and Krishna water supply schemes. Overview of existing water supply scheme is depicted at **Figure 1. Table I** shows the water supply from different sources for Hyderabad city.

Table I : Water Supply from Different Sources

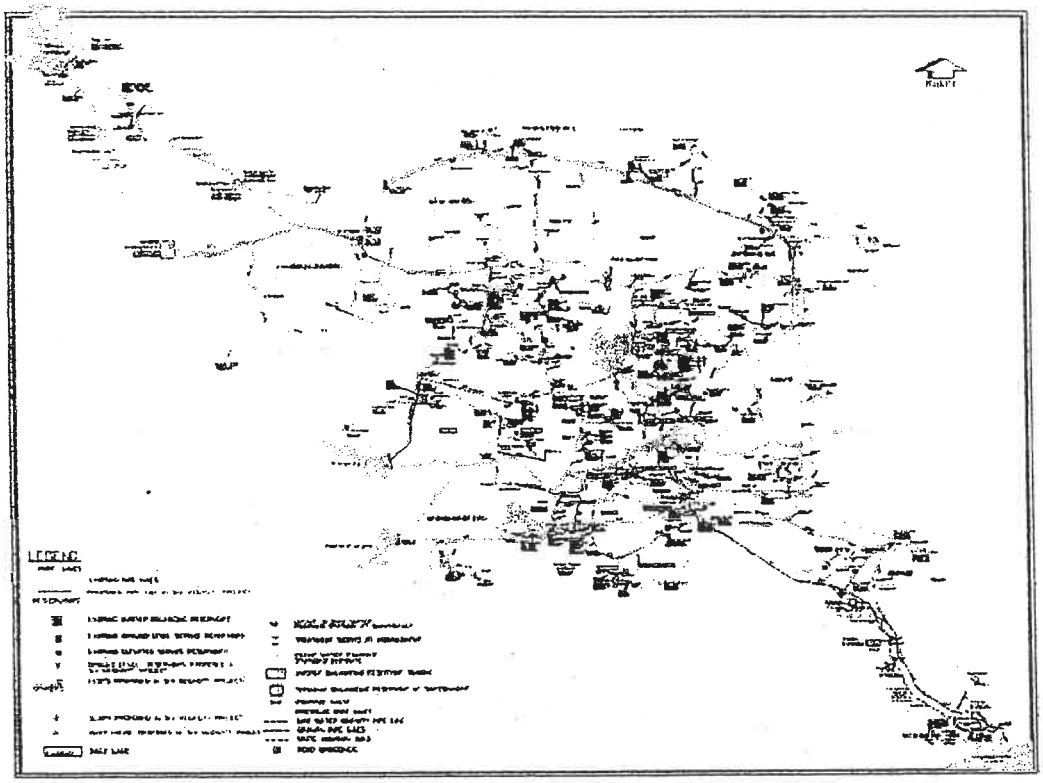
S.No.	Source	Year of commissioned	Normal Supply in Mgd	%
1.	Osman Sagar	1920	27	12
2.	Himayath Sagar	1927	18	9.5
3.	Manjira Phase I	1965	15	7.15
4.	Manjira Phase II	1981	30	14
5.	Manjira Phase III & IV	1991 & 1993	75	36
5.	Krishna Stage I	2004	45	21.4
6.	Krishna Stage II	2005	45	21.4

Source: Presentation of Sri. Vaghrey, HMWS&SB, at EPTRI

Location of industries around water bodies requires permits from the authorities / Pollution Control Board. From 1989 till 1996, three G.Os were issued restricting some of the activities totally, and some partially, in these two catchment areas. Based on the representation received by the Government to relax the restrictions imposed in G.O. Ms. No. 111 of M.A 1996 with regard to allowing non polluting industries , the

Government desired to examine the **"Possibilities of Establishing Non Polluting Industries with in 10 KM Radius of Himayath Sagar and Osman Sagar"** without damaging the lakes and their ecology. Keeping the focus on protection of environment and developmental activities the Commissioner of Industries approached EPTRI to study the possibility of establishing non polluting industries

Fig 1: Overview of Existing Water Supply Scheme



down stream of Osmansagar and Himayathsagar. Since EPTRI has expertise in some areas of the study, it was proposed to take up the study under NINE *Plus*, to supplement the remaining expertise required for this study. Incidentally, it may be pointed out that EPTRI and NGRI are members of the consortium, among others, who had carried out previous similar studies.

2. TERMS OF REFERENCE

The Commissioner of Industries in his letter D.O. No. 12-04-0018-2 dated 22.01.2005, requested EPTRI to examine the list of industries under Green and Orange categories within 10 km radius of Himayatsagar and Osmansagar lakes, as well as examining possibilities of establishing non-polluting industries within this 10 km radius (excluding prohibiting zone), specially in the Kattedan and Gaganpahad areas with the following terms of reference:

- The possibilities of establishing non-polluting industries in areas other than the prohibiting zone falling within 10 km radius of Himayathsagar and Osmansagar.
- The possibility of establishing non polluting industries in Kattedan and Gaganpahad areas.
- The possibility of establishing industries with zero water discharge and for coming out with a list of such activities.
- Examining the list of industries under Green and Orange categories to specifically come out with a consolidated list of non polluting activities that can be allowed within 10 km radius of two lakes.
- Action to be carried out by the industries / plan that could be implemented by Government / Urban bodies which would not increase the accretion to the two water bodies which are life lines for the city.
- Indicate possible zonal regulations, which require to be strictly implemented to ensure sustainability of the arrangements.

To achieve the above objective the work is to be carried out in two phases.

Phase I : Examination of industries with in 10 Km radius down stream of Himayath Sagar and Osman Sagar Lakes.

Phase II: Examination of industries with in 10 Km radius up stream of Himayath Sagar and Osman Sagar Lakes at a latter date.

3. ANALYSIS OF THE PROBLEM

A summary of the regulations imposed by Government of Andhra Pradesh through Government Orders from time to time is presented below.

I G.O. Ms. No 50 M.A. dated 28.01.1989 – deals with only protection of hydrological regime of the catchment areas. For this purpose, the G.O.

- Prohibits the interception of any inflows of water into the rivers in the catchment
- areas of the two lakes, including the removal of unauthorized check dams.
- Prohibits tapping of ground water in these catchment areas.
- Prevents unauthorized occupation of land.

II G.O. Ms. No 192 M.A. dated 31.03.1994 – deals with all sources of pollution

- prohibits within 10 km. from full tank level contour in the catchment areas of the two lakes , activities such as industries, major hotels, residential colonies, or other establishments and permits beyond 10 km. and within the catchment areas with approval (NOC) from HMWSSB, APPCB, Directorate T&CP, HUDA and Industry Department.

III. G.O. Ms. No 111 M.A. dated 08.03.1996 – deals with both hydrological regime and prevention of pollution All the restrictions imposed in G.Os under item I) and II) have been reiterated. In addition, the following restrictions have been imposed within 10 km radius from full tank level of the lake.

- 60 % of the total area shall be kept as open space and roads in all layouts in the villages of the catchment area.
- The land use of about 90% is to be classified as recreational and conservational use.
- To restrict the FSI to 1: 0.5.
- To prohibit polluting industries within 10 km radius both upstream and downstream.

- No industry in the prohibited 10 km. radius (due to likely acidification).
- Not to take up any building works like check dams, lift irrigation works, storage reservoirs, across vagus flowing in the catchment area.

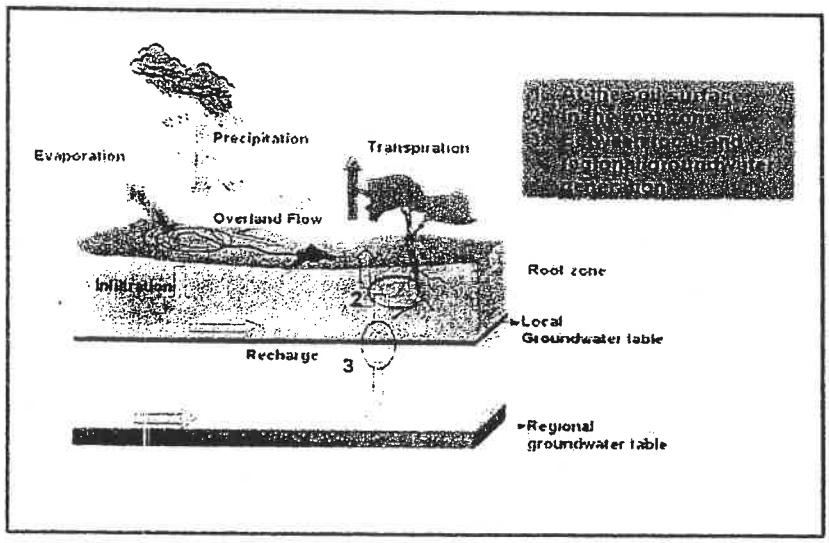
A critical study of the recommendations based on which the above Government Orders have been issued clearly indicates that demarcating line of 10 km. radius all round the lakes from FTL in the catchment areas is not based on any well planned scientific study. It appears that it is based on the expert opinion. In view of this, there is need for scientific evaluation for developmental activities in the area and to develop various scenarios.

4. BASIC SCIENTIFIC ISSUES

Human activities within the lake or their surrounding landscapes in the catchment area have adverse impact on the lake ecology. The degree of impact depends on the nature and extent of these activities. The landscape is a composite system where eco hydrological phenomena form an important component. It can be thought of as a geological matrix, represented by its topography, its mineral composition as well as the permeability characteristics of its various layers or components. When climatic forces such as wind, rain and evaporation act on this matrix, the water flows get divided along pathways on the surface or within the ground or both. **Figure 2** shows the water partitioning on the soil / ground surface. This has a systematic impact on hydro chemical and ecosystem characteristics. The landscape, which has been shaped over thousands of years by the interaction between geological processes and climate, is being changed within a short period by human interventions, which are made for the benefit of mankind without knowing or considering the long-term consequences. As a result, water quality and quantity, which are naturally determined by interrelated forces such as climatological, geological and biological dynamics, are drastically disturbed by human activities. If human interventions result in change of the natural vegetation, these changes will control the state of the ground, the size of the interception storage in the vegetation canopy, and the amount of water that is evapo-transpired back to the atmosphere. In addition to changing the natural vegetation,

there are other land-use activities by man that result in significant effects / impact on the infiltration and storage of water such as built up land, soil compaction by grazing animals, drainage, ploughing, logging and building of water harvesting structures. The accelerated growth of science and applied technology, which gave power to man to interfere with natural processes stated above, has also given him / her the ability to predict the consequences of the proposed actions. For this purpose predictive mathematical models taking into the consideration the interdependency of various processes involved have been developed. Using these models, it is possible to develop scenarios for various developments and their consequences. Based on this, a scenario, which permits the contemplated development with acceptable adverse impacts on the environment, can be selected.

Fig 2: Water Partitioning at the Soil Surface



5. METHODOLOGY

The detail methodology of Phase I study is as follows.

5.1 Preparation of Thematic Maps in the Study Region

The following maps have been prepared to study the proposed area in detail.

a. Contour map
b. Drainage map
c. Land use land cover map
d. Hydrogeomorphology map
e. IDA location map
f. Settlement map

5.2 Inventorization of Existing Industries

The inventorization of existing industries has been done by collection of secondary industrial data from Andhra Pradesh Pollution Control Board on raw material, product, by product, quality and quantity of effluents, air emissions, etc. After obtaining the data the industries have been categorized into Red, Orange and Green category.

5.3 Identifying the List of Non Water Polluting Industries

The list of non water polluting industries / zero waste discharge has been identified based on their process, which is almost similar to green category of industries stipulated by Andhra Pollution Control Board.

5.4 Assessment of Surface Water Quality

The quality of surface water has been assessed and compared with the " Indian Standard Drinking Water- specification IS 10500:1991" and "Classification of Inland Surface Water- IS : 2296 ". To assess the quality of water

a. Samples have been taken from peripheral area of Osman sagar and Himayath sagar to analyze for benthic macro invertebrates to denote the quality of water (Bio mapping of water bodies).
b. Samples have been collected from the two lakes for physico-chemical and bacteriological analysis to determine the quality of water bodies.
c. Samples have been collected for physico-chemical, bacteriological and benthic macro invertebrate analysis from canals /streams / vagus / waterbodies in the study area.
d. Secondary data on water quality was collected from different sources.

5.5 Ground Water Condition

Observation wells were established and depth of ground water level was measured and contours were drawn to obtain the ground water flow directions. To assess the water quality of Ground water samples have been collected from wells, bore wells in the three watersheds viz., Kattedan, inter stream region of Musi and Musa rivers and Gaganpahad IDAs. The geo electric sections along three profiles have been drawn to understand the aquifer geometry and the sub surface lithology. Existing data on hydrogeology and sub surface lithology has been used to get the over all picture regarding the hydro geological condition.

5.6 Air Quality

Evaluation of air pollutant load and assessment of present air quality in the study area has been taken up as follows:

a. For industrial air emission estimation, secondary data has been collected from APPCB records (location, fuel consumption or stack test data).
b. Ambient air quality study has been carried out at four monitoring stations for a period of one month using High Volume Samplers to monitor SPM, SO_2, NO_X.

The data thus generated has been interpreted to provide recommendations on the possibility of establishing non polluting industries in the area other than prohibiting zone falling with in 10 Km radius down stream of Himayath sagar and Osman sagar.

6. STUDY AREA

Considering the study requirements (phase I of the study) the area is identified as 10 Km down stream of Osman Sagar and Himayath Sagar lakes. The Osman Sagar lake was constructed on the River Musi between 1912 and 1920, formed on a sixth order stream. The year of commission of Osman sagar was 1922. Later on, Himayath Sagar was constructed between 1920 and 1927 on the stream Musa a tributary of Musi, formed on fifth order stream. The year of commission of Himayat Sagar was 1927. The two lakes were constructed to meet a part of the drinking water needs of the people in Hyderabad city. In 1920s they were catering for a population of about 5 lakhs. The present supply for drinking water purpose is 27 MGD from Osman sagar and 18 MGD from Himayath Sagar by gravity. These two lakes are situated at a distance of about 10 km. from each other west of Hyderabad and relatively Osman Sagar lies towards North and Himayath Sagar to the South at a distance of 19.31Km and 9.66 km. respectively from Hyderabad city. Osman Sagar lake has a total catchment area of 736 sq.km. and Himayath Sagar lake has a total catchment area of 1340 sq.km. Osman sagar is 2287 hectars and Himayat Sagar is1836 hectars. The storage capacity is 110.436 MCM and 84.016 MCM for Osman Sagar and Himayath Sagar respectively. The FTL of Osman Sagar and Himayath Sagar are 1790ft. and 1763.5 ft respectively. The area down stream of Osman Sagar and Himayath Sagar lakes with in 10 km radius covers about 230 Sq. km. The study area falls in the four districts of Andhra Pradesh. They are Rangareddy ,Medak, Mahaboobnagar and Hyderabad (down stream of Osman Sagar and Himayath Sagar with in 10 km radious). The mandals falling under the study area are Chevella, Maheswaram, Rajendernagar, Saroornagar, Serilingampalli, Shabad, Kothur, Patencheru and Ramchandrapuram. The list of villages in the study area is depicted at **Figure 3.** The study area along with settlement is depicted at **Figure 4.**

The topography of study area has been drawn from connecting ground level of the observation wells to the mean sea level and is depicted at **Figure 5.** It is observed from Fig. 5 that the elevation range is in between 500 to 640 m (amsl). The regional slope is towards east with local slopes tending northeast – south and southeast. The topography contours around the reservoirs show southeastwards elongation due to the regional structural influence on the terrain. Contours swerve head wards of the streams, whereas they protrude out in the inter-tributary higher grounds. Frequency of drought and excess rainfall was observed from analysis of 23 years rainfall data from Chevella rain gauge station and Hyderabad meteorological station during 1974-75 to 1996-97 and 11 years of rainfall data from Moinabad rain gauge station during 1986-87 to 1996-97. Data was analyzed by Mohanrao (1997). Average rainfall recorded at Gundipet for 1901 – 1950 is 798 mm and the average annual rainfall during 1932-89 is 800.52 mm. Average rainfall at Chevella, Janwada and Gundipet is 751.71 mm. Most severe droughts have occurred during 1918, 1972, 1977 and 1987 and 2003, 2004. Minimum daily rainfall recorded at Gundipet is 218 mm (1977). Maximum annual rainfall recorded at Gundipet is 1412 mm(1978).

Average annual Rainfall (mm) during 1980 –96 in Downstream Areas of Osmansagar & Himayatsagar Lakes

Year	Annual	SW	NE	Years	Max	Year	Min
Rajendranagar 1988	838	578	202	8	2010	1995	366
Shamshabad 1986	788	571	169	16	1936	1995	434

Source: Directorate of Economics and Statistics, Govt of AP

6.1 Drainage Pattern in the Study Area

The principal rivers flowing in the study area are Musi river and Musa river. These are the major surface water sources in the study area. To delineate the area directly

draining into the river Musi and Musa, within 10 Km radius of down stream of Osman Sagar and Himayath Sagar lakes respectively, drainage along with water bodies of the study area were brought into GIS platform. The eastern part of Ranga Reddy District and the entire Hyderabad district is a rugged terrain with denudational hills of granitic rocks rising up to a height of 613 m (amsl) and ridges of dolerite and quartz reefs extending over several kilometers. The western part of the area is a plateau with step like topography. The area is drained by the eastward flowing Musi river. The study area has been delineated into three water sheds viz., Golkonda water shed, Inter stream area of Musi and Musa rivers and Gaganpahad water shed. The delineation of water shed is depicted at **Figure 6**. The drainage pattern in the study area is shown in **Figure 7**. It is observed that the pattern of drainage in Musi catchment is typically of Trellis type where tributaries meet the main streams more or less at right angles grading, between these two extreme patterns are the sub- dendritic pattern.

6.2 Land Use/Land Cover in the Study Area

The land use and land cover depicts the use pattern of the land. Based on the scale and the satellite resolution the Land Use/Land Cover classification can be made at different levels. As per the satellite data of IRS 1D, which has 24-m resolution, level II classification is adopted while carrying out the analysis. Necessary training sets were identified based on tone, texture, size, shape, pattern and location information. The interpreted map was verified on ground at limited points and final land use / land cover map was prepared. Digital image processing was carried out to delineate various land use / land cover categories in study area viz. Built up lands, agricultural lands such as double crops, single crop areas and waste lands such as land with or without scrubs, barren rocky/ stony waste and water bodies such as rivers, tanks and sheet rocks / boulder area and reserved forest. The land use & land cover pattern in the study area is presented in **Figure 8**. The central part of the area is cultivable whereas the northwest, southwest and east are grass and scrub lands with intermittent patches of arable land. The southeast is forestland. Hyderabad city, which falls in the eastern segment, forming a district itself, is totally an urbanized area with major water bodies with Himayat Sagar and Osman Sagar lakes lying to the west.

The Hyderabad and Ranga Reddy districts comprise dominantly altisols (red sandy soil) with the northwest part occupied by ultisols (laterrite soil) and vertisols(medium black soil) overlying the basalts. A patch of mixed red and black soil can be seen in the southeast.

The lineament trends are N-S, E-W, NE-SW and NW-SE, follow four major directions. NE-SW followed by NW-SE lineaments are regionally prominent. Several sets of near vertical joints and near horizontal shear fractures form most consistent structures in the granitic terrain. Joints and fractures in granites are more planar in form and appear to have greater areal extent than those in basalts. Joints and fractures are denser along the sides and bottoms of the narrow linear valleys than the large massive upland regions. Major fractures in the granites are occupied by basic dykes and quartz veins at places.

6.3 Hydrogeomorphology in the Study Area

The useful base line information on the factors controlling the groundwater occurrence like lithology, geomorphology and land use pattern play an important role for better delineation of potential groundwater zones and understanding about ground water availability. The hydro geomorphology in the study region is studied using both satellite data and as well existing geological maps.

The hydrogeomorphic features covered in the study area are Shallow weathered pediplain, Slightly dissected plateau, Residual hills, Pediment inselberg complex and Flood plain. Most of the study area is covered with Shallow weathered pediplain, groundwater prospects are poor to moderate in these zones. Some part of the study area is covered with flood plain zone, the groundwater prospects are excellent in these zones. The hydro-geomorphology features occurring in the study area is depicted at **Figure 9.**

A major part of the area in the east is a pediment-pediplain complex suitable for agriculture. Within this, residual hills of granitoids and structural ridges of dolerite

and quartz reefs occur. Groundwater in granitic terrain is fracture-controlled and the water table varies between 10-25 m depending on the morphology of the area. The permeability in these rocks is 0.5 – 25 m/day, specific yield is 0.005 –04 and the yield prospects are 15 m^3/hr. The fractures controlling the groundwater mainly trend NW-SE and N-S. The permeability of these rocks is 0.05 –15 m/day with specific yield of 0.005 – 0.03 and yield prospect of 25 m^3/hr. Usually, the wells in this terrain are quite deep. The wells in laterite yield good quantity of groundwater around the year. The permeability is high (2- 60 m/day), with a specific yield of 0.01 – 0.15 with a yield prospect of 25 m^3/hr (GSI, 1999).

6.4 Industrial Activities in the Study Area

There exist two major industrial estates namely Katedan and Gaganpahad Industrial Estates hosting around 183 units as per APPCB records. The details of each unit such as name of the industry, raw material, product, water consumption, waste water generation, quality of waste water, treatment facility, waste water discharge point, generation of solid waste, hazardous waste and its disposal etc. have been obtained from Andhra Pollution Control Board records. The details of industrial activities at Katedan and Gaganpahad IDAs are presented at **Annex I and II** respectively. The location of IDA in the study area is depicted at **Figure 10.**

6.4.1 Katedan Industrial Estate

Andhra Pradesh State Government during the year 1973-74 has allotted about 250 arces of catchment area of the lake to the Andhra Pradesh Industrial infrastructure Corporation (APIIC).This area was developed into an industrial estate known as Kattedan Industrial estate .

During 1984, the land under the industrial estate has been transferred to APIIC from Rajendranagar Municipality as per the G.O.MS 519 M.A /dated 21.9.94 and circular issued by Director and Commissioner of Municipal administration ,Andhra Pradesh ,Hyderabad vide Lr.No.42453/90-Elec I (1) dated 7.10.94.As a result, APIIC has got

the authority to levy and collect taxes ,issue building permits and responsibility for providing civic amenities and maintenance . However, APIIC has to pay 30% of the total revenue to the Rajendranagar municipality.

There are around 104 industrial units in Katedan IDA which includes textile mills, edible oil refineries, lead extraction units, plastic, rubber and biscuit factories. The list industrial units type wise and category wise of Katedan Industrial Estate is presented at **Table II.** While taking records from the concerned authority there were 14 units who have not mentioned about their products. It may assumed that they are sick units. It is observed from Table II that category wise there are 64 red category, 2 orange category and 24 green category of industries.

6.4.2 Gaganpahad Industrial Estate

There are around 79 industrial units in Gaganpahad IDA. The list of industrial units type wise and category wise of Gaganpahad industrial Estate is presented at **Table III.** It is observed that category wise there are 60 red category and 11 green category of industries in Gaganpahad industrial estate.

Table II : Type Wise Category Wise Number of Units In Katedan IDA

Type of Industry	Category	Total Number
Cloth printing and dying	Red	2
Lead Producing	Red	10
Metal sheet/ containers/ metal producing	Red	4
Oil producing / refinery	Red	5
Plastic/ HDPE products	Red	10
Chemical	Red	6
Rubber products	Red	5
Pharmaceutical formulation	Red	2
Leather products	Red	1

Detergent/ soap	Red	3
Batteries	Red	2
Cloth, textile processing	Red	2
Re treading tyres	Red	2
Steel	Red	1
Welding / electrodes	Red	3
Paints and synthetic resins	Red	1
Ssynthetic yarn users	Red	1
Glass	Red	1
Base oil/ waste oil	Red	2
Reconditioning / detoxifying container	Red (assumed)	1
Total		64
Cotton/ polyester yarn/ cloth	Orange	2
Total		2
Testing of pumps and motors	Green	1
D G assembling unit	Green	3
Corrugated sheets / boxes / packaging material	Green	2
Cement producing	Green	6
Barrel trading	Green	1
Spices	Green	1
Food/ biscuit/ wafers	Green	6
Edible oil, coconut by crushing	Green	1
Book binding cloth	Green	2
Cattle feed	Green	1
Total		24
Product not mentioned		14

Table III : Type Wise Category Wise Number of Units In Gaganpahad IDA

Type of Industry	Category of Industry	Total Number of Industries
Vaccines& antitoxins (tetanus,diphtheria)	Red (bio hazard)	1
Printing & dyeing cloth	Red	6
ead producing	Red	6
Refined Oil	Red	9
Poultry-vaccines	Red (bio hazard)	1
Oil producing	Red	1
Hormone inject able preparations	Red (bio hazard)	1
CTD boards/metal sheets/Ms rods /Brass utensils	Red	8
Welding electrodes	Red	1
Plywood	Red	3
Products made from PVC films /HDPE Resins	Red	7
Chemical	Red	4
Non edible oil	Red	1
Industrial &Decorative laminates	Red	1
Polyester /synthetic yarn	Red	6
Laminated sheets (paper based)	Red	1
Bleaching powder/Liquid bleach	Red	1
Castor oil (commercial grade)	Red	1
Distillery	Red	1
Total		60
Cloth weaving (power loom)	Green	2
Rubber products (chapels)	Green	2
Confectionary /foods	Green	4
Flour mill	Green	2
Paper cones	Green	1
Total		11

Fig. 3 : Villages in the Study Area

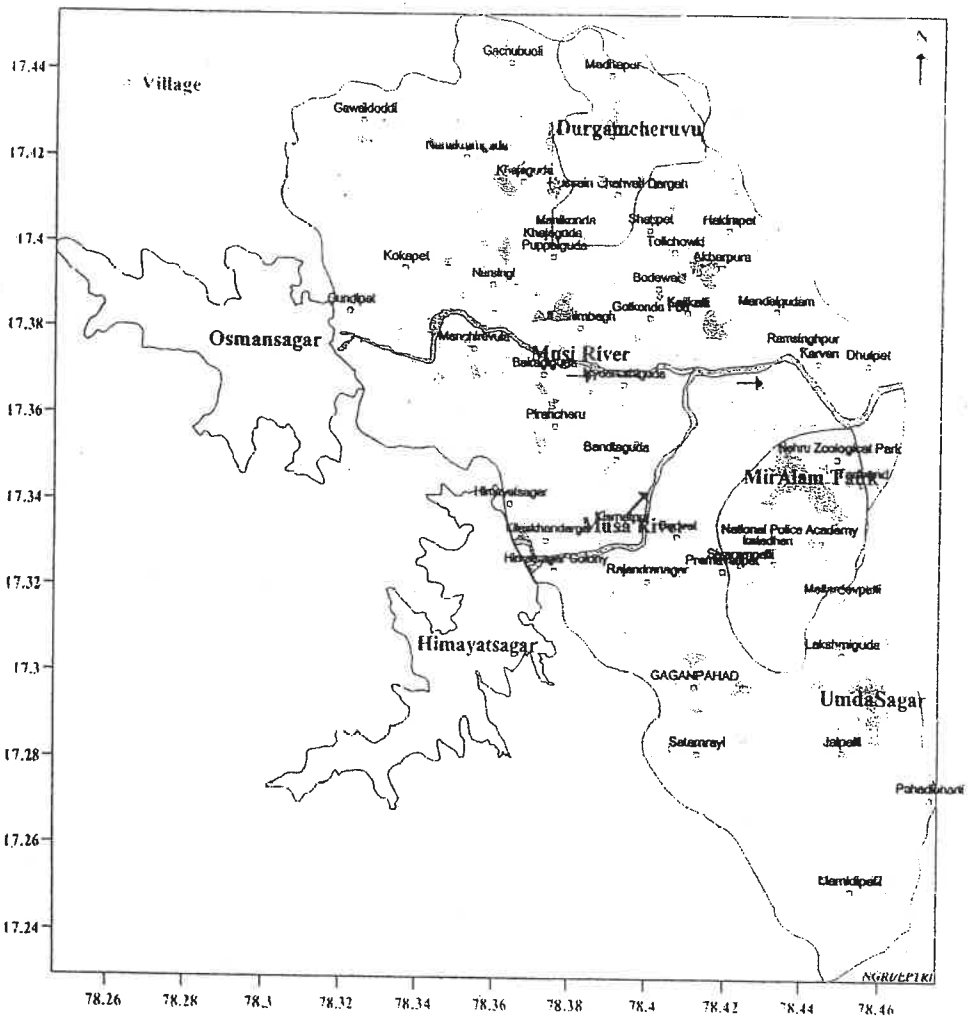


Fig. 3 : Villages in the Study Area

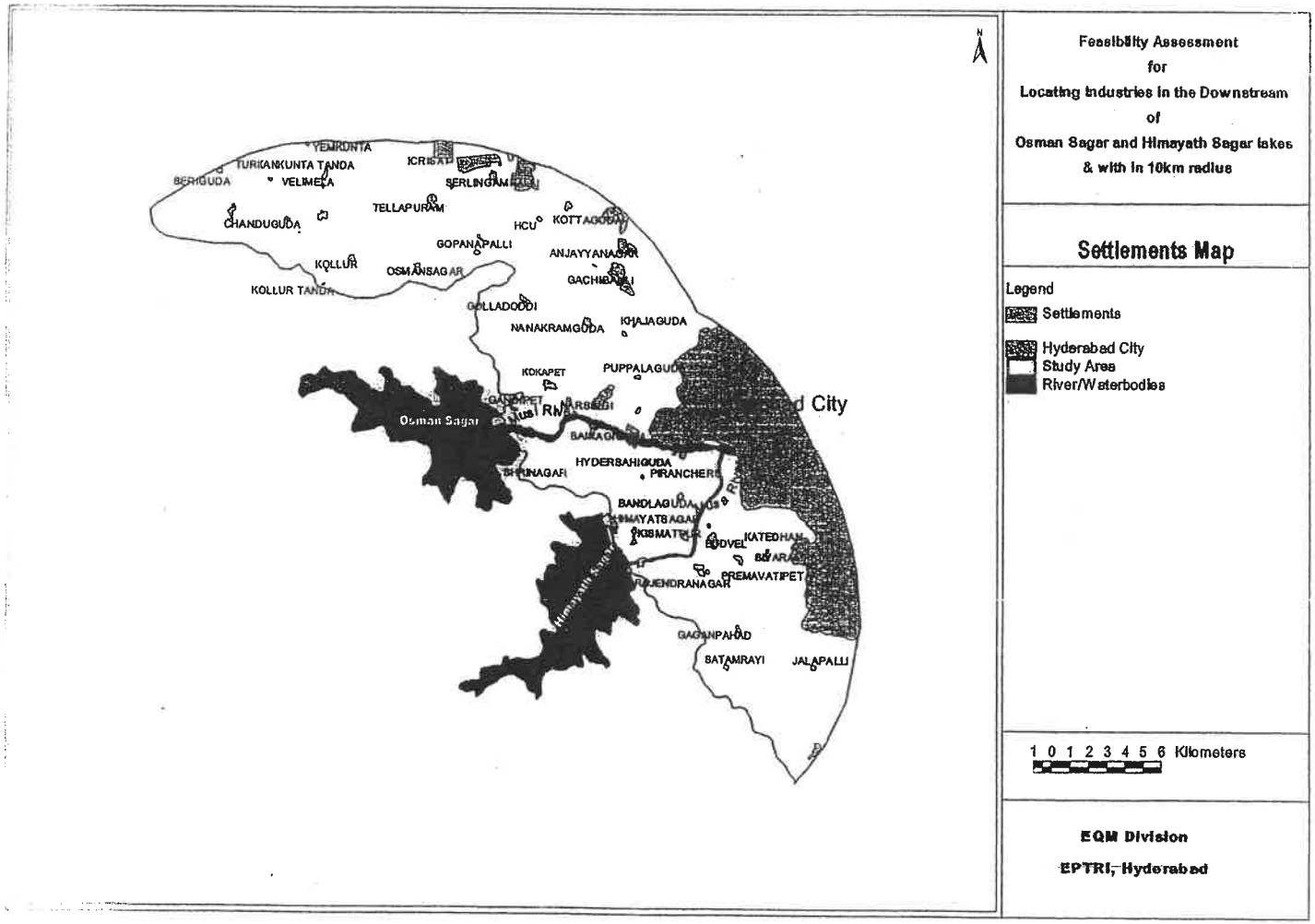


Fig. 4 : Settlement in the Study Area

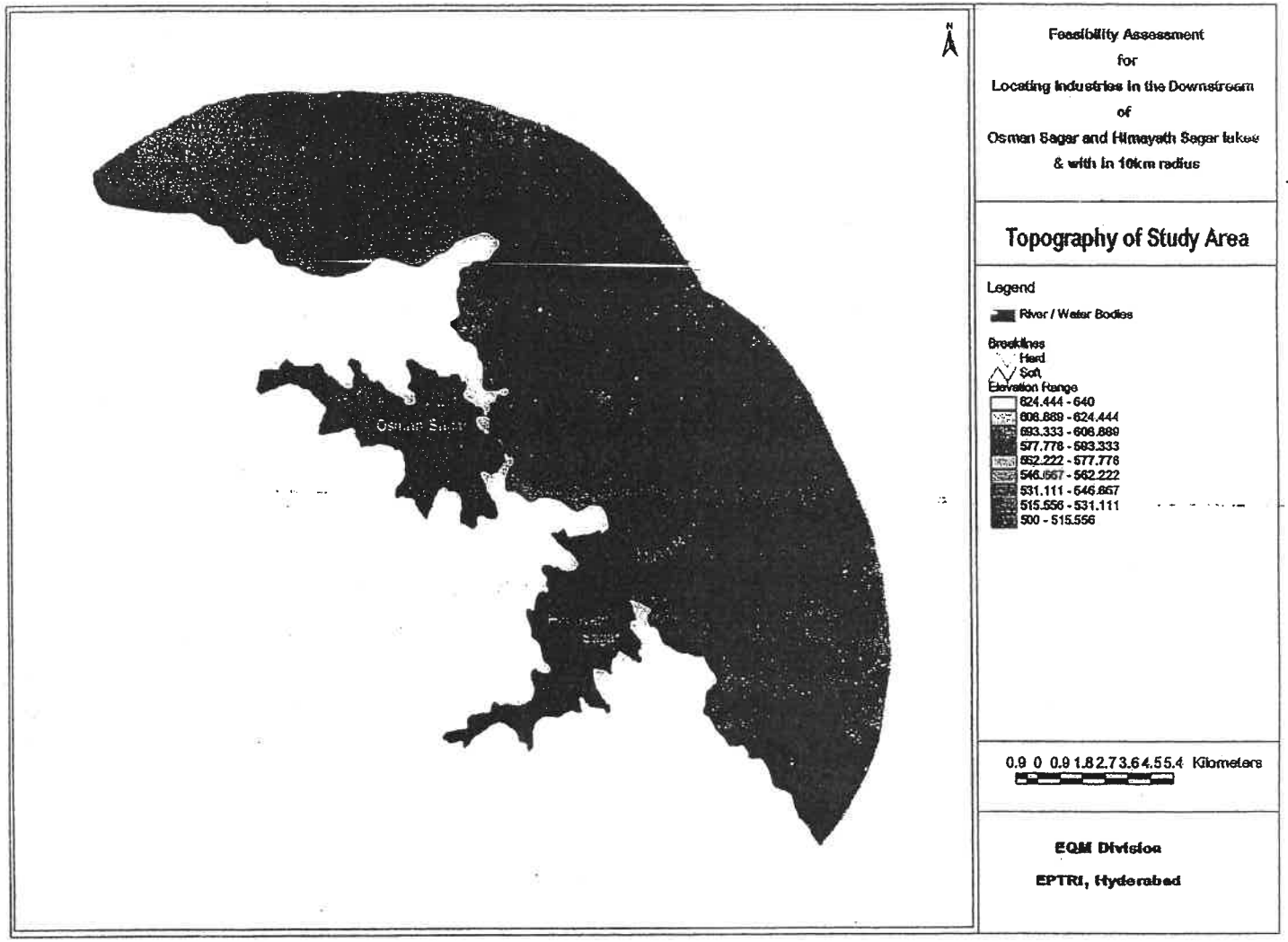


Fig. 5 : Tropography of Study Area

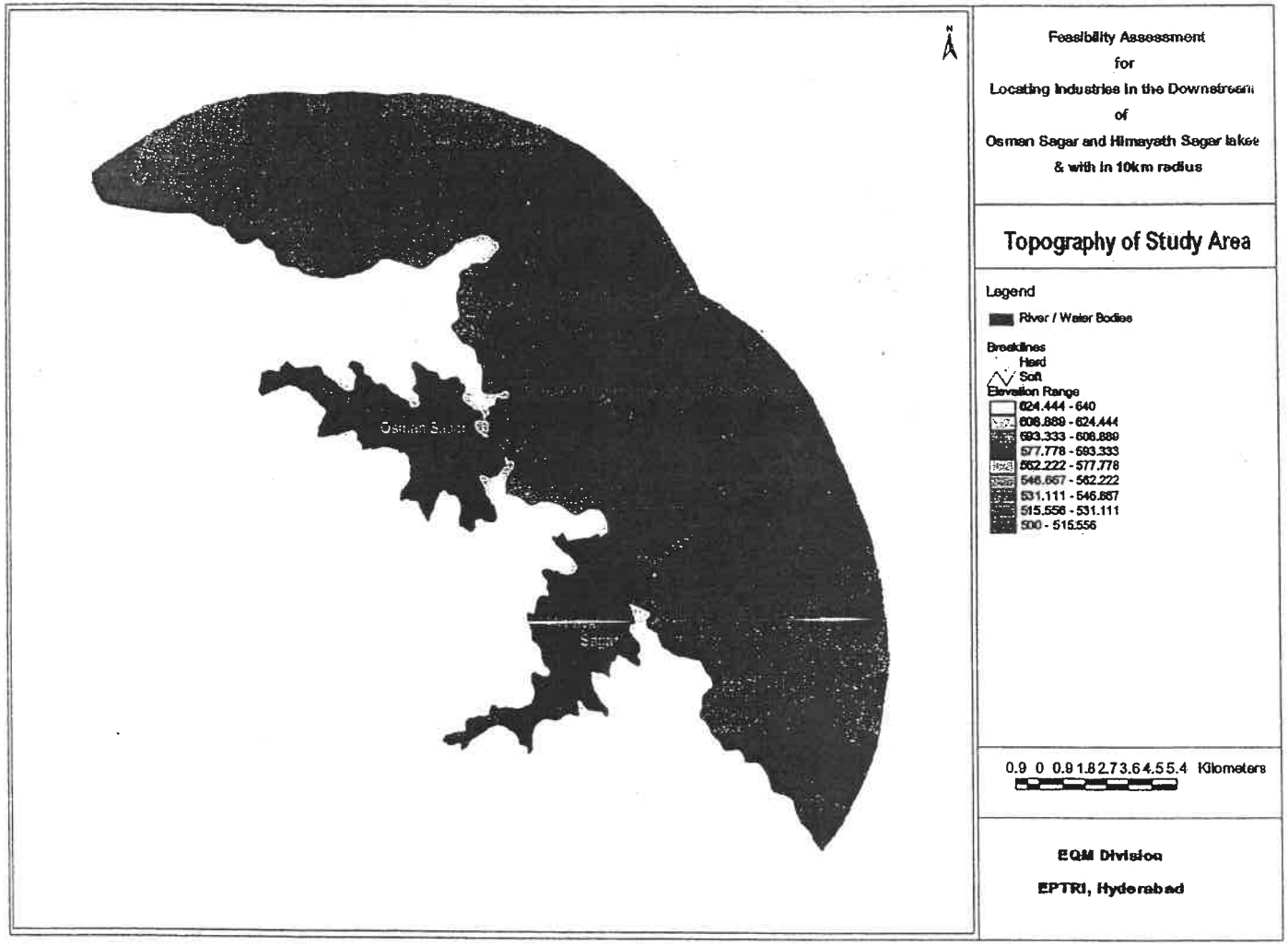


Fig. 5 : Tropography of Study Area

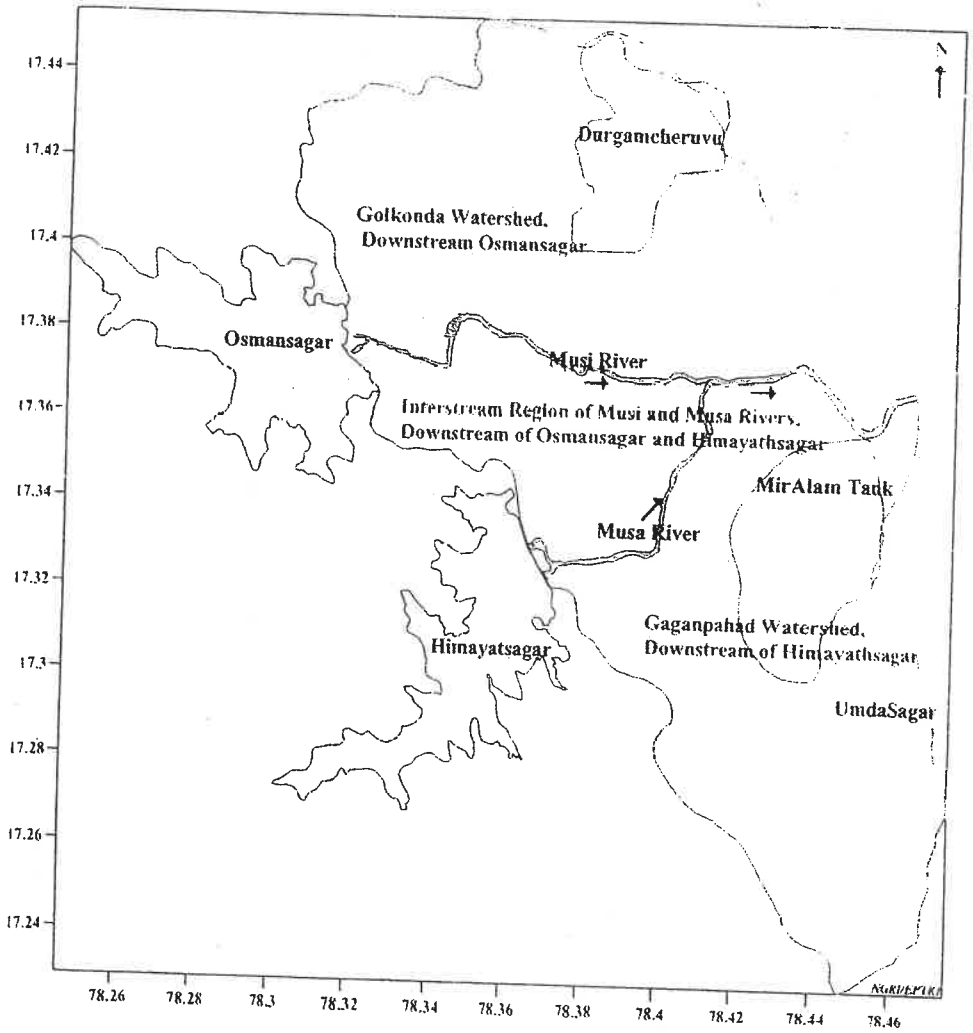


Fig.6 : Delineation of Watersheds

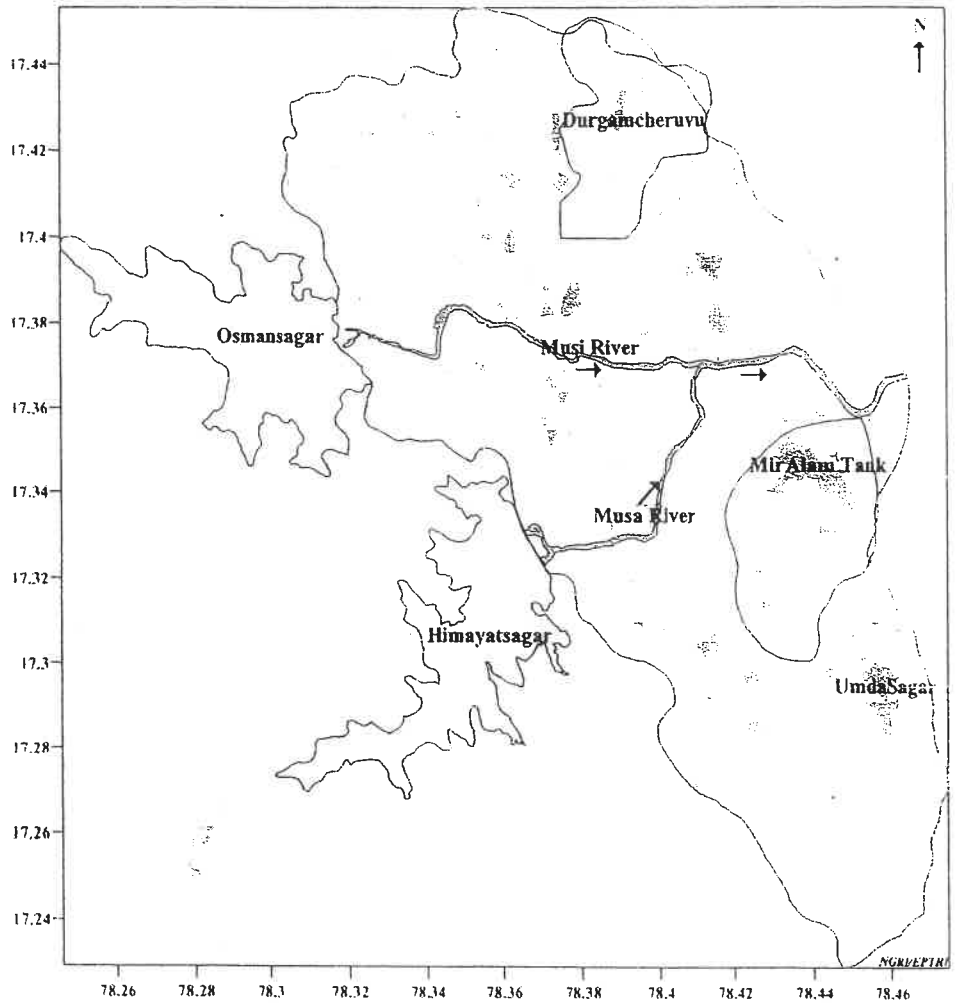


Fig. 7 : Drainage Pattern

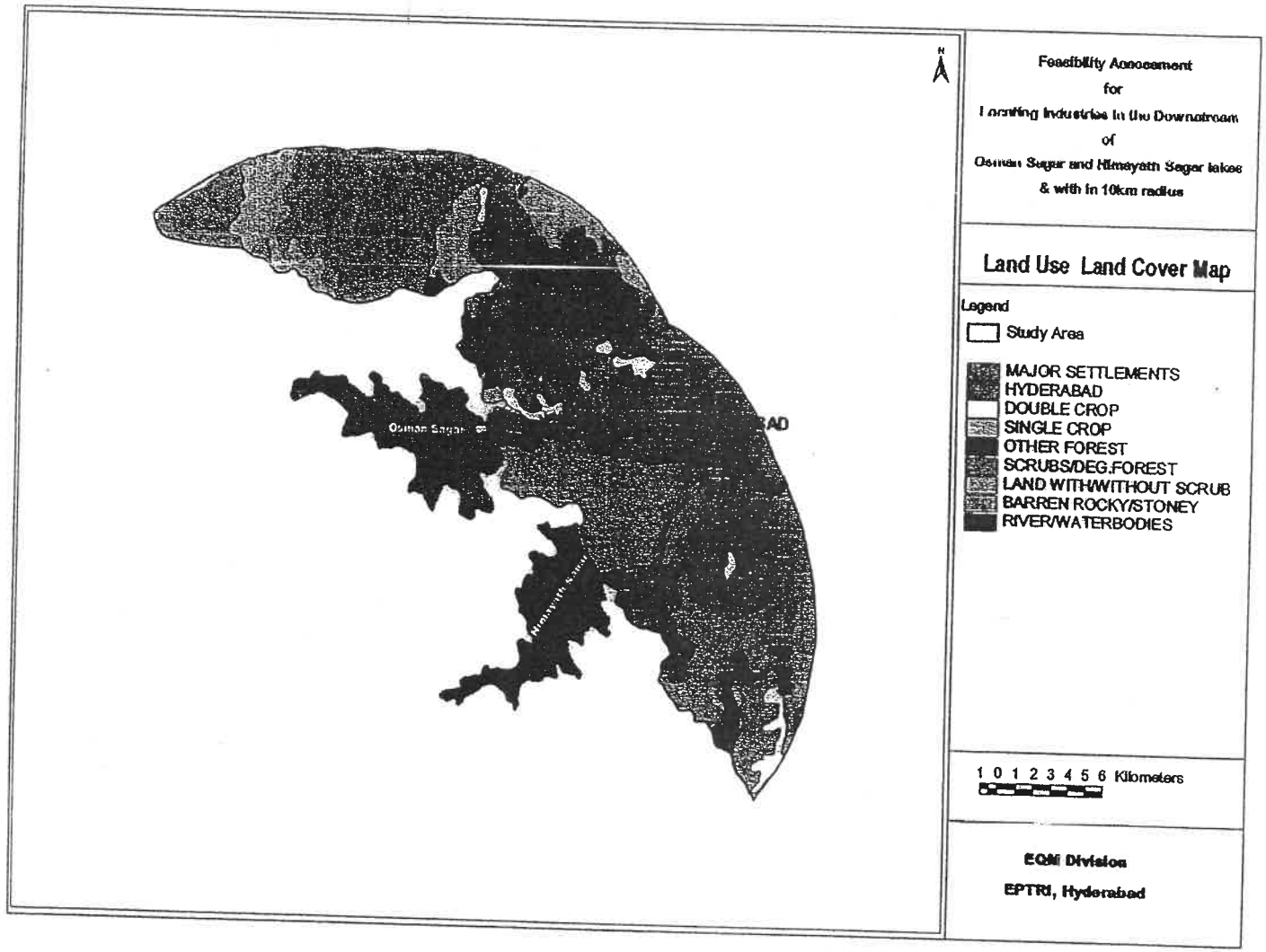


Fig. 8 : Land Use Land Cover

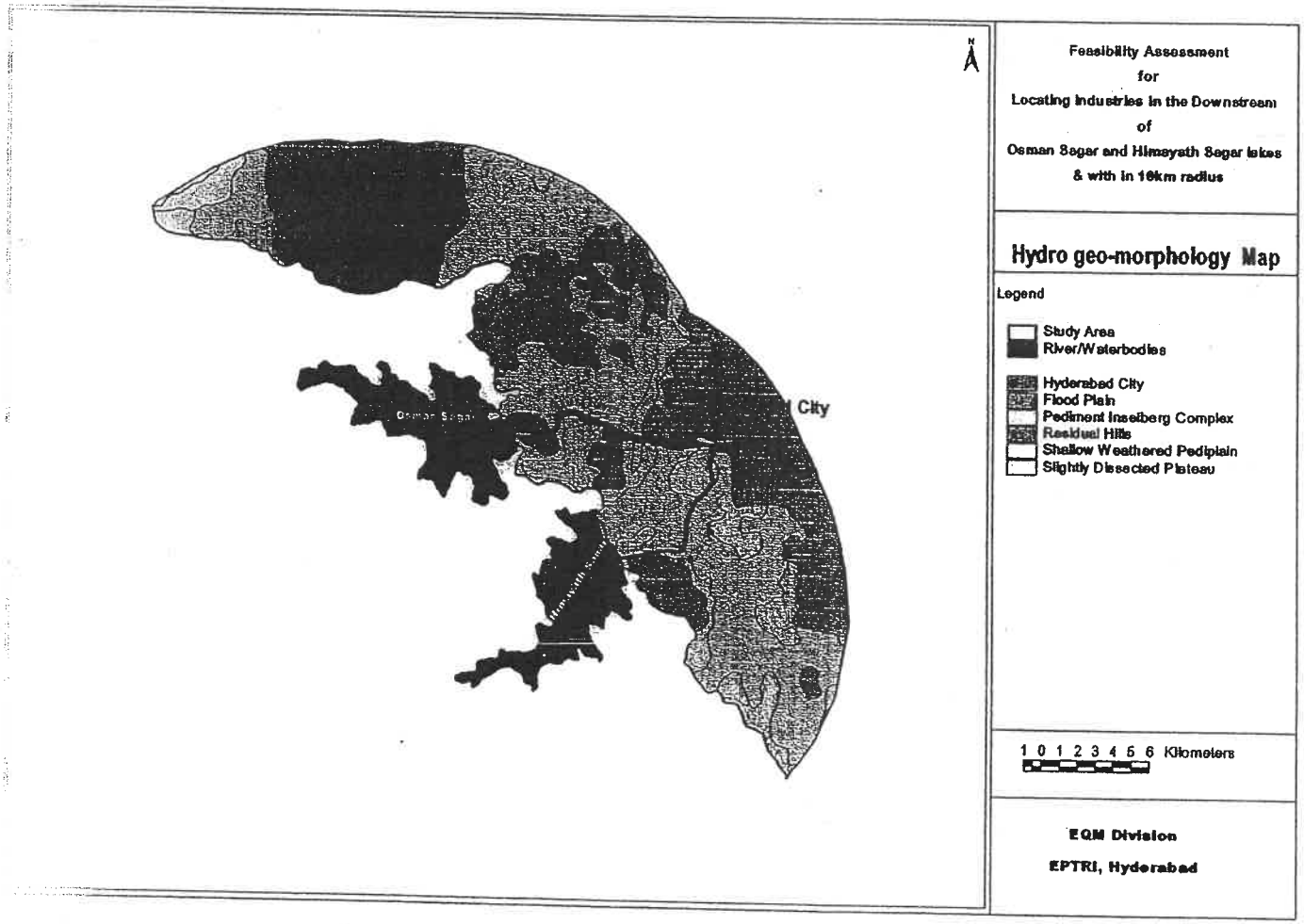


Fig.9 : Hydro Geo –Morphology

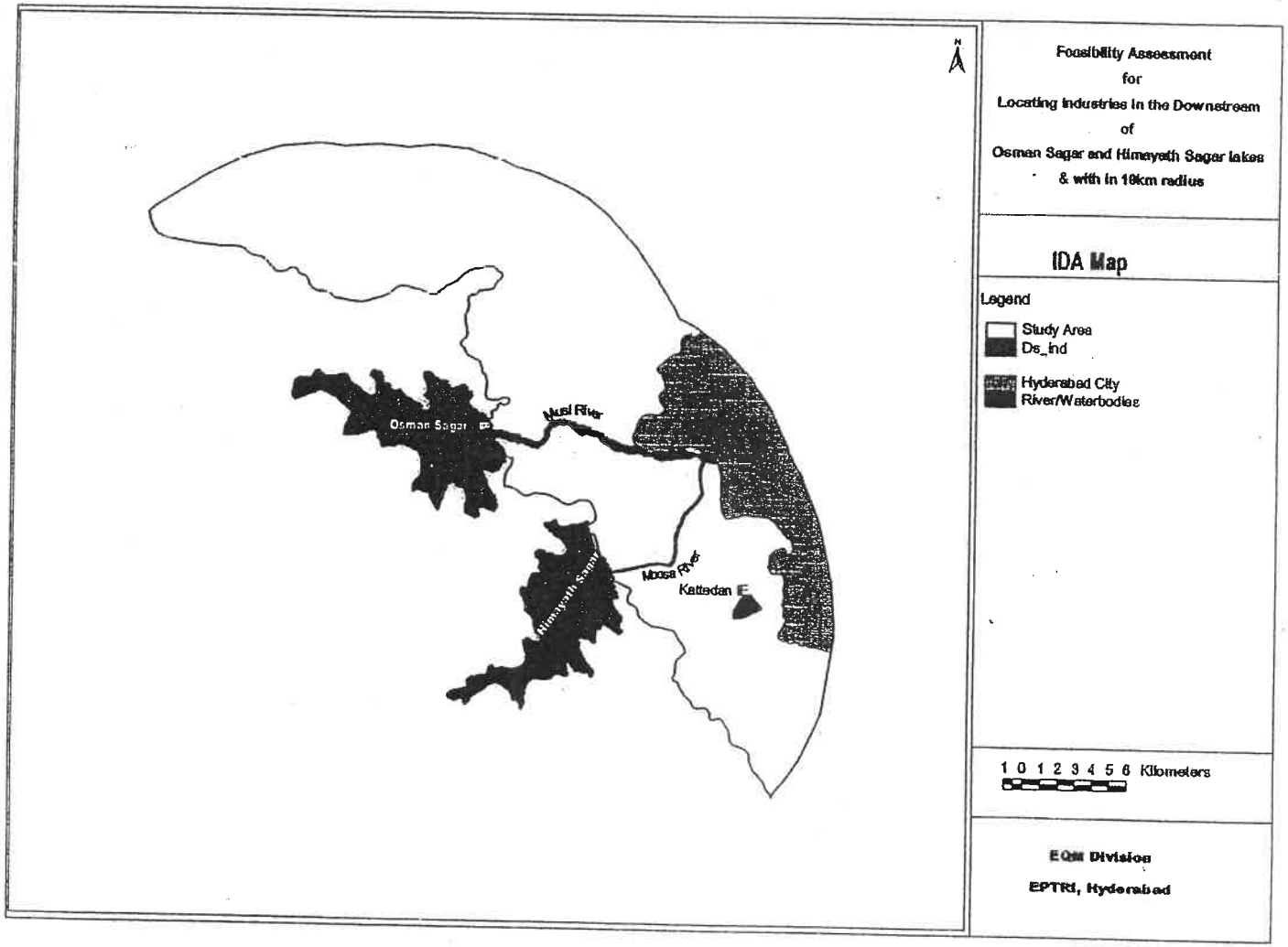


Fig. 10 : IDA Location

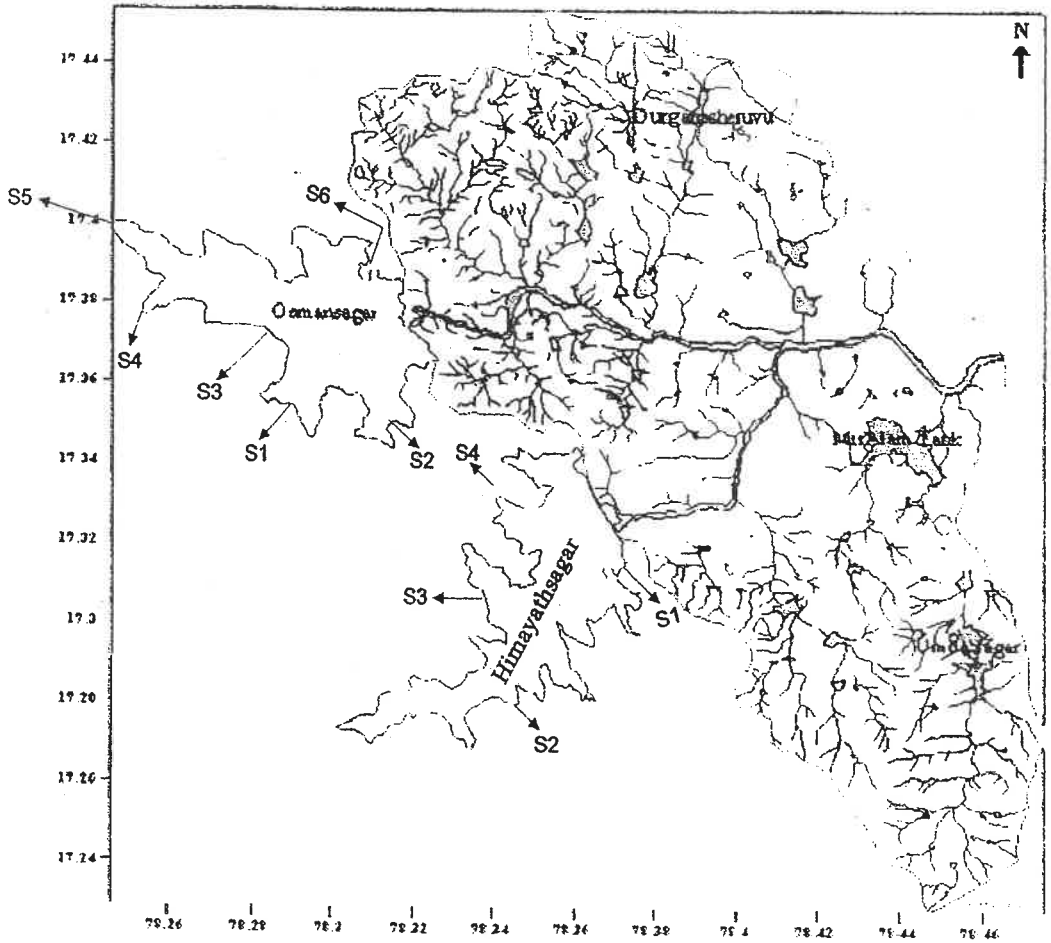


Fig. 11 : Location of Sampling Points of Osmansagar and Himayathsagar

6.5 Surface Water Bodies

The major water bodies such as Musi and Musa river, Noor Mohammed Kunta, Agriculture University Cheruvu, Shivrampally Cheruvu and Meer Alam Tank fall within the 10Km radius down stream of Osman Sagar and Himayath Sagar. Field investigations were under taken in the down stream area of Osman sagar and Himayath sagar to collect information influencing the quality of surface and ground water. EPTRI and NGRI teams had conducted extensive surveys in this regard and contacted a number of agencies and also obtained the secondary data available with them. To assess the quality of water bodies samples have been collected for physico chemical, and biological parameters.

6.5.1 Osman Sagar

The Osman Sagar lake was constructed on the River Musi by Mr. Mir Osman Ali Khan to meet the demand of drinking water to Hyderabad between 1912 and 1920. It has been formed on a sixth order stream. The year of commission of Osman sagar was 1922. In the 1920s it was catering for a population of about 5 lakhs. The present supply for drinking water purpose is 27 MGD. It has a total catchment area of 736 sq.km spread over 2287 hectars. The storage capacity is 110.436 MCM. The FTL is 1790ft. The area down stream of Osman Sagar and Himayath Sagar lakes with in 10 km radius covers about 230 Sq. km.

6.5.1.1 Physico Chemical analysis

Around six samples have been collected from Osman sagar during October 2005 to assess the quality of water. The water samples were collected from six locations and is depicted at **Figure 11** . The detailed analytical result is placed at **Table IV**. The important water quality characteristics are reviewed based on the analysis of water samples and compared with drinking water parameters. The details are as follows.

pH is towards alkaline side in between 8.0 to 8.5, which is well with in the standard. **Alkalinity** ranges between 125 mg/l to 142 mg/l , which is with in the standard. **Colour** is < 5 Pt. Co. Scale to 5 Pt. Co. Scale, with in the standard. **Odour and Taste** is nil, that is, no odour and no flavour. **Turbidity** ranges from 1.0 NTU to 4.3 NTU, which is with in the standard.

Total Hardness is in between 125 mg/l to 130 mg/l, **Calcium Hardness** ranges between 75 mg/l to 80 mg/l and **Magnesium Hardness** is in between 45 mg/l to 60 mg/l. These are well with in the standards. **Total Dissolved Solids** ranges between 172 mg/l to 189 mg/l, meeting the standard.

Chloride, Flouride Sulphate, Sulphate and **Nitrate** are in the range of 11.8 mg/l to 14.7 mg/l, 0.61 mg/l to 1.15 mg/l, BDL to 5.6 mg/l and 3.1 mg/l to 5.2 mg/l respectively . They are all with in the standard.

Calcium, Magnesium, Sodium and Potasium all are well with in the drinking water standards, values are 30 mg/l to 32 mg/l, 10.9 mg/l to 14.6 mg/l , 14 mg/l to 15 mg/l and 3.9 mg/l to 4.4 mg/l respectively.

Copper, Nickel, Manganese, Cadmium, Chromium, Lead, Boron and Cobalt are below detectable level (BDL). **Iron and Zinc** are in the range of 0.1mg/l to 0.44 mg/l and BDL to 0.04 mg/l respectively .As per IS 10500: 1991the Iron concentration is exceeding the limit of 0.3 mg/l in one location. As per the IS: 2296 Classification of Inland Surface Water (Drinking water source with conventional treatment and after disinfection) it is with in the standard of 5.0 mg/l.

The **COD** and **BOD** results have been obtained from the report on " Ecology of Himayath sagar and Osman sagar Lakes- Evaluation of Permissible Developmental Activities in the Catchment Areas" by EPTRI and NGRI, September 2005. The results shows that COD is in the range of 5 mg/l to 35 mg/l and BOD is in the range of Nil to 11 mg/l . As per the IS: 2296 Classification of Inland Surface Water (Drinking water source with conventional treatment and after disinfection) the BOD value is with in

the standard for all the samples except in one place where it has exceeded the standard of 3 mg/l . The man made activities in the catchment area as well as near the water body contributes to organic pollution.

6.5.1.2 Bacteriological Analysis

The secondary data obtained on bacteriological analysis of Osman sagar is placed at **Table V. It** reveals that the Total coliform MPN / 100 ml does not meeting the standard as per IS 10500: 1991. As regards to IS: 2296 Classification of Inland Surface Water (Drinking Water source with conventional treatment and after disinfection) it is within the standard of 5000 MPN /100ml as the water will be used for drinking only after conventional treatment and disinfection.

Table IV Physico – Chemical Analysis of Osman Sagar

S.No	Parameters	Osman Sagar Analysis Result – Collected on 05.10.2005					
		1. Near pump House	2. Center (Peripheral)	3. Outlet- Pump House towards Asif nagar	4. Crust gate, towards Chadergh at	5. Near Chilkur Temple	6. Near Khanapur
1.	PH Temperature ^0C	8.4 24.0	8.3 24.0	8.0 24.2	8.4 23.8	8.1 24.0	8.5 24.0
2.	Colour Pt. Co Scale	5	< 5	< 5	< 5	5	5
3.	Odour	No odour	No odour	No odour	No odour	No odour	No odour
4.	Taste	No flavour	No flavour	No flavour	No flavour	No flavour	No flavour
5.	Turbidity NTU	2.0	2.3	4.3	1.7	1.0	1.8
6.	Total Hardness as $CaCO_3$	125	125	130	135	130	125
7.	Calcium Hardness as$CaCO_3$	75.0	75.0	75.0	75.0	80.0	80.0
8.	Magnesium Hardness as $CaCO_3$	50.0	50.0	55.0	60.0	50.0	45.0
9.	Total Dissolved Solids at 180^oC	175	172	176	179	189	178
10.	Chloride as Cl^-	13.7	13.7	13.7	12.7	14.7	11.8
11.	Calcium as Ca	30.0	30.0	30.0	30.0	32.0	32.
12.	Fluoride as F	1.15	1.10	0.61	1.12	0.95	0.94
13.	Magnesium as Mg	12.2	12.2	13.4	14.6	12.2	10.9
14.	Sulfate as SO_4^{-2}	BDL	4.9	4.8	4.6	5.6	5.5
15.	Nitrate as NO_3	4.6	4.6	5.2	4.6	3.1	4.6
16.	Total Alkalinity as $CaCO_3$	131	125	131	131	142	131
17.	Iron as Fe	0.13	0.18	0.44	0.10	0.10	0.23
18.	Copper as Cu	BDL	BDL	BDL	BDL	BDL	BDL
19.	Nickel as Ni	BDL	BDL	BDL	BDL	BDL	BDL
20.	Manganese as Mn	BDL	BDL	BDL	BDL	BDL	BDL

21.	Zinc as Zn	BDL	0.02	BDL	BDL	BDL	0.04
22.	Cadmium as Cd	BDL	BDL	BDL	BDL	BDL	BDL
23.	Chromium as Cr^{+6}	BDL	BDL	BDL	BDL	BDL	BDL
24.	Lead as Pb	BDL	BDL	BDL	BDL	BDL	BDL
25.	Boron as B	BDL	BDL	BDL	BDL	BDL	BDL
26.	Cobalt as Co	BDL	BDL	BDL	BDL	BDL	BDL
27.	Sodium as Na	14.0	14.0	15.0	14.0	14.0	14.0
28.	Potassium as K	3.9	3.9	3.9	3.9	4.4	3.9
29.	SAR--	0.56	0.56	0.57	0.52	0.53	0.54
30.	Percent Sodium %	19.0	19.0	19.5	17.9	18.4	19.0

All results are expressed in mg/l other wise stated.

Table V Bacteriological Analysis of Osman Sagar

Water body	Year/sample	Coliform(MPN/100ml)
Osman sagar	2002	240+-570

SOURCE : City development strategy, ASCI, Table 5-8 (HMWSSB 2002)

6.5.2. Himayat Sagar

Parallel to the Osman Sagar Lake is a slightly smaller lake called the Himayat Sagar. It is named after the youngest son of the seventh Nizam, Mr. Himayat Ali Khan. It is also a drinking water source for Hyderabad city . Its catchment area is 1340 sq.km spread over 1836 hectars. The storage capacity is 84.016 MCM. The FTL is 1763.5 ft.and it was constructed between 1920 and 1927 on the stream Musa a tributary of Musi, formed on fifth order stream. Himayat Sagar was commissioned in 1927 to meet a part of the drinking water needs of the people in Hyderabad city. The present supply for drinking water purposes is 18 MGD. Osman Sagar and Himayath Sagar are situated at a distance of about 10 km. from each other west of Hyderabad and relatively Osman Sagar lies towards North and Himayath Sagar to the South at a distance of 19.31 Km and 9.66 km. respectively, from Hyderabad city.

6.5.2.1 Physico Chemical analysis

A total of four samples have been collected from Himayath sagar during October 2005 to assess the quality of water. The location points are depicted at **Figure 11** . The detailed analytical results are placed at **Table VI**. The important water quality characteristics are reviewed based on the analysis of water samples and compared with drinking water parameters. The details are as follows.

pH is towards alkaline side in between 8.2 to 8.5. This is well with in the standard. **Alkalinity** ranges between 114 mg/l to 142 mg/l , which is with in standard. **Colour** is 10 Pt. Co. Scale to 15 Pt. Co. Scale, which is with in the standard. **Odour and Taste** is nil, that is no odour and no flavour. **Turbidity** ranges from 6.4 NTU to 7.0 NTU, which is with in the standards.

Total Hardness is in between 95 mg/l to 130 mg/l, **Calcium Hardness** ranges between 55 mg/l to 90 mg/l and **Magnesium Hardness** is in between 35 mg/l to 40 mg/l. They are well with in the standards. **Total Dissolved Solids** ranges between 158 mg/l to 189 mg/l, meeting the standards.

Chloride, Flouride , Sulphate and **Nitrate** are in the range of 9.8 mg/l to 10.8 mg/l, 0.92 mg/l to 1.6 mg/l, BDL to9.5 mg/l and 3.1 mg/l to 5.1 mg/l respectively . They are all with in the standards except Flouride which is more near out let crest gate towards chadar ghat (in one location).

Calcium, Magnesium, Sodium and Potasium all are well with in the drinking water standards of 22 mg/l to 36 mg/l, 8.5 mg/l to 9.7 mg/l , 18 mg/l (in all samples) and 3.9 mg/l to 4.4 mg/l respectively.

Copper, Nickel, Manganese, Cadmium, Chromium, Lead, Boron and Cobalt are below detectable level (BDL). **Iron and Zinc** are in the range of 0.86 mg/l to 1.6 mg/l and BDL to 0.007 mg/l respectively. The Iron has crossed the standard in two locations where as Zinc is well with in the standard IS 10500:1991. As regards to IS:

2296, Classification of Inland Surface Water (Drinking Water source with conventional treatment and after disinfection) it is with in the standard of 5 mg/l

The COD and BOD results have been obtained from the report on " Ecology of Himayath sagar and Osman sagar Lakes- Evaluation of Permissible Developmental Activities in the Catchment Areas" by EPTRI and NGRI, September 2005. The results shows that COD is in the range of 40 mg/l to 70 mg/l and BOD is in the range of 17 mg/l to 20 mg/l which is exceeding the limit of 3 mg/l at all locations. The man made activities in the catchment area may contribute to organic pollution.

6.5.2.2 Bacteriological Analysis

The secondary data obtained on bacteriological analysis of Himayath sagar is placed at **Table VII**, reveals that the Total coliform MPN/100ml is not meeting the standard as per IS 10500: 1991. As regards to IS: 2296 Classification of Inland Surface Water (Drinking Water source with conventional treatment and after disinfection) it is with in the standard of 5000 MPN /100ml., as the water will be used for drinking only after conventional treatment and disinfection.

Table VI : Physico Chemical Analysis of Himayath Sagar

S.No	TEST PARAMETER (s)	Himayath Sagar Analysis RESULT –Date of Sampling 05.10.2005			
		1. Upward-Right side	2. Outlet-Crust gate towards Chaderghat	3. Near Pump House towards Puranapool	4. Upwards – Left side
	pH	8.5	8.5	8.4	8.2
1	Temp. ^{0}C	24.3	24.1	24	23.8
2	Colour Pt. Co Scale	15	15	10	10
3	Odour	No Odour	No odour	No odour	No odour
4	Taste	No flavour	No flavour	No flavour	No flavour
5	Turbidity NTU	6.4	7	6.8	6.5
6	Total Hardness as $CaCO_3$	95	100	130	105

7	Calcium Hardness as $CaCO_3$	55	60	90	70
8	Magnesium Hardness as $CaCO_3$	40	40	40	35
9	Total Dissolved Solids at 180°C	159	158	189	174
10	Chloride as Cl^-	9.8	9.8	10.8	9.8
11	Calcium as Ca	22	24	36	28
	Fluoride as F	1.1	1.6	0.92	1.1
13	Magnesium as Mg	9.7	9.7	9.7	8.5
14	Sulfate as SO_4^{-2}	BDL	BDL	7.6	9.5
15	Nitrate as NO_3	3.1	3.4	4.3	5.1
16	Total Alkalinity as $CaCO_3$	114	114	142	131
17	Iron as Fe	1.6	0.86	0.94	1.1
18	Copper as Cu	BDL	BDL	BDL	BDL
19	Nickel as Ni	BDL	BDL	BDL	BDL
20	Manganese as Mn	BDL	BDL	BDL	BDL
21	Zinc as Zn	BDL	BDL	0.007	BDL
22	Cadmium as Cd	BDL	BDL	BDL	BDL
23	Chromium as Cr^{+6}	BDL	BDL	BDL	BDL
24	Lead as Pb	BDL	BDL	BDL	BDL
25	Boron as B	BDL	BDL	BDL	BDL
26	Cobalt as Co	BDL	BDL	BDL	BDL
27	Sodium as Na	18	18	13	18
28	Potassium as K	4.4	4.4	4.4	3.9
29	SAR	0.8	0.78	0.69	0.77
30	Percent Sodium %	28	27.1	22.4	26.3

All results are expressed in mg/l other wise stated.

Table VII : Bacteriological Analysis of Himayath Sagar

Water body	Year/sample	Coliform(MPN/100ml)
Himayat sagar	2002	240+-570

SOURCE :city development strategy, ASCI, (HMWSSB 2002)Table 5-8

6.5.3 Noor Mohammed Kunta

Noor Mohammed Kunta is a surface water body situated in Rajendranagar municipality in the South eastern zone of Hyderabad with coordinates at 78 25' 43" East longitude and 17 18' 51" North latitude, into Ranga Reddy district .

The Noor Mohammed Kunta is a man made lake originally impounded to cater to the irrigation needs of Kattedan and Bumrukmadwola villages . As per the HUDA survey ,this water body is identified as a 'dry' lake located in Kooware village of Ranga Reddy district with a water spread of 13.6 hectares (34 acres). As per the records of MRO office, Rajendranagar, the catchment area of the lake is 1.75 M.sqm (430 arces).The registered ayacut according to 1964 figures was 10 acres in Kattedan and 33 arces in Bumrukmadwola village. The National Highway No.7 forms the western boundary of the Noor Mohammed Kunta, while the Secunderabad-Kurnool railway line forms its Eastern boundary. On the Northern side of the lake there is a hillock, which is limiting the lake's spread on this side. On the Southern side, there are green meadows which serve as grazing grounds for animals. The lake has a natural slope in the north-west direction and comprises of an earthen bund with its TBL at 546.83m above MSL with a surplus arrangement (natural ground escape) on the eastern end of the bund . At present, the overflow passes through a sluice which is situated at the middle of the bund and close to the Highway .The overflow water finds its way in to Sivarampally cheruvu through the A.P.Agricultural University through a road culvert abutting NH.7..

According to the MRO's records , till the recent past , the lake was surrounded by a thick green vegetation belt which was used for community cattle grazing . The lake water was used as a source for drinking water by the villagers and animals . Healthy edible fish species like ***Rohu*** were found in the lake. This fresh surface water body

and the ecosystem existing in it, faced environmental threat due to the rapid urban-industrial changes taking place in the sprawl of the its catchment since the early 1970s.This also resulted in the complete reduction of its ayacut.

6.5.3.1 Physico Chemical Analysis

Water samples was collected for physico chemical and biological analysis (benthic macro invertebrate) from Noor Mohammed Kunta to assess the quality of water. The details of analytical results is at **Table VIII**.

Table VIII : Physico Chemical Analysis of Noor Mohammed Kunta (2005)

S.No.	Parameter	Noor Mohammed Kunta
1	pH	7.3
2	Total Dissolved Solids	1790
3	Bicarbonate (HCO3)	432
4	Chlorides	485
5	Flouride	0.94
6	Sulphate	402
7	Nitrate	18.3
8	Calcium	129
9	Magnesium	67
10	Total Hardness	597
11	Sodium	357
12	Potasium	26

All results are expressed in mg/l except pH.

EPTRI has done study of Noor Mohammed Kunta in 1997. The analytical results is placed at **Table IX.**

Table IX: Physico Chemical Analysis of Noor Mohd. Kunta (1997)

	Sampling Location							
Parameter	1	2	3	4	5	6	7	8
BOD 5 day @ 20°C	124	174	108	294	404	174	100	20
COD	763	813	362	1002	555	645	337	119
Dissolved Oxygen	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
Total dissolved and suspended Ortho Phosphate	0.7	0.8	0.8	1.1	0.7	0.8	0.7	0.4
Total Kjeldahl Nitrogen	3.1	3.6	1.7	8.4	95	3.1	3.6	3.6
Free Ammonia Nitrogen	0.3	0.2	0.1	1	0.1	0.3	0.2	0.2
Nitrate nitrogen	1.6	1.2	51	1.5	1.5	1.5	2	2.3
Chlorides	597	793	704	734	695	714	685	773
Fluorides	2.9	2.2	1.2	1.6	2	1.7	3.0	2.8
Bicarbonates as HCO_3	537	793	659	683	659	671	732	712
Sulphates as SO_4	1476	1446	1650	1702	2339	1709	1632	1899
Potassium as K	17	14	20	18	16	17	20	15
Sodium percent (All bases expressed as meq/l)	76	84	84	77	80	82	83	42
Magnesium	63	27	31	87	89	82	2.4	82
Calcium	190	178	158	174	190	107	222	218
Total Hardness as $CaCO_3$	733	544	524	792	842	604	564	881
Alkaline Hardness as $CaCO_3$	733	554	525	740	740	604	564	712
Non Alkaline Hardness $CaCO_3$	Nil	Nil	Nil	52	102	Nil	Nil	169
Methyl Orange Alkalinity as $CaCO_3$	590	810	660	650	640	640	660	636
Cation load, meq/	63.3	72.7	71.9	71.9	84.1	70.3	68.7	67.2
Dissolved solids	3708	3722	3700	3569	3653	3560	3666	3748
Suspended solids	123	246	249	1387	233	2436	133	142
Conductivity µ Siemens/l	6506	6203	6727	5490	6088	5933	6546	6246
pH	8.4	8.3	8.4	8.3	8.5	8.2	8.3	8.3
Temperature °C	27	26	27	27	26	25	26	27

All results are expressed in mg/l other wise stated.

Descriptions of Sampling Points

1. Overflow of the lake
2. Near the eastern side of the lake
3. Near the hillock
4. Inflow from the culvert near the Railway track (on the southern side of the lake)
5. Inflow from the culvert receiving the effluents(south west corner of the lake)
6. Near the western side of the lake
7. Centre of the lake
8. Outflow of the lake before joining the sivarampally cheruvu

It is observed that **pH** is towards alkaline side, between 7.9 to 8.5, **Alkalinity** ranges between 590 mg/l to 810 mg/l ,**Total Hardness** is in between 524 mg/l to 881 mg/l, **Total Dissolved Solids** ranges between 3560 mg/l to 3748 mg/l, **Chloride**, and **Nitrate** are in the range of 597 mg/l to 793 mg/l, 1.2 mg/l to 51 mg/l respectively. **Sodium and Potasium** are 42 mg/l to 84 mg/l and 14 mg/l to 20 mg/l respectively. The **DO** is nil in all the points, **COD** and **BOD** are in the range of 119 mg/l to 1002 mg/l and 20 mg/l to 294 mg/l respectively.

If the Noor Mohammed Kunta is to be used for Irrigation, Industrial cooling and controlled waste disposal purposes, as per the Classification of Inland Surface Water IS 2296 , pH, Total Dissolved Solids, Chlorides and Sodium are exceeding the limits. The standard of water quality for the above purpose is as follows.

pH 6.0 to 8.0 , Total Dissolved Solids as 2100 mg / l, Chlorides 600 mg /l, Sodium 26 mg /l, Boron as 2 mg / l, Sulphate as 1000 mg / l and Conductivity as 2,250 mhos /cm.

6.5.4 Sivarampally cheruvu

The reconnaissance survey indicated that the bund of Sivarampally cheruvu is in good condition. However, the masonry weir was found to be dismantled. The water colour of the cheruvu is brown. It is observed that the tank receives the overflow of Noor Mohd kunta, which in turn receives the effluents from the Kattedan industrial area. The Shikam of the tank, as reported by the MRO, Rajendranagar, is about 0.04 km^2 (10 acres 85 guntas) and comes under village survey Nos. 116,117,118 and 119. Of this, the area under Survey No. 116 belongs to the Government and the remaining is *Patta* land. The registered ayacut under this cheruvu was 23 acres 23 guntas. As per Source Register of MRO, the depth of the tank at the outlet sluice is 4 feet 6 inches at the time of construction. The hydrological features of the tank are shown at **Table X.**

Table X: Hydrological Features of Sivarampally Cheruvu

Feature	Sivarampally cheruvu
Catchment area	3.64 km^2
FTL	+535.485 m.
MWL	+536.185 m.
TBL	+536.785 m.
Area at FTL	0.067 l m^2
Water holding capacity at FTL	0.11 Mm^3
Lowest bed	+529.50 m.

Source: EPTRI Report on Action Plan for Conservation of Miralam Tank and Sivarampally Cheruvu

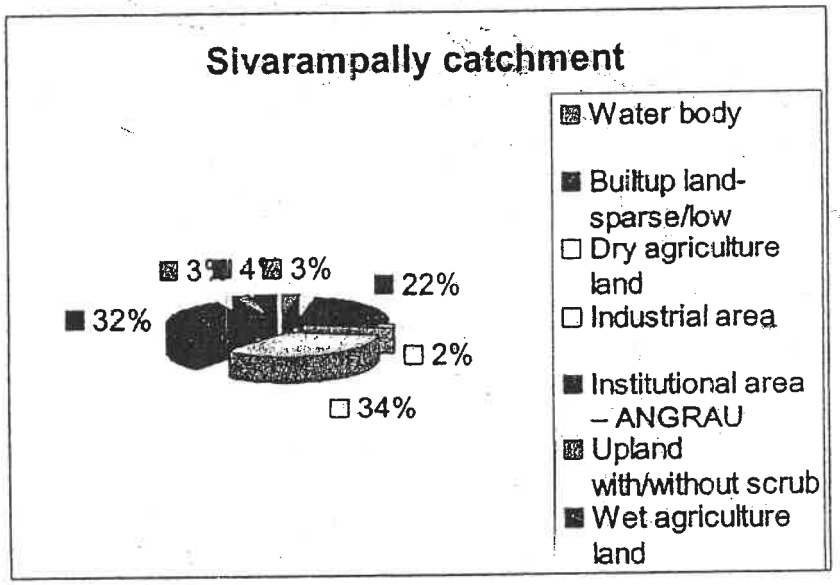
The hydrographic survey indicated that the tank has maximum depths near the foreshore at North-western side. The details of land use in the catchment area is presented at **Table XI**. The percentage of land use land cover is depicted at **Figure 12**

Table XI : Land Use / Land Cover Area in Sivarampally Cheruvu Catchment Area

Land use/Land cover category	Area in Sq.Km
Industrial area	1.24
Dry agriculture land	1.17
Built-up land-sparse/low	0.8
Wet agriculture land	0.16
Upland wild/without scrub	0.1
Water body	0.1
Institutional area – ANGRAU	0.07

Source: EPTRI Report on Action Plan for Conservation of Mir alam Tank and Sivarampally Cheruvu

Fig. 12: Land Use / Land Cover Percentage in Sivarampally Cheruvu Catchment



Water body..... 03%
Builtup land-sparse/low..... 22%
Dry agriculture land..... 02%
Industrial area.....34%
Institutional area – ANGRAU.....32%
Upland with/without scrub.....03%
Wet agriculture land.....04%

6.5.4.1 Physico Chemical analysis of Sivarampally Cheruvu

The details of analytical results of Sivarampally Cheruvu is presented at **Table XII**. The results shows that the water is not suitable for irrigation purposes as the total dissolved Solid is ranging from 4000 mg / l to 6000 mg / l , Chlorides is between 1000 mg / l to 1300 mg /l and sulphates range is 1000 mg / l to 2200 mg / l. The permissible levels of Total dissolved Solids, Chlorides and Sulphates for surface waters to be used for irrigation purpose are 2100 mg / l, 600 mg / l and 1000 mg / l respectively.

Table XII : Physico- Chemical Analysis of Sivarampally cheruvu

S.No	Parameter	S1-Inlet		S2-Towards coming up colony		S3-Towards ring road		S4-Outlet		S5-Centre	Class E Stnd.
	Monsoon	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Post	
1	pH	8.5	8.4	8.7	8.7	8.7	8.5	8.7	8.5	8.4	6.0-8.0
2	Cond. µmhos/cm	7.2	6.4	7.3	7.3	7.4	6.3	7.3	6.3	6.3	2.25
3	TDS	5610	4200	5985	5320	6100	4050	5320	4150	4075	2100
4	TSS	12	15	15	12	20	26	12	10	15	--
5	TDVS	75	10	70	80	76	60	80	58	70	---
6	CaCO3	56	85	67	56	62	105	56	65	80	----
7	HCO3	510	515	510	487	515	495	487	525	500	---
8	Calcium CaCO3	551	---	604	577	604	----	577	---	---	---
9	Mg as CaCO3	499	---	551	524	551	---	524	---	---	---
10	SO4	1899	1200	2161	1934	2211	1160	1934	1050	1160	1000
11	Nitrates as NO3	25	25	25	24	27	26.7	24	27.2	26	---
12	Nitrates as NO_2	--	0.03	--	--	--	0.03	--	0.06	BDL	---
13	Fluoride	1.16	1.2	1.11	1.22	1.28	1.2	1.22	1.3	1.2	----
14	Ortho P	5.9	--	7.5	--	7.8	---	7.8	---	---	---
15	Total P	---	126	---	59.5	---	49	---	47.2	---	---
16	Na	1866	1175	1788	1685	1977	1256	1685	1120	960	---
17	K	42	22	45	47	49	21.4	47	21.4	21	---
18	COD	155	190	155	146	146	175	146	150	135	---
19	BOD 3	70	35	65	66	66	35	66	30	35	---
20	Cl	1315	1030	1365	1042	1266	1050	1042	1080	1055	600
21	B	BDL	23.5	BDL	19.5	BDL	23.3	BDL	20.6	24.6	2
22	Iron	--	1.7	--	--	--	1.1	--	0.88	0.79	----
23	Mn	0.12	0.18	0.06	1.65	0.02	0.29	0.25	1.65	0.28	---
24	Cu	BDL	0.21	BDL	BDL	BDL	0.12	BDL	0.13	0.12	---
25	Zn	0.08	0.95	BDL	0.03	0.02	0.78	BDL	0.71	0.87	---
26	Ni	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
27	Co	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
28	Cd	0.007	BDL	0.006	BDL	0.005	BDL	BDL	BDL	BDL	----
29	Pb	BDL	0.16	BDL	BDL	BDL	0.12	BDL	0.13	BDL	--
30	Cr	BDL	0.88	BDL	BDL	BDL	0.37	BDL	0.31	0.32	---
31	Hg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	--
32	SAR	25	--	23	---	25	---	22	---	---	26
33	DO	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	---
34	MPN/ 100ml	1609+	NIL	---	$43x10^1$	---	NIL	1609+	NIL	$23x10^1$	----
35	E.coli /100ml	NIL	NIL	---	NIL	---	NIL	NIL	NIL	NIL	---

All results are expressed in mg/l other wise stated.
Source: EPTRI Report on Action Plan for Conservation of Mir alam Tank and Sivarampally Cheruvu

6.5.5 Miralam tank

Mir Alam Tank a reservoir was once the city's water source built by and named after Mir Alam, (Prime Minister of Hyderabad 1804-1808).This tank is a unique piece of engineering with a mile-long bund formed by 21 arches. Mir Alam tank, which was once the drinking water source but has now, turned into highly polluted lake.

Both the bund and surplus overflow weir are in good condition. As per the records of Mandal Revenue Office, Rajendranagar, the Miralam tank comes under village Survey No. 293 with a shikam of 1.42 km^2 (347 acres) and the ayacut under this tank was abandoned after the construction of Zoological Park. As per the land use map of NRSA (1996), the catchment area of this tank is covered by a number of residential areas, Kattedan industrial area, agricultural fields, water bodies, quarries, barren and rocky areas. During the study carried out by EPTRI, it was observed that a major portion of the catchment in the immediate neighborhood of Miralam tank is occupied by residential colonies. The sewage/sullage and municipal solid waste generated in the surrounding residential colonies and the overflow of Sivarampally cheruvu are the major sources of pollution. The overflow of this tank passes through a small water body, which is located in Nehru Zoological Park and ultimately joins River Musi. The hydrological features of the Miralam tank obtained from hydrographic survey is shown at **Table XIII.**

Land Use / Land Cover area particulars in the catchment area of Miralam tank is at **Table XIV.** Percentage wise land use and land cover is depicted at **Figure 13.**

The effluents from the industries located along the railway track find their way into a channel running along and under the track and ultimately reach the low lying areas on the north eastern side of the lake. Traversing the railway track, there are two major culverts which convey industrial effluents to the kunta. On the western side of the lake there is a vent close to NH7 opening into the lake situated in AP agricultural University campus . As pointed out earlier, the industries which are situated in the catchment area close to the lake are mostly oil refineries, textile and battery units.

The waste discharges from most of these units can be treated effectively by biological methods. If the untreated effluents are released to the environment, they get degraded in the water course and in the soil. The degree of degradation depends on the various environmental factors existing in the lake and in the soil. However the biodegradation of the colour causing compounds in the industrial wastes in the natural environment is difficult and persists for a long time in the receiving environment. This is happening when wastes containing colour are finding their way into Noor Mohammed Kunta. In addition to the liquid industrial wastes, solid wastes are finding their way into the lake due to deliberate regular dumping by both industries and residents regularly. This is not only resulting in pollution of the lake but reduction of its holding capacity. In addition, the exposed tank bed is sometimes being used as a cremation ground. The water samples were collected from Meer Alam Tank to assess the quality of water and results were compared with IS 2296 for Class B , Out door bathing organized / recreational purpose. Sampling locations are shown in **Figure 14**. The detailed report of physico – chemical analysis is placed at **Table XV**. From the Table XV it observed that the range of concentration of different chemicals is as follows.

pH is towards alkaline side in between 8.2 to 8.8, **Alkalinity** ranges between 284 mg/l to 313 mg/l', **Colour** is 25 Pt. Co. Scale to 30 Pt. Co. Scale, **Odour and Taste** is nil, that is no odour and no flavour. **Turbidity** ranges from 1.8 NTU to 5.2 NTU.

Total Hardness is in between 425 mg/l to 430 mg/l, **Calcium Hardness** ranges between 125 mg/l to 130 mg/l and **Magnesium Hardness** is in between 295 mg/l to 305 mg/l. **Total Dissolved Solids** ranges between 1203 mg/l to 1224 mg/l.

Chloride, Flouride Sulphate and Nitrate are in the range of 441 mg/l to 446 mg/l, 0.94 mg/l to 1.08 mg/l, 77.5 mg/l to 184 mg /l and 5.9 mg/l to 7.1 mg/l respectively.

Calcium, Magnesium, Sodium and Potasium are in the range of 50 mg/l to 54 mg/l, 71.7 mg/l to 74.1 mg/l , 230 mg /l to 250 mg/l and 21.9 mg/l to 22.4 mg/l respectively.

Copper, Nickel, Manganese, Cadmium, Chromium, Lead, Boron and Cobalt are below detectable level (BDL). **Iron and Zinc** are in the range of 0.07 mg/l to 0.43 mg/l and BDL to 0.06 mg/l respectively.

The Fluoride , pH, Arsenic, DO, COD and BOD results were obtained from the NGRI report on " Lake Water Budget of Meer Alam Tank and Ground Water and Surface Water quality in Meer Alam Tank Watershed- HUDA Lakes Study- August 2004". The results show that Fluoride is in the range of 0.9 mg/l to 3.6 mg /l ,pH range 7.3 to 8.7, Arsenic range 0.05 mg/l to 0.059 , DO is in between 6.3 mg /l to 7.3 mg /l, COD is in the range of 48 mg/l to 75 mg/l and BOD is in the range of 6.4 mg/l to 14.6 mg/l . As per IS 2296 standard for outdoor bathing organized / recreational purpose, DO is well with in the standard but BOD, pH and Fluoride are exceeding the limit . The man-made activities in the catchment area contribute to organic pollution.

Table XIII : Hydrological Features of Meer Alam Tank

Feature	Miralam Tank
Catchment area	13.5 km2
FTL	+517.3 m
MWL	+517.92 m
Area at FTL	1.32 km2
Water holding capacity at FTL	7.89 Mm2
Lowest bed level of the tank	+505.36 m

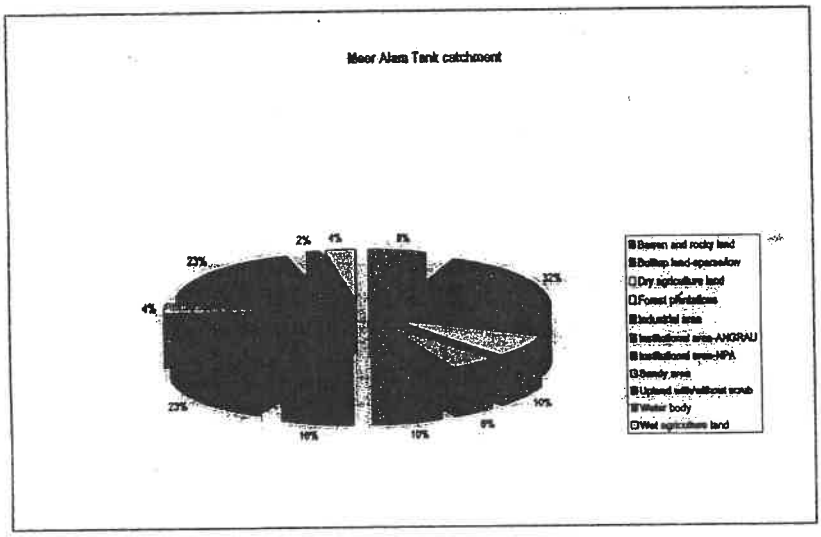
Source: EPTRI Report on Action Plan for Conservation of Mir alam Tank and Sivarampally Cheruvu

Table XIV : Land Use / Land Cover in Meer Alam Tank Catchment

LANDUSE/LANDCOVER CATEGORY	AREA IN SQ. KM
Built-up land-sparse/low	4.365
Upland with/without scrub	3.115
Industrial area	1.403
Dry agriculture land	1.339
Barren and rocky land	1.025
Institutional area – NPA	0.827
Wet agriculture land	0.579
Sandy area	0.497
Water body	0.248
Institutional area – ANGRAU	0.071
Forest plantations	0.040

Source: EPTRI Report on Action Plan for Conservation of Mir alam Tank and Sivarampally Cheruvu

Fig 13 : Percentage of Landuse / Land Cover in Meer Alam Tank Catchment



Barren and rocky land.....08%
Builtup land-sparse/low.....32%
Dry agriculture land.....10%
Forest plantations.....06%
Industrial area.....10%
Institutional area-ANGRAU.....10%
Institutional area-NPA.....23%
Sandy area.....04%
Upland with/without scrub.....23%
Water body.....02%
Wet agriculture land.....04%

Table XV : Physico – Chemical Analysis of Meer Alam Tank All results are

S.No	TEST PARAMETER (s)	1. Towards Hasan nagar	2. Near Boats club inside Zoo park	3. Inlet -Pahad & Upparpalli
1	pH	8.2	8.7	8.8
2.	Colour Pt. Co Scale	30.0	25.0	25
3.	Odour	No odour	No odour	No odour
4.	Taste	No Flavour	No Flavour	No Flavour
5.	Turbidity NTU	5.2	1.8	2.9
6.	Total Hardness as $CaCO_3$	430	425	430
7.	Calcium Hardness as $CaCO_3$	125	125	135
8.	Magnesium Hardness as $CaCO_3$	305	300	295
9.	Total Dissolved Solids at 180°C	1,213	1,224	1,203
10.	Chloride as Cl^-	466	441	441
11.	Calcium as Ca	50.0	50.0	54.0
12.	Fluoride as F	1.08	0.94	1.0
13.	Magnesium as Mg	74.1	72.9	71.7
14.	Sulfate as SO_4^{-2}	77.5	184	114
15.	Nitrate as NO_3	7.1	6.1	5.9
16.	Total Alkalinity as $CaCO_3$	284	290	313
17.	Iron as Fe	0.34	0.07	0.43
18.	Copper as Cu	BDL	BDL	BDL
19.	Nickel as Ni	BDL	BDL	BDL
20.	Manganese as Mn	BDL	BDL	BDL
21.	Zinc as Zn	BDL	BDL	0.06
22.	Cadmium as Cd	BDL	BDL	BDL
23.	Chromium as Cr^{+6}	BDL	BDL	BDL
24.	Lead as Pb	BDL	BDL	BDL
25.	Boron as B	BDL	BDL	BDL
26.	Cobalt as Co	BDL	BDL	BDL
27.	Sodium as Na	250	230	230
28.	Potassium as K	22.4	21.9	21.9
29.	SAR –	5.2	4.9	4.8
30.	Percent Sodium %	54.3	52.5	52.2

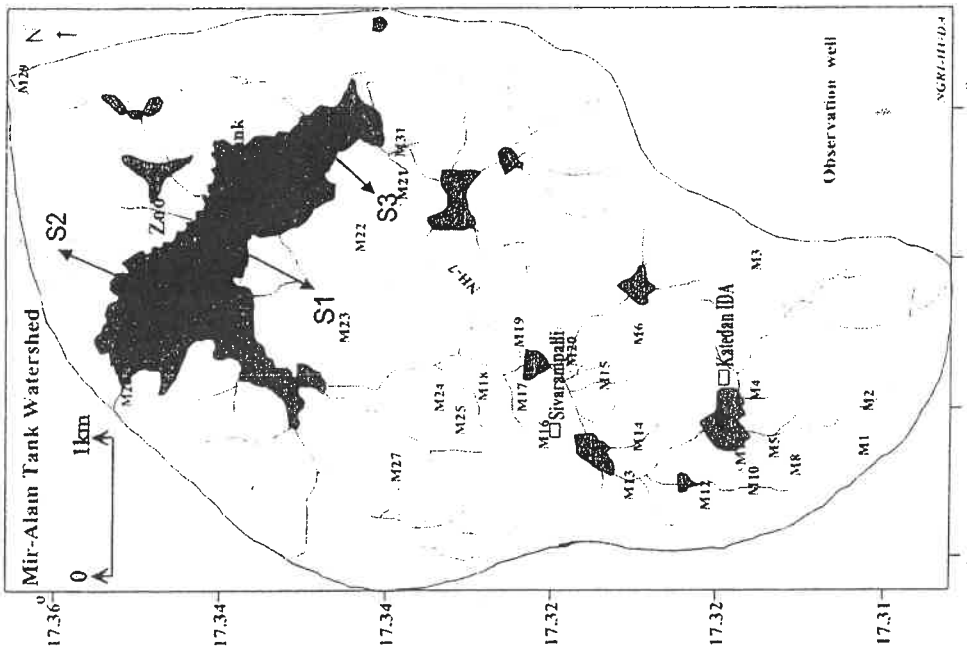


Fig.14 : Sampling Location of Meer Alam Tank

expressed in mg/l other wise stated.

Fig. 14 : Sampling Locations of Meer Alam Tank

6.5.6 Bio-Monitoring of Water Bodies / Bio- Mapping of Water Bodies

Monitoring of environmental components is an important pre-requisite for pollution control activities. Bio monitoring is the introduction of biological variables for assessment of the structural and functional aspects of aquatic ecosystems. Through bio monitoring, the cumulative effect of all the pollutants can be determined and the overall health of the aquatic ecosystems could be properly assessed. The benthic macro-invertebrates were found to be the most suitable among all other living systems present in aquatic eco system. Two methods for evaluation of benthic macro invertebrates were adopted. They are:

a. Sequential comparison index for diversity and
b. BMWP (Bio-monitoring Working Party) score system for saprobity.

The benthic macro- invertebrate Taxa used for bio monitoring is presented at **Table XVI**.

Table XVI : Benthic Macro-Invertebrates – Taxa

EPHEMEROPTERA	TRICHOPTERA
PLECOPTERA	ODONATA
HEMIPTERA	CRUSTACEA
COLEOPTERA	DIPTERA
MOLLUSCA	HIRUDENIA
DIPTERA	OLIGOCHEATA

The Biological Water Quality Criteria for Evaluation of Water Bodies is based upon the range of saprobic values and diversity of the benthic macro-invertebrate families with respect to water quality. The details of Biological Water Quality Criteria for Evaluation of Water bodies is placed at **Table XVII**. The ranges prescribed in the Table XVII are guidelines. The abnormal combination of saprobity with diversity range indicates sudden change in environmental conditions, which may lead to destruction of specific life forms.

Table XVII : Criteria for Biological Water Quality Evaluation

Range of saprobic score	Range of diversity score	Water quality	Water quality class	Indicator colour
7 and more	0.2 – 1	Clean	A	• Blue
6 – 7	0.5 – 1	Slight pollution	B	• Light Blue
3 – 6	0.3 – 0.9	Moderate pollution	C	• Green
2 – 5	0.4 & less	Heavy pollution	D	• Orange
0 – 2	0 – 0.2	Severe pollution	E	• Red

6.5.6.1 Observation of Organisms and Water Quality Evaluation

The organisms / Taxanomic group observed with saprobic and diversity score sampling station wise in Osman Sagar, Himayat Sagar, Noor Mohammed Kunta, Sivrampally Cheruvu and Mir Alam Lake are presented at **Tables XVIII, XIX, XX , XXI and XXII** respectively.

It is observed from the Tables XVIII to XXII that **Osman Sagar** has shown the tendency of moderate to severe pollution. Bio-map is placed at **Figure 15.** This is because near the peripheral areas people throw garbage / immerse idols etc. The algal blooms were also observed near periphery. This denotes that lake is rich in nutrients. **Haimayath Sagar** has shown that in few of the pockets there is moderate to high pollution besides being maintaining clean water in some pockets. Bio-map is placed at Figure 15. **Noor Mohammed Kunta** is showing its status as heavy to severe pollution. Bio-map is placed at **Figure 16. Sivarampally Cheruvu** is in the range of slight to heavy to severe pollution. Bio-map is placed at **Figure 17. Meer Alam Tank** is in the range of slight to heavy to severe pollution. Bio-map is placed at **Figure 18.**

Table XVIII : Biological Water Quality Criteria-Taxanomic Group, Saprobic Score and Diversity Score of Osman Sagar Lake

Sample Points	Taxonomic Groups	Saprobic score	Diversity score	Water quality	Water quality class	Indicator colour
1. Near Pump House	Coleoptera, Mollusca Crustacea	3.3	0.3	Moderate Pollution	C	Green
2. Center (Peripheral)	Hemiptera,Odonata Diptera, Coleoptera	4.9	0.7	Moderate Pollution	C	Green
3. Outlet – Crust Gate – towards Chaderghat	Odonata	1	0.1	Severe pollution	E	Red
4. Left Side – Near Chilkur Temple	Coleoptera,Mollusca Crustacea	3	0.3	Moderate Pollution	C	Green
5. Opposite to HMWS&SB Pumping Station	Odonata, Mollusca Ephemeroptera	4	0.3	Moderate Pollution	C	Green

Table XIX : Biological Water Quality Criteria -axanomic Group, Saprobic Score and Diversity Score of Himayat Sagar Lake

Sample Points	Taxonomic Groups	Saprobic score	Diversity score	Water quality	Water quality class	Indicator colour
1. Upward – Right Side	Hemiptera Ephemeroptera	5	0.4	Heavy Pollution	D	Orange
2. Outlet – Crust Gate – Towards Chaderghat	Hemiptera Dipteria Ephemeroptera	4	0.5	Moderate Pollution	C	Green
3. Near Pump House towards Puranapool	Hemipteria	9	0.1	Clean	A	Blue
4. Upward – Left Side	Hemiptera Ephemeroptera	3	0.4	Moderate Pollution	C	Green

Table XX : Biological Water Quality Criteria- axanomic Group, Saprobic Score and Diversity Score of Noor Mohammed Kunta

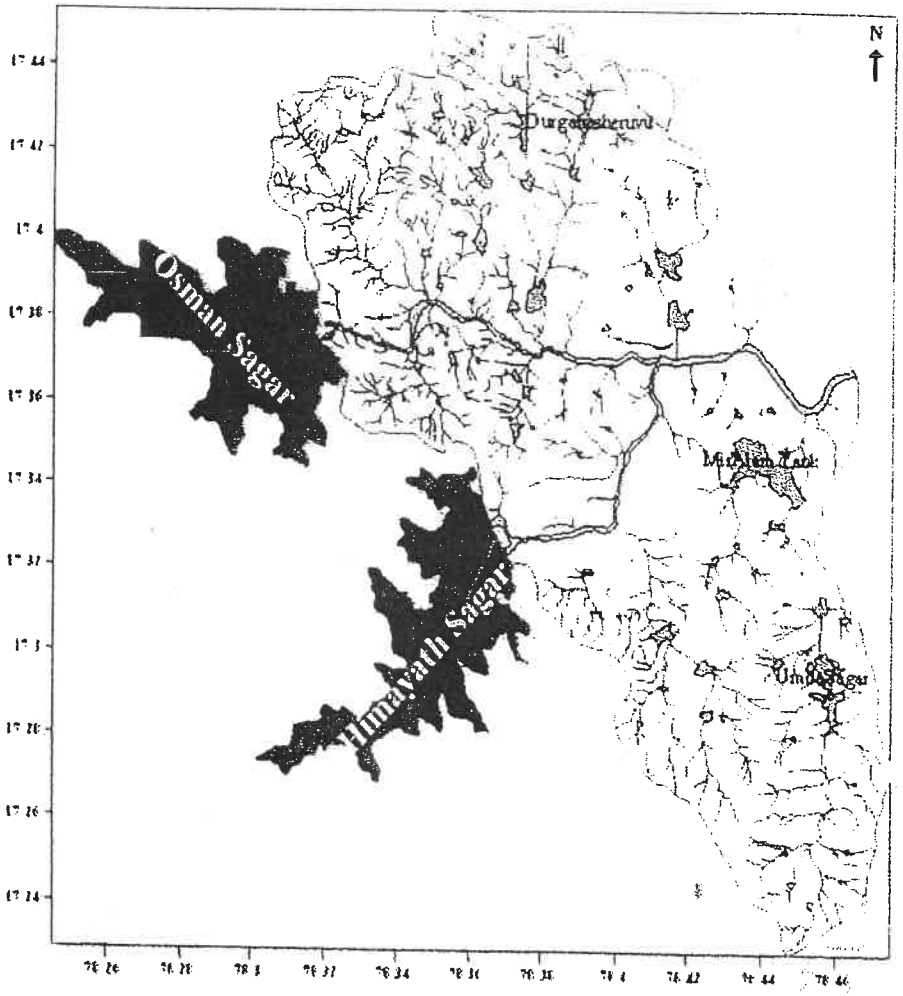
Sample Points	Taxonomic Groups	Saprobic score	Diversity score	Water quality	Water quality class	Indicator colour
1. Near over Flow	Hemiptera Ephemeroptera	5	0.4	Heavy Pollution	D	Orange
2. Near the Eastern side	Hemiptera Ephemeroptera	5	0.4	Heavy Pollution	D	Orange
3. Near the Hillock	Odonata	1	0.1	Severe pollution	E	Red
4. Inflow from the Culvert Receiving the Effluents	Odonata	1	0.1	Severe pollution	E	Red
5. Near the Western Side	Odonata	1	0.1	Severe pollution	E	Red

Table XXI : Biological Water Quality Criteria - Taxanomic Group, Saprobic Score and Diversity Score of Sivarampally Cheruvu

Sample Points	Taxonomic Groups	Saprobic score	Diversity score	Water quality	Water quality class	Indicator colour
1. Upward – Right Side	Odonata	1	0.1	Severe pollution	E	Red
2. Outlet – Crest Gate – Towards Chaderghat	Hemiptera Ephemeroptera	5	0.4	Heavy Pollution	D	Orange
3. Near Pump House towards Puranapool	Dipteria Mollusca	7	0.6	Slight Pollution	B	Light Blue
4. Upward – Left Side	Dipteria Mollusca	7	0.6	Slight Pollution	B	Light Blue

Table XXII : Biological Water Quality Criteria-Taxanomic Group, Saprobic Score and Diversity Score of Mir Alam Lake

Sample Points	Taxonomic Groups	Saprobic score	Diversity score	Water quality	Water quality class	Indicator colour
1. Near Hasan Nagar	Corixidae Dipteria Ephemeroptera	5	0.4	Heavy Pollution	D	Orange
2. Near Boats Club inside Zoo Park	Hemiptera Dipteria	2	0.2	Severe Pollution	E	Red
3. Inlet – Pahad, Upparpalli	Dipteria Mollusca	7	0.6	Slight Pollution	B	Light Blue



- Sever Pollution
- Heavy Pollution
- Moderate Pollution
- Slight Pollution
- Clean

Fig. 15 : Bio-Map of Osman Sagar and Himayath Sagar

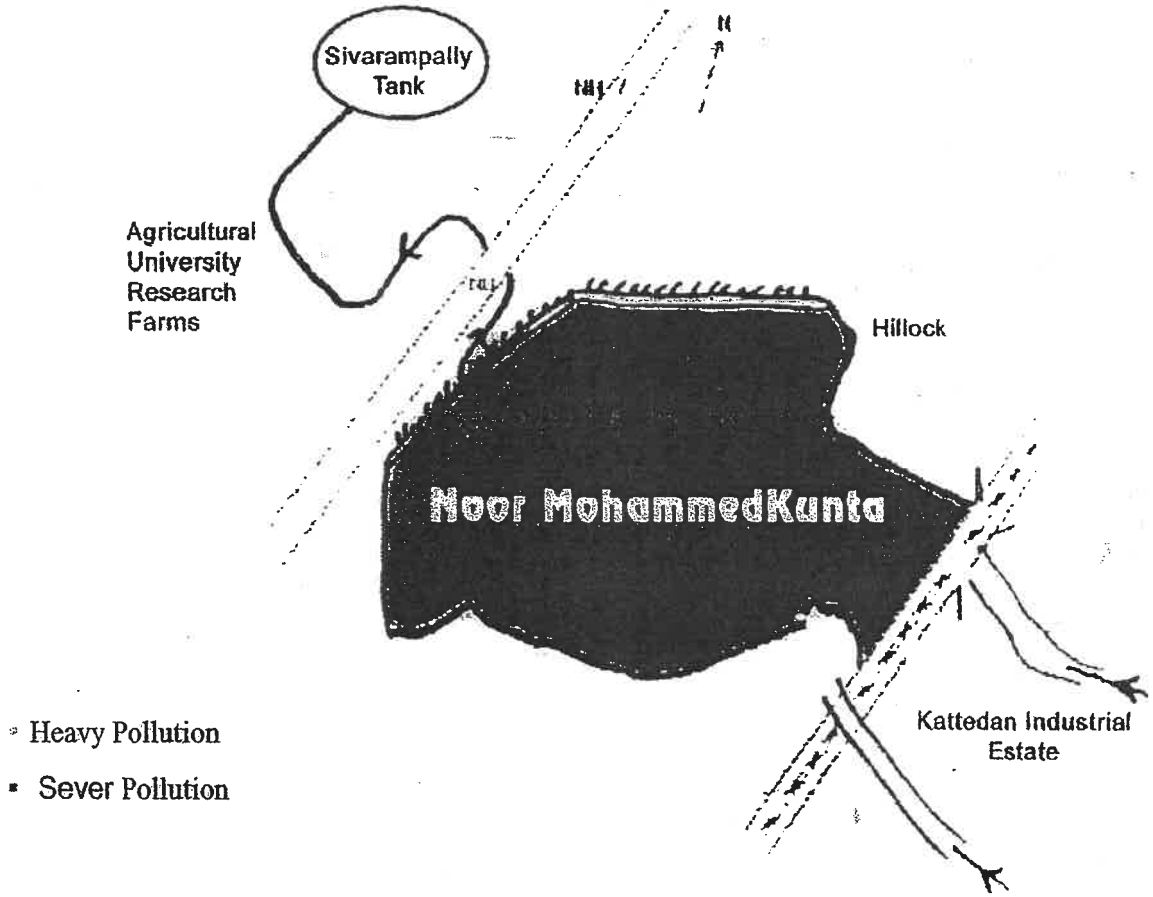


Fig. 16 : Bio-Map of Noor Mohammed Kunta

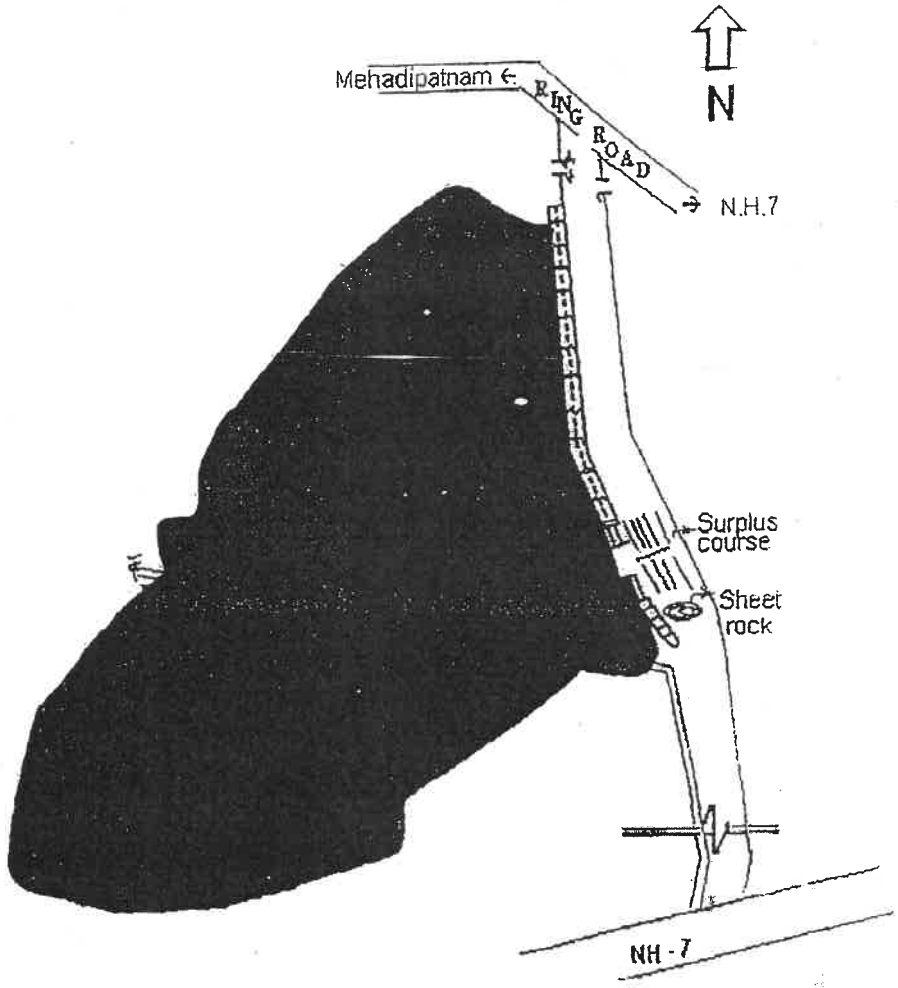


Fig 17 : Bio Map of Sivarampally Cheruvu

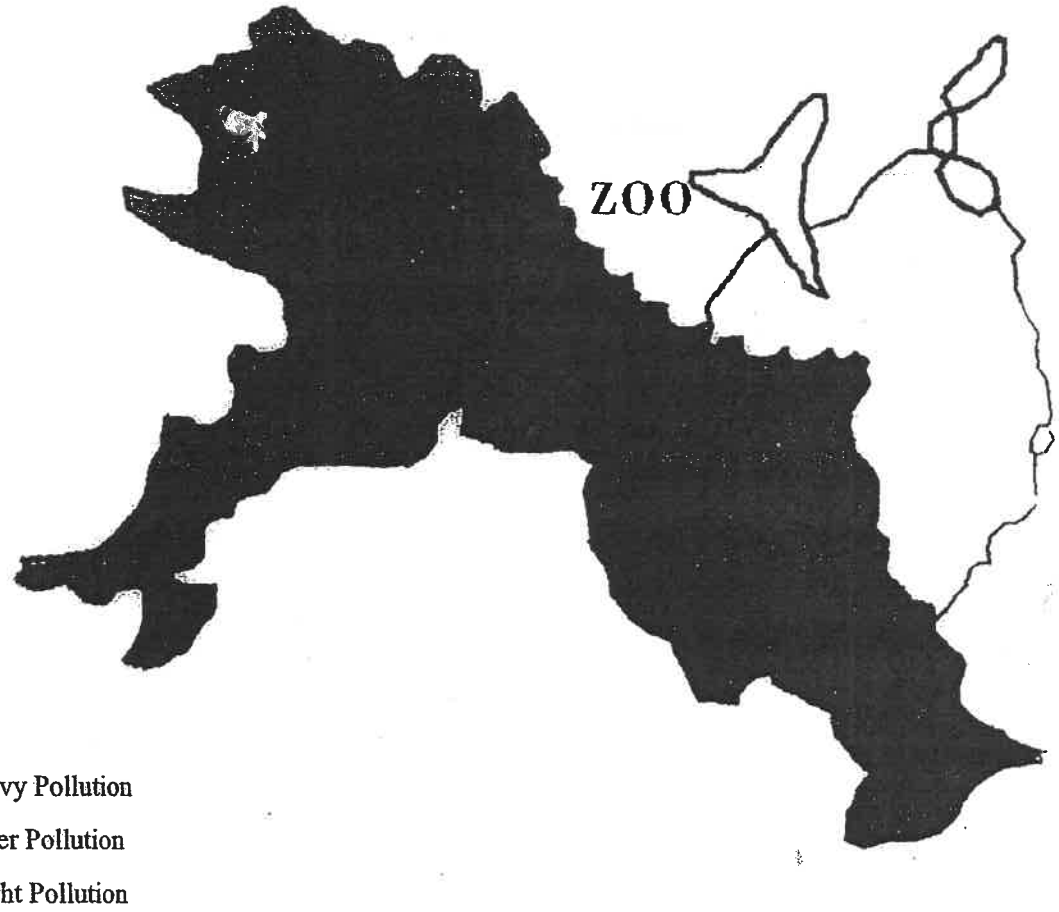


Fig. 18 : Bio-Map of Meer Alam Tank

6.6 Ground Water Condition

As regards to the geology of the study area it is predominantly exposes, rocks of Peninsular Gneissic Complex (PGC) along with enclaves of schists (older metamorphics), basic dykes (Proterozic), Bhima Group comprising Upper Proterozoic sedimentary formations and a thin cover of Deccan Traps (Cretaceous to Paleogene) and laterite(Pleistocene). The PGC comprises two varieties of granitoid rocks viz., older granodiorite –adamellite (AG) and younger granite (ss) alkali feldspar. The schistose rocks (older metamorphics) trending NNW-SSE to NW-SE occur as enclaves within the granitoids. They include predominantly amphibolite, hornblende-biotite schist, occasional quartzite, ferruginous quartzite, hornblendite, pyroxene granulite, talc schist and garneferous quartz- sericite schist. Bands of migmatites resulting from intermixture of the granitoids and the older metamorphics occur at several places. Granite (s.s) is widely distributed throughout the area. It is grey to pink, medium to coarse-grained, prophyritic or non-porphyritic and massive. It occupies higher topographic levels forming denudational hills, dome-shaped mounds (inselbergs) and boulder outcrops.

The granitoid complex is associated with profuse injections of aplite and fine grained quatrzo-feldspathic veins and pegmatite, quartz veins and reefs which trend NW-SE, N-S and NNE-SSW. The length of these bodies varies from 7 to 50 m. Basic intrusives which include dolerite, gabbro and pyroxenite, cut across all the rocks in the area. These dykes are oriented E-W, NE-SW and N-S with widths of 7 to 50 m and lengths up to several kilometers. Upper Proterozoic sediments of Bhima group unconformbly overlie the granotoids in the western most part of the area. These are represented mainly by limestone sequence intercalated with shale and sandstone.

Regional slope is towards east with local slopes tending northeast – south and southeast. The topography contours around reservoir show southeastwards elongation due to the regional structural influence on the terrain. Contours swerve head wards of the streams, whereas they protrude out in the inter-tributary higher grounds. Frequency of drought and excess rainfall analysis of 23 years rainfall data from

Chevella rain gauge station and Hyderabad meteorological station during 1974-75 to 1996-97 and 11 years of rainfall data from Moinabad rain gauge station during 1986-87 to 1996-97 was analyzed by Mohanrao (1997). Average rainfall recorded at Gundipet for 1901 – 1950 is 798 mm and the average annual rainfall during 1932-89 is 800.52 mm. Average rainfall at Chevella, Janwada and Gundipet is 751.71 mm. Most severe droughts have occurred during 1918, 1972, 1977 and 1987 and 2003, 2004. Minimum daily rainfall recorded at Gundipet is 218 mm (1977). Maximum annual rainfall recorded at Gundipet is 1412 mm(1978).

Average annual Rainfall (mm) during 1980 –96 in Downstream Areas of Osmansagar & Himayatsagar Lakes

Year	Annual	SW	NE	Years	Max	Year	Min
Rajendranagar 1988	838	578	202	8	2010	1995	366
Shamshabad 1980	788	571	169	16	1936	1995	434

Source: Directorate of Economics and Statistics, Govt of AP

6.6.1 Groundwater Conditions

Earlier the CGWB has drilled 40 exploratory wells, 8 of them are in Basalts and remaining fall in granitic terrain during 1970. Lithologs indicate that thickness of Deccan traps are between 30 –77 m. Weathered vesicular fractured and massive traps are normally encountered successively. The maximum thickness of weathered zone is 18 m. In granitic terrain the exploratory drilling down to 164 m has indicated that in general the weathered zone is followed by massive granite with occasional fractured zones of limited thickness. In hard rock areas, the occurrence and movement of groundwater mainly depends on the secondary porosity and permeability resulting from faults, fractures, joints etc. and associated weathering. The depth of weathering and nature of weathered material depend upon the landform conditions.The weathered

zones act as storage reservoirs for holding groundwater whereas, the fractures below them circulate the groundwater by acting as conduits.

The downstream areas comprise predominantly granitic terrain. In granitic terrain, groundwater occurs in inter-granular pore spaces of unconsolidated weathered material and in the porous secondary structures (mostly sheet fractures) under semi-confined conditions. The average depth to water level ranges from 10-20 m in recharge areas (uplands) and from ground level to about 3 m in valley bottoms. The recharge areas constitute about 70 per cent of the drainage basin in granitic terrain. The productive aquifers in granitic terrain are met at depth of 15 to 50 m below land surface, depending on topography.

Well inventory of 65 wells are found in **Figure 19** and **Table XXIII** . Water level and water quality monitoring has been carried out at the observation wells (**Figure 19**). The depth to groundwater level in the down stream areas have been found varying from 4 – >20 m during post monsoon - November 2005 placed at **Figure 20** . Groundwater conditions have been analyzed by drawing groundwater level contours, which are showing a predominant regional groundwater flow from West to East with local flow towards the Musi and Musa rivers, depicted at **Figure 21.** Generally, water table has a configuration similar to that of land surface; however, depths to water levels are greater in upland areas than in valley bottoms. Depth to the lowest annual water level varies from one meter in granitic low lands to forty meters in basaltic up lands. In granitic terrain piezometric level divides coincide with phreatic level and topographic divides.

The dominant lithological units in the area are Peninsular gneisses and granites. The granites are grey and pink in color. The peninsular gneisses and granites are traversed by dolerite dykes, pegmatite, quartz and epidotic veins. During low precipitation years, like 1972 when the precipitation during that year was lowest by 50 per cent of average annual rainfall, demand for groundwater was highest. During 1973, 1974 years the precipitation was near normal. Peninsular granite gneisses are the chief rock formations, which are jointed and faulted with fracture systems developed along the

lineaments. The saprolitic zone extends down to 16 m at places. Details on groundwater structures at 245 locations revealed that groundwater occurs under phreatic conditions in the interconnected secondary porosity similar to that of granular porosity in saprolitic zones and fissure porosity of massive varieties. Soils in the area belong to the low nutrient alfisol variety, thereby leading the common vine cultivators to the heavy application of inorganic fertilizers.

Pediplains are covered with reddish brown sand and clay soils. It spreads over the weathered granitic gneisses and sedimentary rocks. The zone of weathering is moderate to deep (5-20 m). Pediplains area is under cultivation for dry and wet crops. Drainage over the pediplain is dendritic and parallel controlled by the lineaments, fractures and mega joints.

6.6.2 Groundwater Withdrawal

Reddy PR, 1991, reported a yield range of 300 – 600 lpm for bore wells in the fractured zone of Peninsular Gneisses / Deccan Trap where for bore wells in the weathered zones of peninsular gneisses and deccan traps yield 0-200 lpm. CGWB 1975 reported that specific yield value range 3 –4 % for granite/Deccan trap. Maximum radius of influence of bore well in fractured zone of granite trap is worked out by taking maximum well yield, average maximum draw-down and specific yield of the aquifer. Bore well will run for 210 days in a year with maximum average yield of 300 lpm 0.3 m^3/min for 16 hours in a day.

6.6.3 Aquifer System

The hard rock formations are due to lack of primary porosity. Hence the aquifer system in these rocks is developed in response to the development of secondary porosity due to various tectonic disturbances and weathering activity. The aquifer system at shallow depths is normally developed due to joints and in situ weathering of granitic rock and its thickness vary between less than a few meters to about 18 m.

The deeper aquifer system is developed due to major joints, fractures, crevices and shear zones etc.

Table XXIII : Well Inventory of the Samples Collected during November 2005 Downstream of Osmansagar and Himayathsagar (With in 10 km Radius)

Well No	Type of Well	Village/Location	Latitude	Longitude	DTW (m)	MP	RL (m-amsl)	WL (m-amsl)
G1	HP	ZP Primary School Laxmiguda	17°18.413'	78°27.013'	3.35	0.45	548.5	545.6
G2	HP	L/S of the road after school from Laxmiguda to Mamidipalli in Jalpalli(v)	17017.006	78027.071	1.52	0.48	569.54	568.5
G3	HP	Pahadi sharif on the way to Durgah from busstop in front of star photo studio	17016.233	78028.415	1.29	0.42	588.98	588.11
G4	HP	On Srisailam road Mamidipalli G.farm on the road in front of VIDEOCON	17014.89	78028.426	1.59	0.7		
G5	HP	Mamidipalli Busstand	17015.132	78027.171	2.39	0.5	587.3	585.41
G6	HP	Behind Uni.Sankyo Bhd Gaganpahad besides Annapurna industrial estates	17017.616	78024.575				
G7	SW	Very near to G6 Near main entrance of Annapurna industries	17017.61	78024.637				
G8	HP	Gaganpahad Estates Senthil transport opp. Uni sankyo Harmone plants Gp.	17017.599	78025.04	10.26	0.42	558.18	548.34
G9	HP	Inside Maisamma templeon mainroad NH7	17018.401	78025.29	4.6	0.6	587.3	545.15
G10	SW	Noor Mohd.Kunta	17018.948	78025.497				
G11	HP	Katedan near Anjaneya swamy temple/Sai baba temple opp. Swapna theatre	17018.731	78026.306	8.85	0.46	549.22	540.83
G12	DW	Katedan Industrial Inside Maszid	17018.722	78025.757	1.6	0.6	551.51	550.51
G13	HP	Sriram Colony near Jalpally Village Moduvan colony	17017.746	78026.427	4.28	0.7		
G14	HP	Ring road - Shamshabad Anand Nagar Gagan Pahad near Railway gate	17018.233	78025.426	6.7	0.75		
G15	HP	Near APASS(ANGRAU) tank on bypass road, besides TN-Kerala transport	17019.521	78025.604	4.24	0.7	448.2	544.66
G16	SW	ANGRAU Tank	17019.473	78025.83				
G17	HP	Near Miralam out let Kishanbagh R/S of the main road inside crossing Mir.outlet	17021.414	78027.047	3.54	1	497.31	494.67
G18	HP	Hassan nagar R/S of main road	17020.131	78026.603	3.6	0.7	522.94	520.04

		just adjecent to NPA compound wall v.nr tomain rd						
G19	HP	Sivaram pally Ambedkar nagar	17019.686	78025.893	1.15	0.4	540.28	539.53
G20	SW	Sivaram pally tank water	17019.661	78025.879				
G21	BW	APAU	17019.25	78025.345			536.96	
G22	HP	Premavati pet infront of Panchayat office	17019.61	78025.033	2.55	0.5	540	537.95
G23	HP	Budwel Teachers colony straigt road after APAU to Kishanpur,Nr kirana 1-5-261	17019.863	78024.343	2.55	0.5	529.35	527.3
G24	HP	Rajendranagar ward No.20 Behind Khadi Qtrs Near post office lane	17019.162	78023.976	2.7	0.5	538.26	536.06
G25	DW	Himayat sagar Opp APERL besides Dhaba	17019.352	78022.509	1.7	0.7	536.85	535.85
G26	BW	Grey Hounds Colony NS6 Grey hounds Quarters behind NIRD campus	17°18.707'	78°24.411'				
G27	HP	Rajendranagar Dairy form Xroad- Confluence of Himayatsagar road to ring road	17020.739	78024.936	5.1	0.45	528.2	523.55
G28	HP	Karwan near the gate Hindu smasana Vatika Abhirudhi samithi,rg rd fm attapur	17022.519	78026.189	1.8	0.5	495.21	493.91
G29	DW	Bundlaguda after the village opp. Sri Malle Vihar plots gate	17020.943	78023.446	0.52		521.23	520.71
G30	HP	Kismatpur Behind Methodist church	17020.152	78023.551			521.62	
G31	HP	Durga Himayatsagar	17020.073	78022.323	1.31	0.5	528.31	527.5
G32	HP	Piran cheru just inside R/s of the road to chilkur	17021.357	78022.632			525.4	
G33	SW	Durgam cheruvu Outlet					546.5	
G34	BW	Dhobighat Jublihills	17026.313	78023.969			579.327	
G35	HP	Near Annapurna Society	17026.305	78023.431				
G36	HP	Adjacent to Durga temple,opp vijayalakshmi super bazar,srisai nagar Madhapur	17026.616	78023.497	6.24	0.3	568.9	562.96
G37	HP	Mandal primary school Madhapur, Sherlingampalli, Mdl Rangareddy	17026.499	78023.283	4.7	0.4	567.17	562.872
G38	HP	Near Rayadurgam police station, back side of tower	17025.274	78022.919	1.8	0.4		
G39	HP	Inside of Nilex leather factory	17025.247	78023.315	1.95	0.5	544.5	543.05
G40	HP	Hussaini wala durga Rayadurgam	17024.651	78023.475	3.68	0.3	544.5	541.12
G41	HP	Sairam colony, Shaikpet-Manikonda(near mandal primary school Rajendranagar			2.9	0.3	537.96	535.36
G42	HP	Opp Renuka yellamma temple (vinayaka nagar) Shaikpet	17024.074	78023.836	3.97	0.5	535.3	531.83
G43	HP	Virat nagar Tolichowki beside sri lakshmi general store opp community hall	17023.949	78024.596	7.1	0.5	526.36	519.76
G44	HP	Akbarpura, Limra Tent house near Tolichowki,opp Dr	17023.765	78025.046	4.41	0.4	524.09	520.08

		Ambedkar community hall						
G45	HP	Near Madina Highschool, Hakeempet	17024.234	78025.086	2.6	0.36	535.25	533.01
G46	HP	Narsuinghi, after Primary School,opp Darshanam Venkaiah house H.No 6-101	17023.579	78021.557	1.22	0.5	531.5	530.78
G47	HP	Opp Sri Laxminarsimha temple, Rachamallaiah kalyanamandapam, Puppalguda	17024.026	78022.282	2.6	0.6	538.45	536.45
G48	BW	Khajaguda opp R Shivaiah H.No 2-16	17024.898	78021.923				
G49	BW	Satamrayi Raja Rajeshwari Temple	17016.479	78025.092				
G50	HP	Hyderguda near Hanuman Temple	17021.976	78025.494	2.68	0.6	508.2	506.12
G51	SW	Langar house Tank Outlet	17°22.721'	78°25.024'				
G52	SW	Musi River Near Sangam	17022.347	78024.685				
G53	SW	Moosa river	17022.387	78024.892				
G54	HP	Hydershaw Kote infront of Zilla Prathamika Vidya Pathakam,ZPHighschool	17021.936	78023.541	1.82	0.6	510.21	508.99
G55	HP	Bairagiguda on the road R/S from Hydershah to Manchirevula	17022.221	78022.285	3.09	0.5	518	515.41
G56	HP	Manchirevula MPPrimary School Near to school on road to chevella	17022.486	78021.15			531.57	
G57	HP	Kokapet Narsingh	17023.111	78019.881	12.51	0.5	536.95	524.94
G58	DW	Kokapet ,Near Anjaneya Swamy Temple	17023.754	78020.026	3.35	0.3	532.5	529.45
G59	HP	Nanakramguda	17025.227	78021.067	4	0.5	570.41	566.91
G60	HP	Gawaldoddi infront of Laxminarayana House,	17025.754	78019.493	4.1	0.6	582.56	579.06
G61	HP	On the way to Golkonda Fort from Langar House infront of Isapat Tea&Madina H	17022.929	78024.413	2.52	0.5	520.35	518.33
G62	HP	Gandhamguda, Behind Dumping Yard, Maszid-E-Jani Begum,Sangamcity cluy,RNR.					523.46	523.46
G63	HP	Ibrahimbagh, Vasavi Engg.College Temple	17022.83	78022.89	5.2	0.6	512.65	508.05

6.6.4 Interpretation of VES data

The geoelectric sections along three profiles have been drawn to understand the aquifer geometry and the regional geology of the downstream area of Osmansagar and Himayatsagar Lakes , the same is predicted at **Figure 22**. Earlier geo electrical profiles taken in Durgamcheruvu and Mir Alam Tank watersheds have been used for

preparation of hydrogeological sections (Gurunadha Rao et al, 2005). The interpreted layer parameters from the VES have been shown in **Table XXIV**.

Profile AB : The various hydrogeological conditions inferred through CGWB and state Groundwater Department have been verified through the vertical geo-electric section along the profiles. The inferred hydrogeologic section along AB from VES is presented at **Figure 23 a**. The profile runs in the north- south direction adjacent to the two lakes and passes through the three watersheds. The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which is about 5 m. The weathered zone is underlain by thin fracture zone of about < 5 m thickness. The basement rock is shallow and has been encountered at a depth of 6-8 m.

Profile CD: The thickness of weathered zone along the profile is < 5 m . The inferred hydrogeologic section along CD from VES is presented at **Figure 23 b**. The maximum thickness of fracture zone has been found to be 15 m in the Gaganpahad watershed. The fracture zone is absent with a very shallow basement rock around G9 near the confluence of Musi and Musa rivers. The groundwater potential will be good in the Gaganpahad watershed as compared with the inter-stream area and Golconda watersheds. The combined thickness of weathered zone and fracture zone is maximum around Mamidipally and Gaganpahad villages.

Profile EF : The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which in this case is < 2 m. The inferred hydrogeologic section along EF from VES is presented at **Figure 23 c**. The profile is passing through the Eastern part of the confluence of Musa river with Musi river and passes through Durgamcheruvu and Mir-Alam Tank watersheds. The weathered zone is underlain by fracture zone of thickness of about 5 m. In general the weathering seem to be reducing along the profile. The weathering of the geological formations is also dependent on the length of the flow path and lineaments criss-cross the tributaries draining into the Musi river. The basement rock has been encountered a within 10 m in this area. The hydrogeological sections indicate poor groundwater

storage in the area and thus experiences an acute groundwater shortage during summer. All the three sections are combined in Figure 23.

Table XXIV : Interpreted Layer Parameters from Geoelectrical resistivity Soundings in Downstream Area (with in 10 km Radius) of Osmansagar and Himayatsagar Lakes

ρ and h are Electrical resistivity (in Ohm-m) and thickness (in m) respectively. Suffixes indicate the Layer Number

VES. NO.	Latitude	Longitude	ρ1/ h1	ρ2/ h2	ρ3/ h3	ρ4/ h4	ρ5/ h5	Depth
G1	78.4744	17.2684	160.9 0.9	57.8 3.2	226.6 21.4	966.9		25.5
G2	78.4466	17.2486	22.4 2	54 12.5	9321.1			14.5
G3	78.4137	17.25883	90.5 1.1	52.4 6.1	305.2 11	2616.2		18.2
G4	78.4132	17.33982	223 2.3	54.3 13.1	820.4			15.4
G5	78.4538	17.280683	24.8 1.1	16.3 6.6	962.5			7.7
G6	78.44012	17.296283	10.2 1	60.6 7.7	760.1			8.7
G7	78.42053	17.277333	199.6 0.8	29 3.2	2389.3 46	603.8 27.9	1173.2	77.9
G8	78.4225	17.320733	53.8 1	13.9 5.2	43.7 10.1	1020.3		16.3
G9	78.39608	17.3602	144.3 0.9	32.5 10	1002.2			10.9
G10	78.3695	17.3376	273 0.9	67 12.2	966.2			13.1
G11	78.35225	17.359583	165.3 0.7	32.8 22	336.6			22.7
G12	78.35695	17.3791	9.8 0.9	5.8 2.8	39.4 8	229.7		11.7
G13	78.37387	17.38145	151.2 1	38.5 7.9	145.9 7.2	1915.9		16.1
G14	78.32978	17.395833	18.9 2.4	37.7 13.9	507.6			16.3

G15	78.32482	17.40795	40.7 4.8	49.2 13.3	243.4			18.1
G16	78.3457	17.4222	44.8 9.8	88.5 10.1	650.3			19.9
G17	78.36207	17.439367	17.9 0.9	32.4 7.4	68.8 12	370.8		20.3
G18	78.41402	17.403717	255.9 0.8	68.6 4.6	181.8 25.6	496.4		31
G19	78.39647	17.391733	87.7 1	178.1 10.1	904.4			11.1
G20	78.43353	17.361383	17.1 0.9	32.3 11.7	188.5			12.6
G21	78.43705	17.376533	41.8 0.9	33.6 8.7	78.6 13	361.2		22.6
G22	78.36625	17.397583	140.7 0.6	52.5 2.2	204.3 9	9748.6		11.8
G23	78.40988	17.294633	9.4 1	22.2 6.5	52.5 19.4	1007.7		26.9
G24	78.45057	17.26065	56.2 0.8	28.8 6.5	1073.8			7.3
G25	78.4474	17.312267	31.9 1.3	87.5 5.9	1415.8 73.9	759.7		81.1
G26	78.40433	17.314183	8.7 1.1	18.2 8.1	177.9			9.2
G27	78.39148	17.319633	124.5 1	62.1 5	153.9 24.8	1005.8		30.8
G28	78.34447	17.392067	19.9 2.7	227.4 30.6	1092			33.3
G29	78.33175	17.426233	85.4 0.9	33.7 4	160.5 23	1038.7		27.9
G30	78.39137	17.349367	23.7 4.1	141.9 17.7	1075.8			21.8

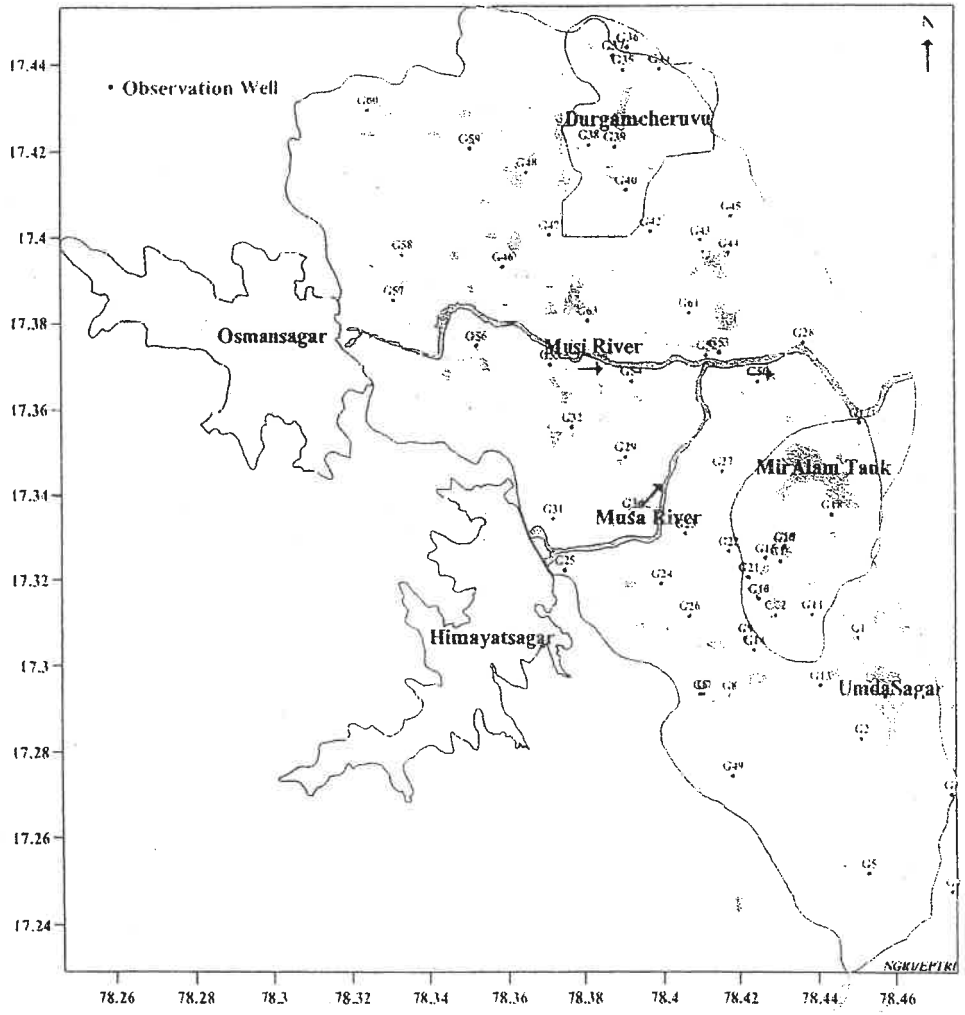


Fig. 19: Village Well Inventory- Observation wells

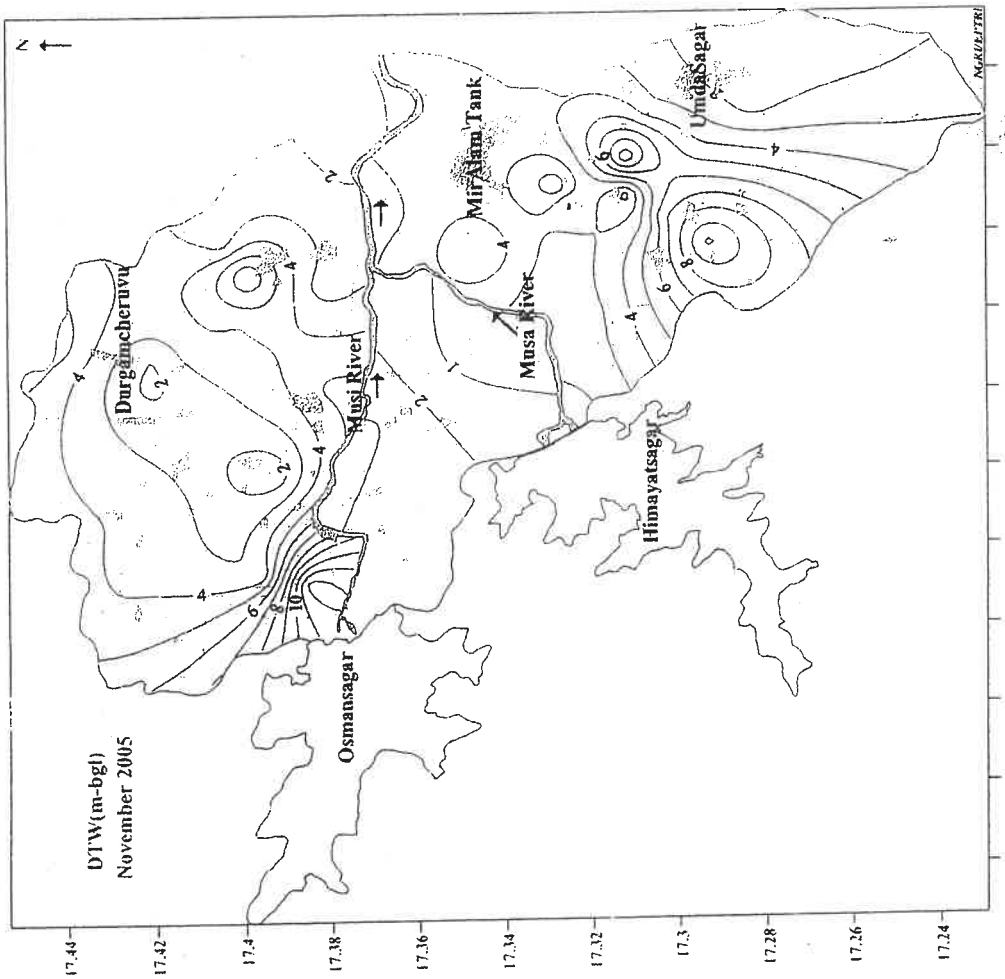


Fig. 20: Depth to Groundwater Level in m - November 2005

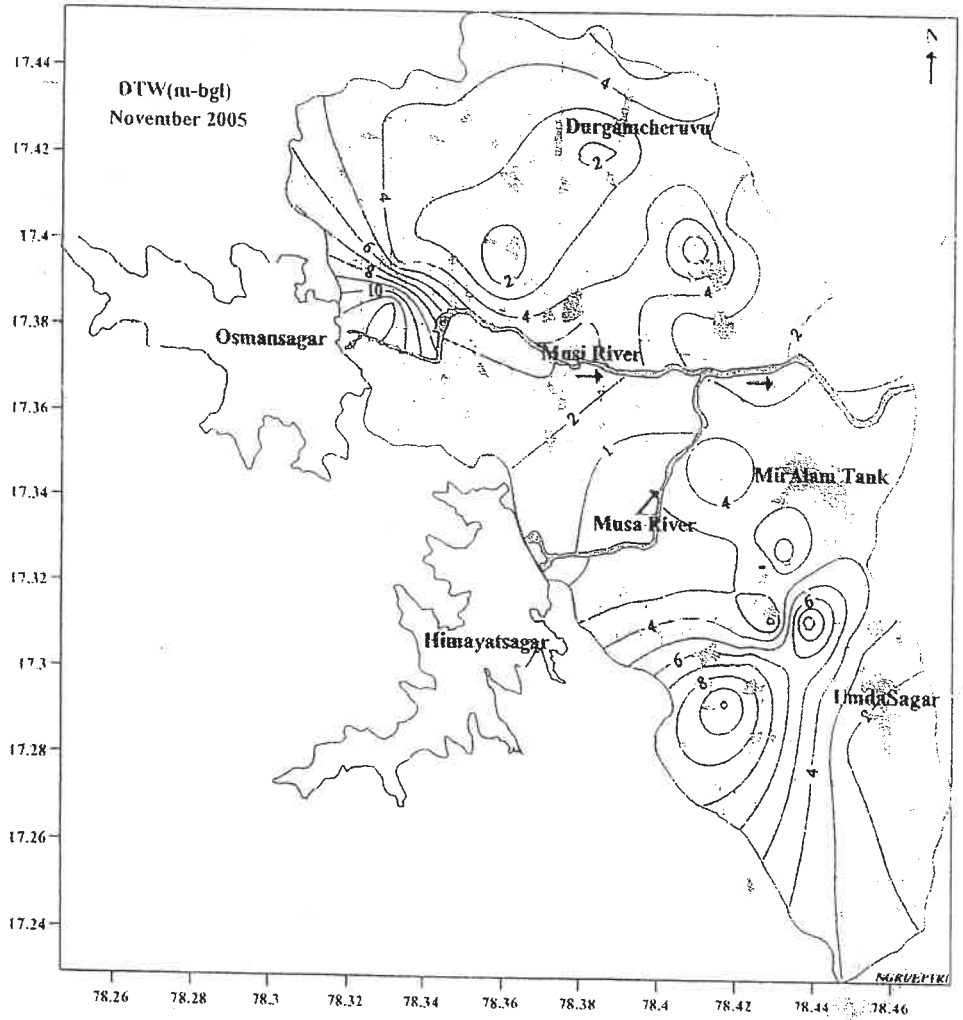


Fig. 20: Depth to Groundwater Level in m - November 2005

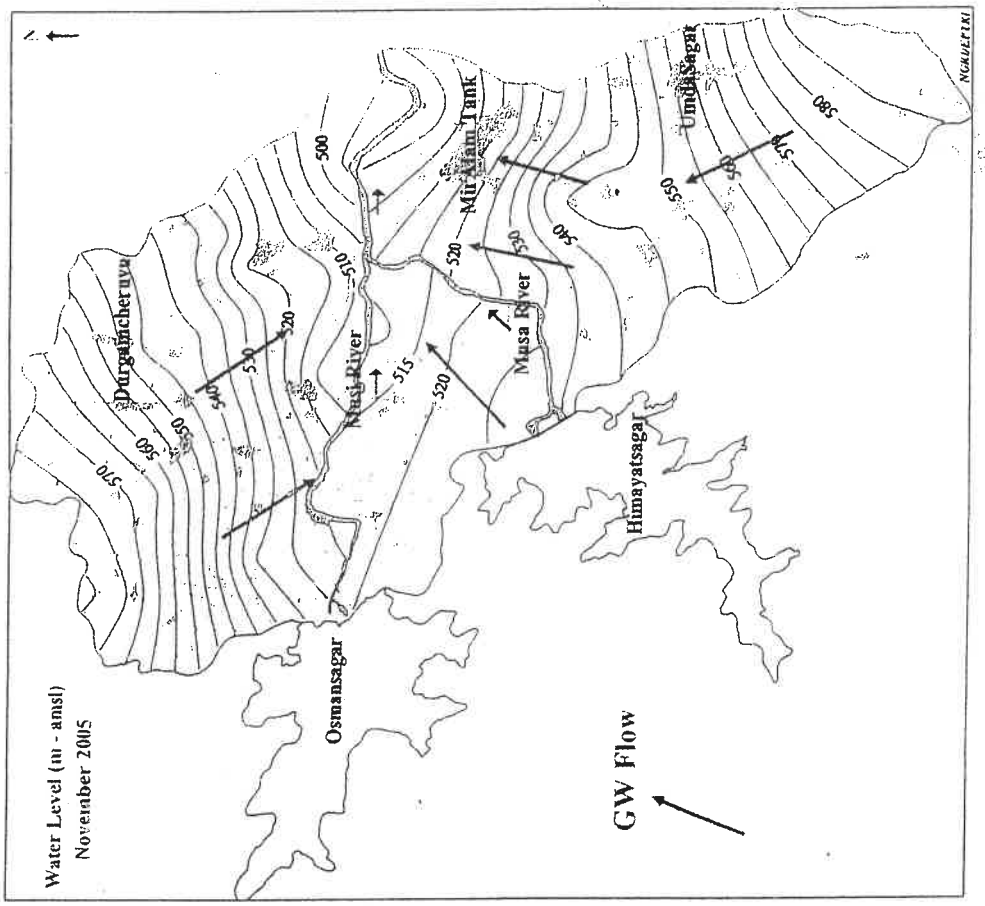


Fig. 21 Groundwater level contours in m(amsl) and Flow Direction – November 2005

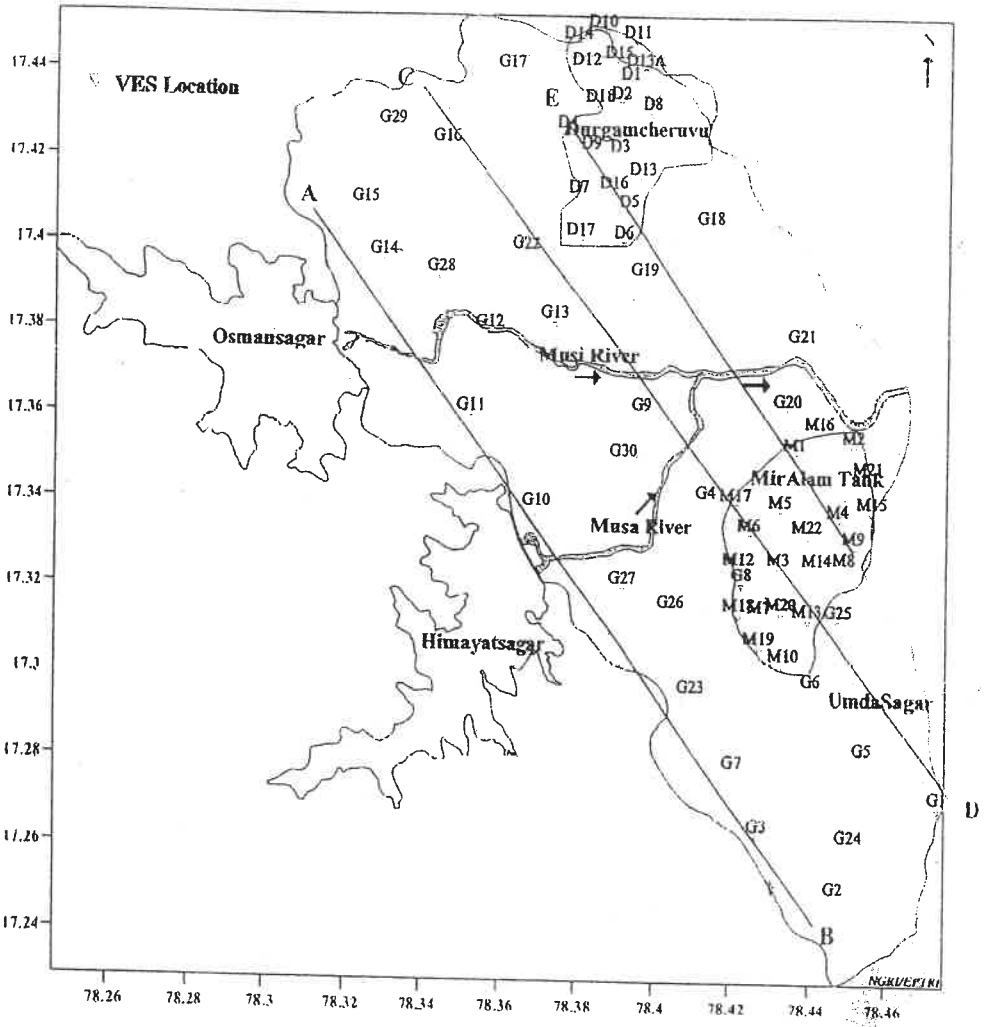


Fig. 22 : VES Locations and Profiles AB, CD and EF

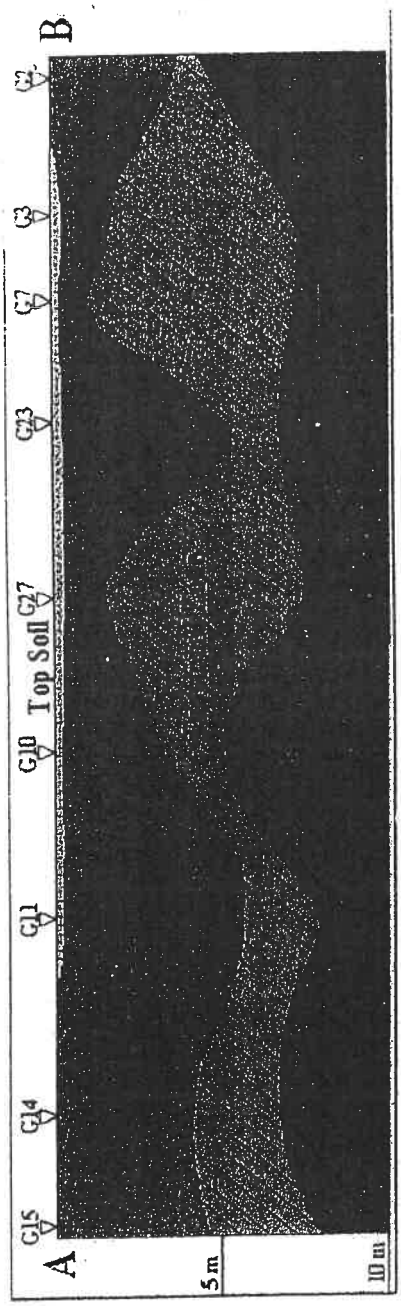


Fig. 23 a : Inferred Hydrogeologic section along AB from VES

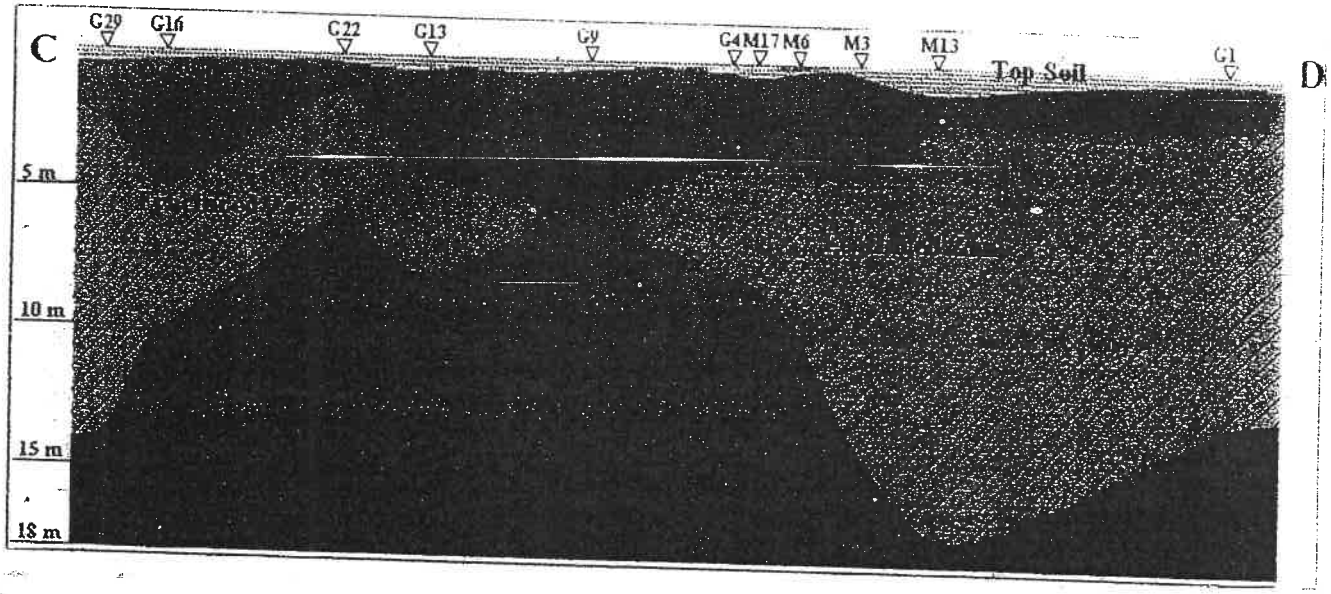


Fig. 23 b : Inferred Hydrogeologic section along CD from VES

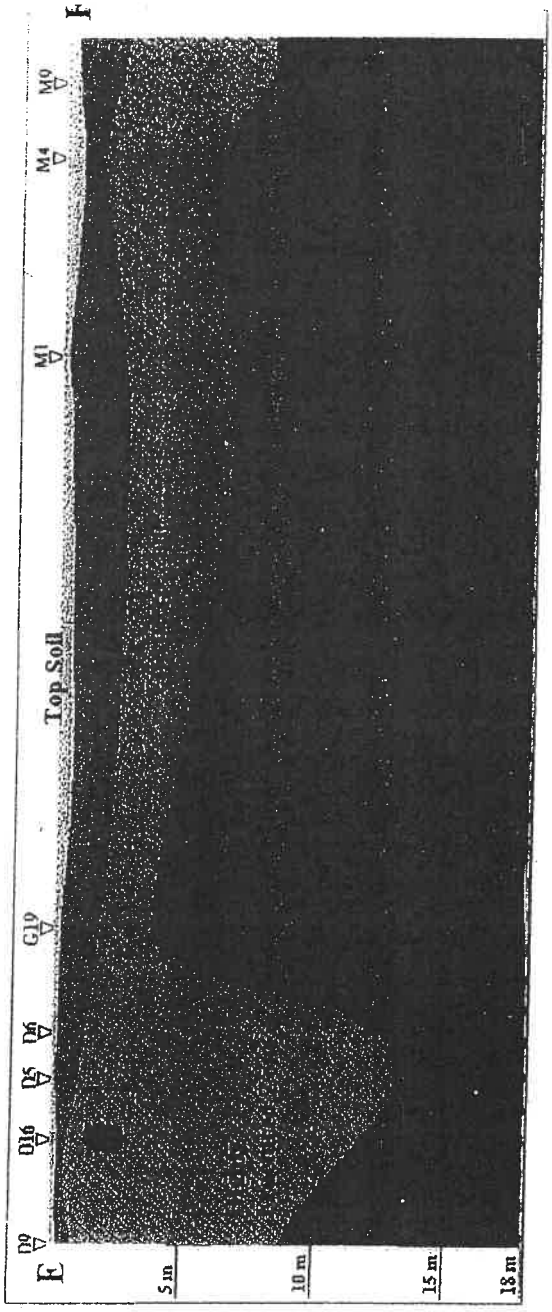


Fig. 23 c : Inferred Hydrogeologic section along EF from VES

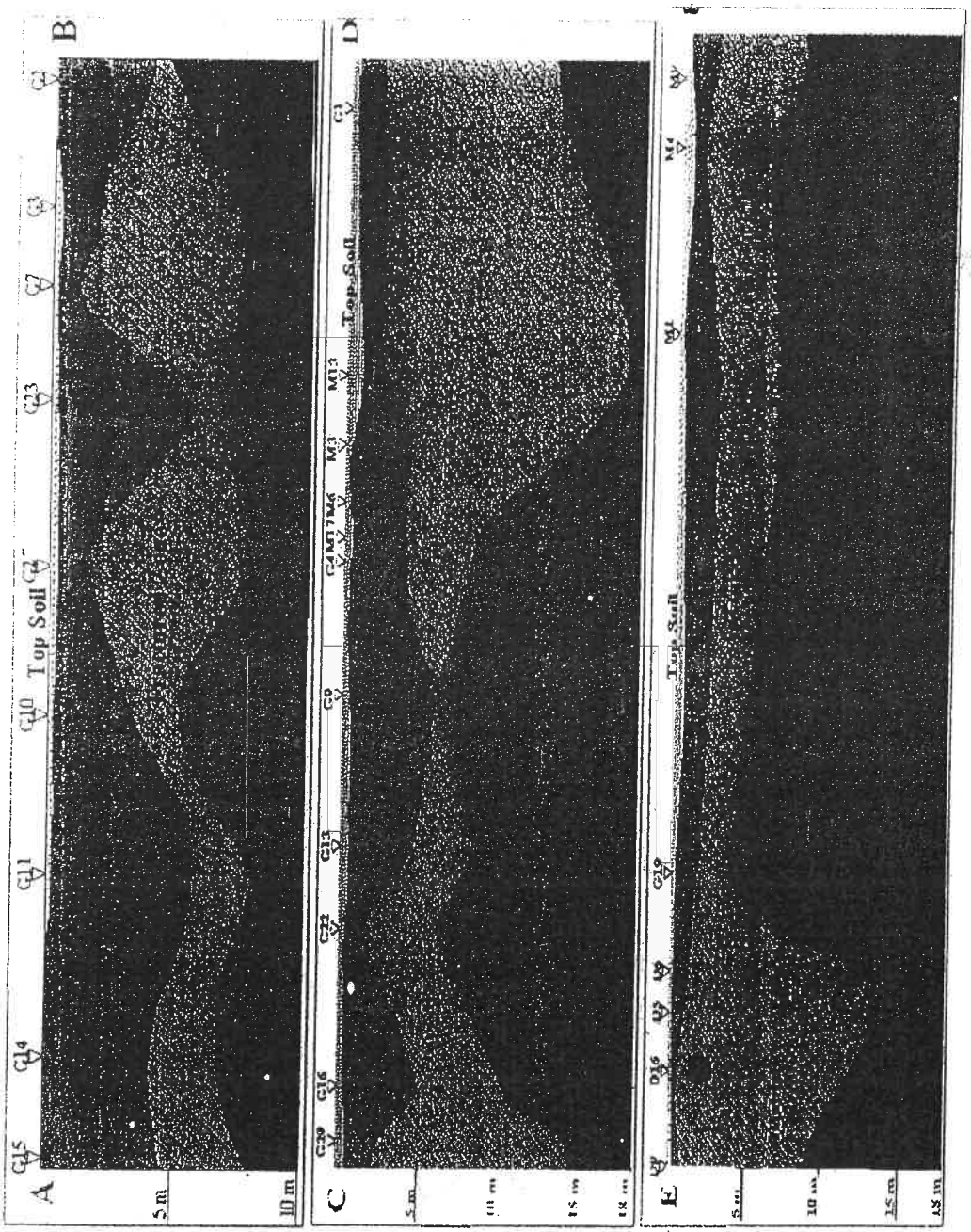
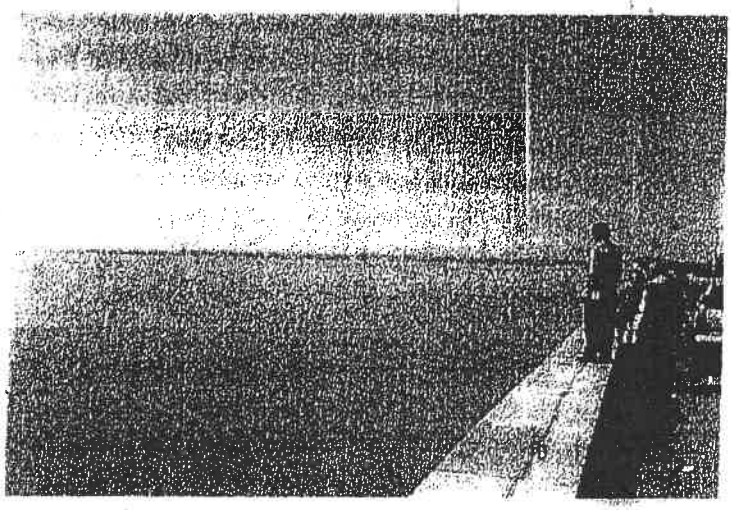
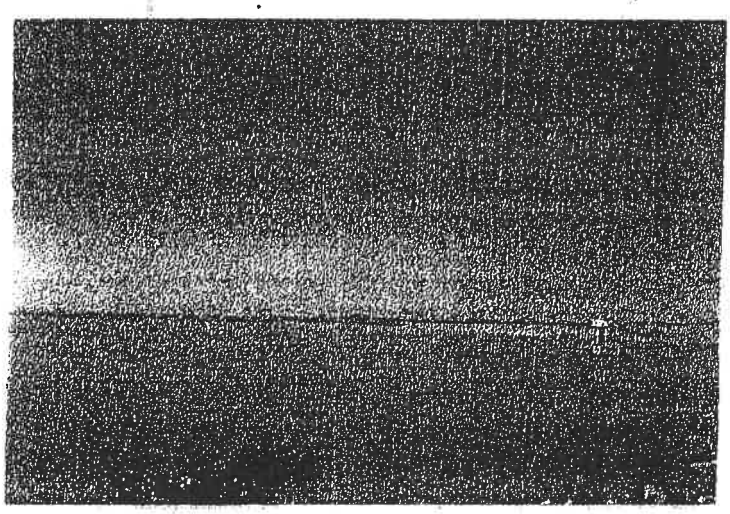


Fig. 23 : Inferred Hydrogeologic sections along AB, CD and EF from VES

View of Lakes





groundwater in general is fit for irrigation. They are mostly calcium-magnesium, carbonate-bicarbonate types of water. Iron content in groundwater is generally more than the permissible limit of 0.3 mg/l for drinking purposes. At some places fluoride content is higher than permissible limits (i.e. greater than 1.5 mg/l). Nitrate in groundwater has been found elevated in granitic low lands, valley bottoms and near irrigated lands. Water quality analyses indicate Sodium, Calcium, Magnesium, Bicarbonate, Sulphate, chloride and nitrate as nitrate as primary constituents and secondary constituents being potassium, carbonate and fluoride.

pH value

The pH of an aqueous solution is a measure of the number of hydrogen ions or protons present. The pH of a solution is measured with a pH meter and an electrode. The pH of a solution is sensitive to the amount of dissolved CO_2. The groundwater pH is varying from with an average of 7.44 in Osmansagar catchment area whereas it is varying from 4 to 8.7 with an average of 5.7 in Himayatsagar catchment area.

TDS Concentration

Total dissolved solids concentration gives a general nature of groundwater quality status. The groundwater TDS concentration varies from 216 – 3242 mg/l with an average of 1233 mg/l in Gaganpahad watershed. It is slightly lower in the Golconda watershed where it varies between 248 –1762 mg/l with an average of 907 mg/l and in the inter-stream region varies from 492- 2374 mg/l with average of 1052 mg/l (Table XXV). The statistical analysis of TDS is presented in Table 5. Violations of elevated TDS concentrations are found in 25 % of samples of all the three watersheds. Spatial variation of TDS concentration indicate elevated concentrations around Katedan area (Figure 24).

Chloride

The chloride concentration in groundwater varies from 17-757 mg/l (ref. Table XXV). The spatial variation of chloride concentration in groundwater could clearly

be seen around Katedan area (Figure 25). Violation of chloride has been found in 25% of samples > 350 mg/l has been found in Gaganpahad watershed.

Sulfate

The sulfate concentration in groundwater is varying from 8 – 745 mg/l (ref. Table XXV). The spatial variation of sulfate concentration contours indicate elevated values around the Katedan area (Figure 26). Violations of sulfate concentrations are found in 25% of groundwater samples in Gaganpahad watershed. Mostly violations are confined to the area between Katedan and Sivarampally villages, which is attributable to industrial pollution.

Nitrate as NO_3

The concentration of nitrate as NO_3 in groundwater has been estimated and is varying from 7.6 to 464 mg/l (ref Table XXV). Violations of Nitrate concentrations as regards drinking water standards have been found in about 50% of groundwater samples in a wide spread area (Figure 27). The reasons attributed to the scenario could be application of nitrogen fertilizers and their return flows to the groundwater system as well as impact of rapid urbanization particularly in the Golkonda watershed. CAGP project of CGWB has reported high concentration of Nitrates in the catchment areas during 1970s. Growth of dairy farms and waste disposal practices from households particularly of animal dung are contributing to the scenario. WHO drinking water standard for Nitrate as Nitrate is 45 mg/l.

Fluoride

The concentration of Fluoride in the groundwater is varying from 0.4 – 3.1 mg/l (ref. Table XXV). The mean F value is > 0.75 mg/l. The violations of Fluoride concentrations in groundwater has been limited to local areas within the watersheds (Figure 28).

Sodium

The sodium concentration is varying from 19 - 452 mg/l. The mean values are found to be around 140 mg/l (ref. Table XXV). No violation of WHO drinking water limit has been found (**Figure 29**).

Potassium

The potassium concentration in groundwater is found varying from 1 – 483 mg/l (ref. Table XXV).

Calcium

The Calcium concentration in groundwater is found varying from 26 – 517 mg/l with a mean value 171 mg/l (ref. Table XXV).

Magnesium

The magnesium concentration in groundwater is found varying from 9 - 285 mg/l with mean value 87 mg/l (ref. Table XXV).

In general the groundwater quality is Ca-Na – K-Cl – HCO3 in the area. The broad classification of groundwater inferred from the Piper plots is Ca-Na – K-Cl – HCO3 type . The groundwater in the Wilcox diagram indicates that about 90 percent of the samples are falling under Low sodium hazard and high salinity hazard C3S1 Class (**Figure 30**). Elevated TDS, Chloride and Sulphate concentration in groundwater have been found in the Gaganpahad watershed covering the Katedan IDA. Local pockets with high TDS have been also found around some point sources in Gaganpahad village. The groundwater quality in Golconda and inter stream region is reflecting the in situ conditions where as in Gaganpahad watershed the anthropogenic impact could be recognized through the elevated values. In general the groundwater is fit for irrigation. However, the nitrate as nitrate concentrations are found to be very high in the entire area. It may be due to growing of horticulture crops and during earlier times, the grape gardens, which requires lot of fertilizers application in these peri-urban watersheds. **Figure 31** represents the observatory wells in Durgam

cheruvu. The groundwater quality of Durgamcheruvu is depicted at **Figure 32a to 32 d.** Location of VES of Durgam cheruvu is presented at **Figure 33.** Geo electrical cross section is depicted at **Figure 34 and 35.** The observatory wells in Meeralam Tank is presented at **Figure 36.** The ground water quality of Meeralam Tank is depicted at. **Figures 37a to 37e.** The geo electric cross section of Meeralam Tank is depicted at **Figures 38 and 39.**

Table XXV : Water Quality Analyses of Groundwater samples during November 2005 Downstream of Osmansagar and Himayathsagar (With in 10 km Radius)

S.No.	pH	TDS	HCO_3	Cl	F	SO_4	NO_3	Ca	Mg	T.H.	Na	K
G1	7.5	661	314	108	3.1	86.2	34.6	77.6	37.5	348	112.2	3.8
G3	7	519	236	69.7	1.84	36.2	80.8	71.6	41.1	348	52.4	2.4
G4	7.1	836	367	74.5	0.97	39	210.5	111.4	65.3	547	40.6	1
G5	7.1	898	284	166	1.5	62	166.5	95.5	53	458	131	1.9
G6	7	2100	189	721	0.77	405	131.4	187	95.5	860	168	1.2
G8	7.2	2300	355	757	0.66	260	64.5	437.8	218	1990	199.4	3.5
G9	7.7	2375	183	601	0.95	389	61.4	517	241.7	2289	149.8	3.4
G11	6.8	1200	254	288	1.28	61	159.6	171	94.3	816	92	3.8
G12	7.4	887	154	170	0.5	158	79.3	79.6	47	393	146	0.6
G13	7.3	670	254	108	0.9	63.4	115.7	93.5	49.6	438	50	0.6
G14	6.9	2400	226	745	0.98	587	103	318.4	159.6	1453	165.2	8
G15	7.1	3242	290	697	1.08	745	343	485.6	285.2	2388	452	49.7
G17	7.6	556	290	63	1.17	40.7	28	40	23	194	99	22.5
G18	6.8	918	248	243	0.72	98	73.5	137	33	448	117	5
G19	7.3	2131	373	631	1.79	549.4	16.2	153	93	766	430	10
G21	7.5	1939	237	99.5	0.5	677.5	15.4	487	285	239	128	2
G22	7.3	812	231	114	0.67	106.3	121	96	19	318	119	31.3
G23	7.2	940	272	184.4	0.82	92.6	110	99.5	55	478	104	2
G24	7.1	1160	331	209	0.7	131.5	191	107.5	58	507.5	117	1.6
G25	7.6	540	343	73	0.8	47	20.4	52	37	284	94	0.5
G26	7.2	600	272	116.5	1.83	47	11	54	48.4	333	61	1.6
G27	6.8	284	124	44	1.95	7.6	50	26	22	154	31	1.3
G28	7.5	1647	314	352	1.1	262	176	86	48	413	411	7.8
G29	7.9	956	462	180	0.97	129	25	123.4	64	572	86	13.6
G30	7.4	2374	669	400	0.96	205	241	113	68	563	334	483
G31	7.4	877	302	163	0.86	106	84	94	45	418	142	18.3
G32	7.4	635	391	112	0.62	42	22	74	30.2	308	71	0.9
G34	7.8	810	396	114	1.56	152	29	95	51	446	113	1.6
G35	7.4	1095	456	228	2.1	102.7	40	111	66	550	198	2.2
G36	7.4	856	296	150	1.4	112.5	120	115	59	530	101	1.9
G37	7.3	714	237	126	1.5	120	103	99	51	455	65	1.4
G38	7.3	712	325	148	0.76	115	15.3	93	30	356	96.2	1.1

G39	7.8	653	275	24	0.6	70	19	59.4	22	238	145.3	1
G40	7.3	1584	260	286	1	245	464	139	72	643	188	30
G41	7.7	474	272	53	0.5	73	10	91	17	297	40	16
G42	7.4	248	142	32	2.9	30	13	38	1.2	99	37	1
G43	7.5	794	337	124	0.8	151	54	77	42	366	108	1.3
G44	7.5	720	266	138	0.7	12	68	93	39	391	88.5	1
G45	7.7	827	148	18	0.57	119	123	111	35	420	100	1.8
G46	7.3	1154	231	262	0.6	181	168	176	24	540	136	42
G47	7.5	382	254	32	0.5	32	41	54	30	257	27.5	1.7
G48	7.4	596	248	95	1.2	113	61	63	31	287	67	0.7
G49	7.3	216	130	17	0.8	34.5	7.6	30	9.6	114	19.4	0.5
G50	7.4	1024.	302	211	0.4	172	95	129	10.8	335	188	30
G54	7.2	1346	385	124	0.8	248	127	210	104.6	955	96.5	11.4
G55	7.7	492	361	39	0.6	34	25	57	31.3	272	56	6.2
G56	7.5	687	266	99	0.53	97	64	59	30	272	57.4	36
G57	7.3	796	195	55	0.9	117	50	250	47	816	91	1.3
G58	7.6	1224	379	187	0.98	169	232.6	109	65	539	189	8.6
G59	7.6	1762	337	352	0.9	321	344	223	35	703	205	31
G60	7.5	1268	384	167	0.9	268	208	142	43	535	125	42
G61	7.6	668	396	95	0.4	45	5.2	80	36.3	348	82.2	76
G62	7.3	739	278	129	0.8	105.5	110.6	106	60.4	512	44	1
G63	7.4	1143	307	262	1	133	118.4	133	64	597	169	1.5

6.6.7 Resistivity Tomography

The Resistivity tomography picture of weathered and fractured zones representing less than 100 ohm.m indicates that the thickness of weathered and fracture zone not exceeding 15 m at Manchirevula, Narsingi and Manikonda villages in the northern part. But in the Poppulguda (where a SEZ proposed by HUDA) the thickness of weathered and fracture zone is hardly few meters (<5m). The thickness of weathered and fracture zone is about 25 m around Gaganpahad village showing a moderate groundwater potential. In view of the above scenario as regards poor groundwater potential in the downstream areas, it is not advisable to construct high rise buildings/industrial parks requiring sustainable groundwater supplies during the breakdown of the proposed Krishna surface water schemes for even a week. The high rise buildings may be restricted to 10 floors by providing adequate ground space for installation of water harvesting structures to sustain the meager groundwater potential in these areas after development takes place.

Fig 24 : Total Dissolved Solid (TDS) in Groundwater mg/l) November 2005

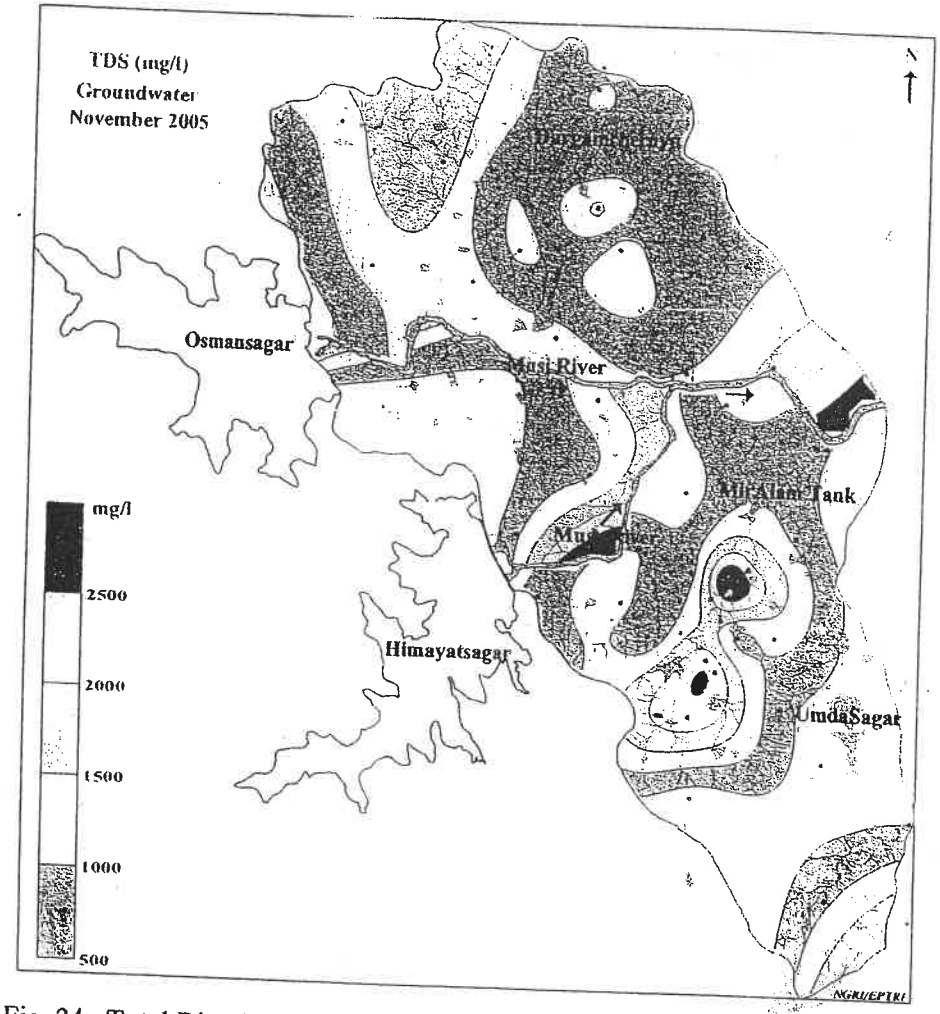


Fig. 24 : Total Dissolved Solids (TDS) in Groundwater (mg/l) – November 2005

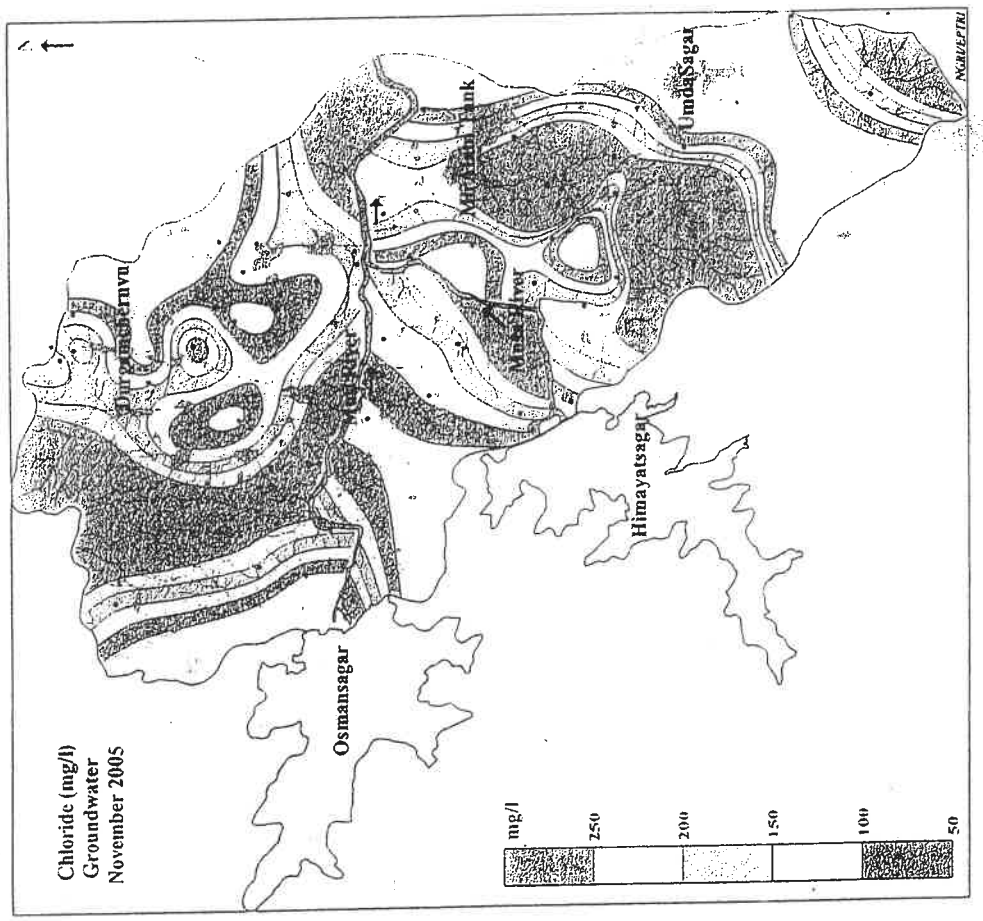


Fig. 25 : Chlorides in Groundwater (mg/l) – November 2005

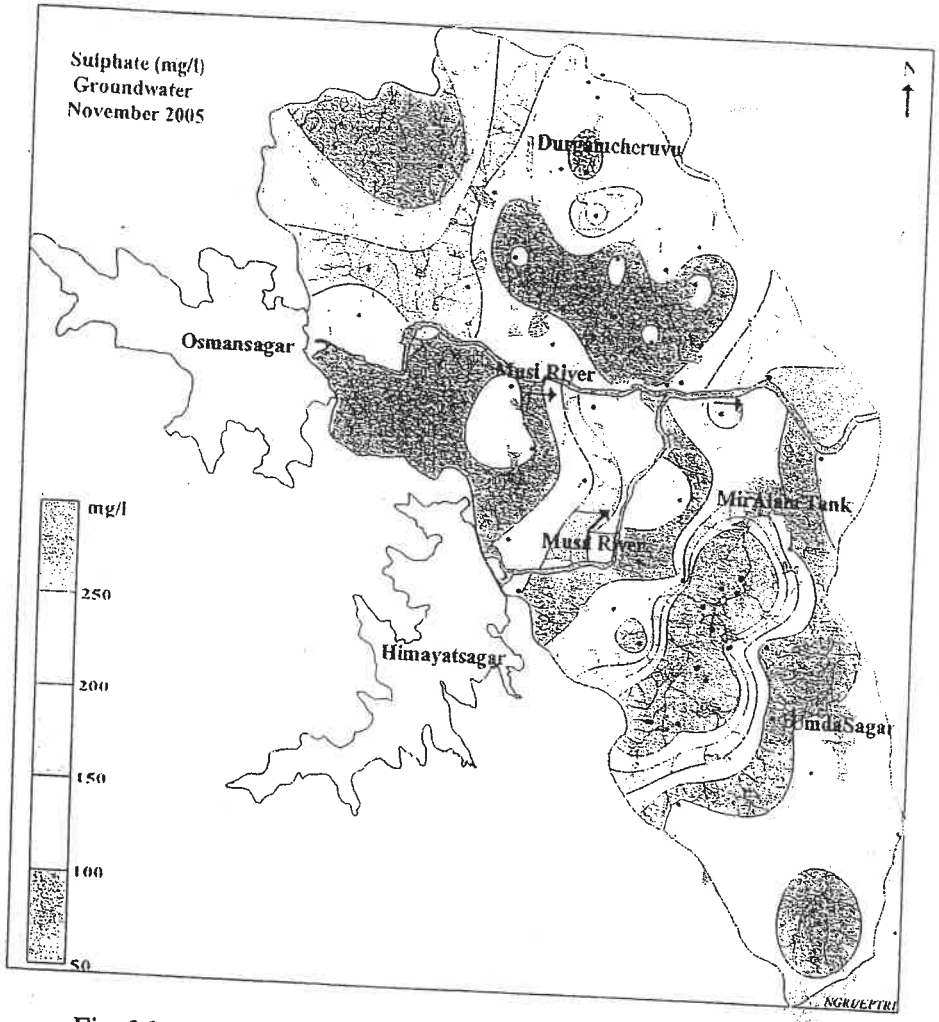


Fig. 26 : Sulphates in Groundwater (mg/l) – November 2005

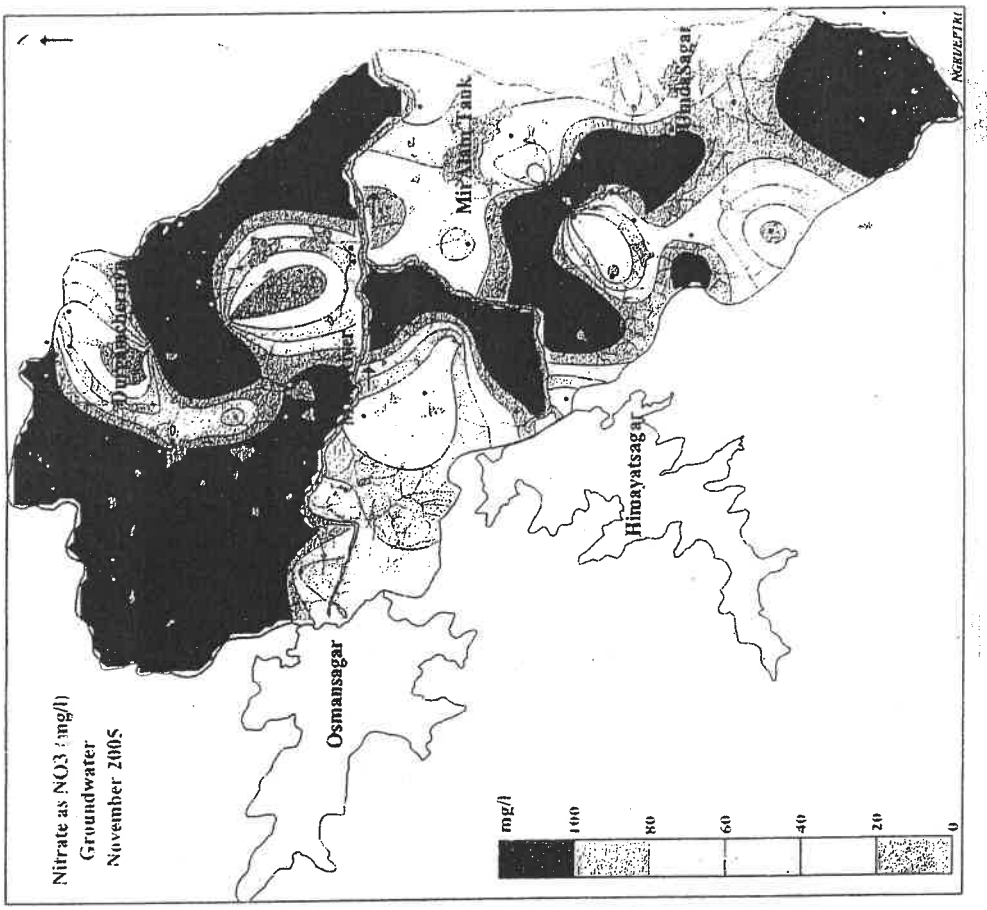


Fig.27 : Nitrate as Nitrate in Groundwater (mg/l) – November 2005

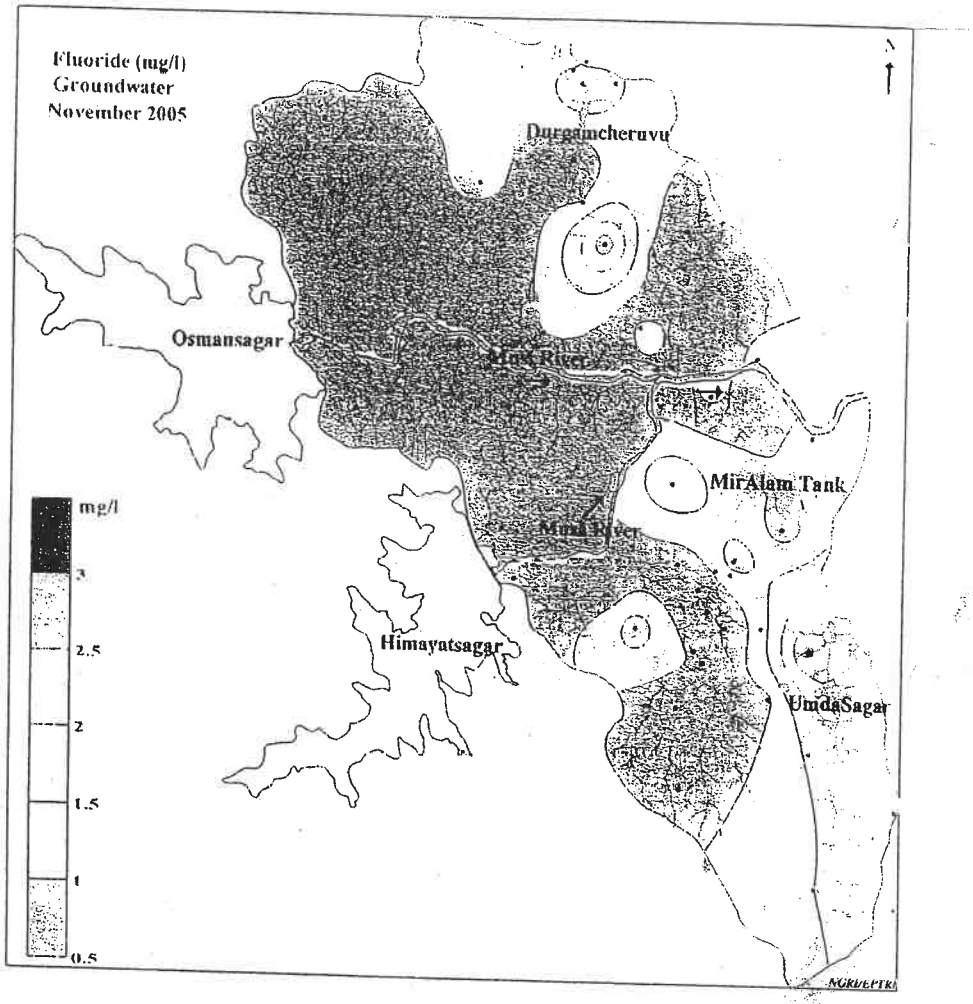


Fig. 28 : Fluorides in Groundwater (mg/l) – November 2005

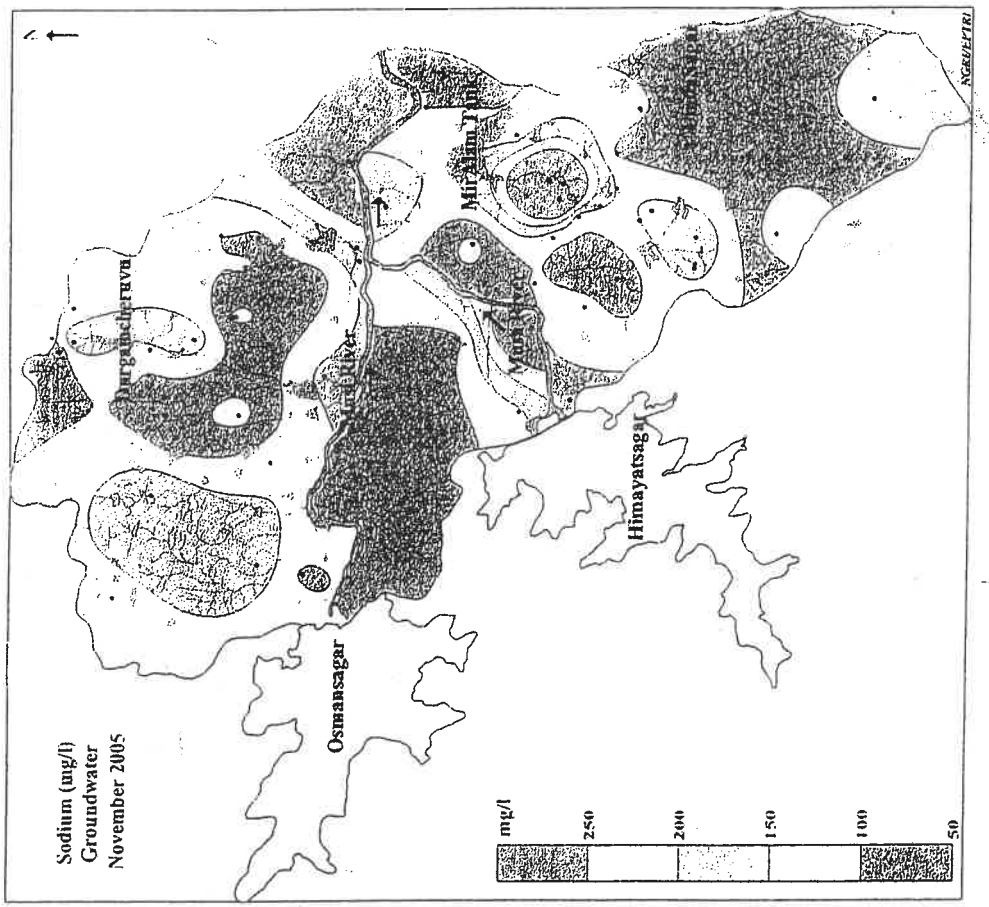


Fig. 29 : Sodium in Groundwater (mg/l) – November 2005

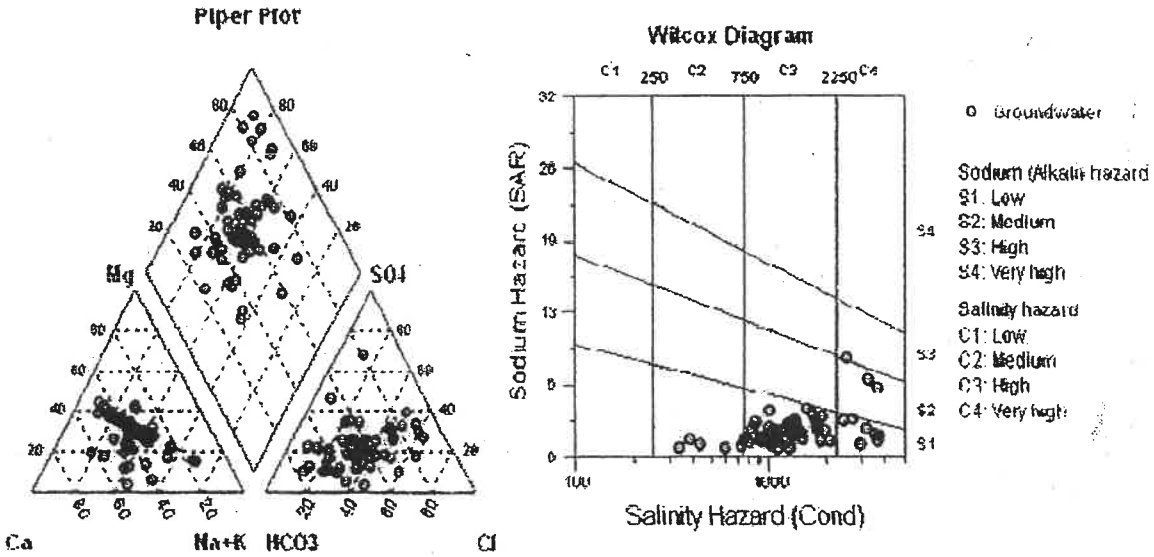


Fig. 30 : Groundwater Quality Piper and Wilcox Diagrams – November 2005

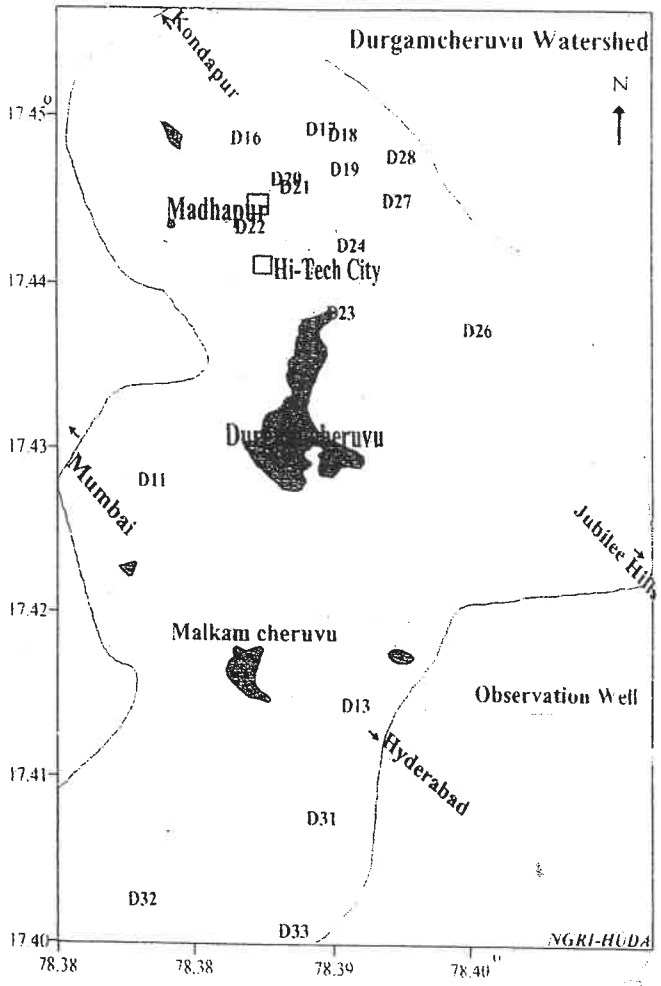


Fig.31: Observation Wells in Durgamcheruvu Watershed

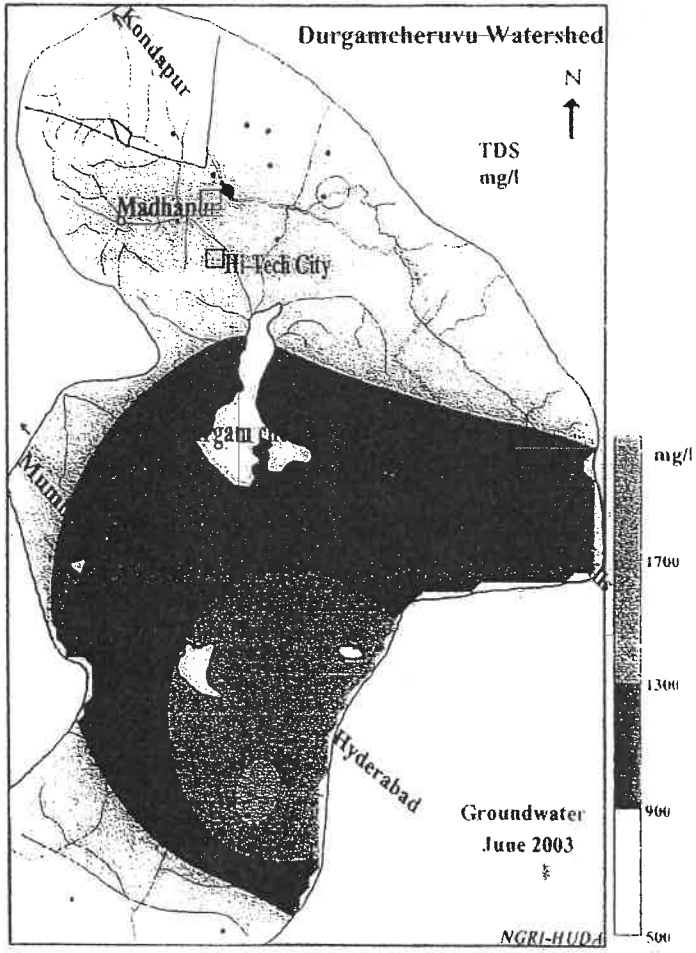


Fig.32a : TDS Concentration in Groundwater (mg/l) – June 2003

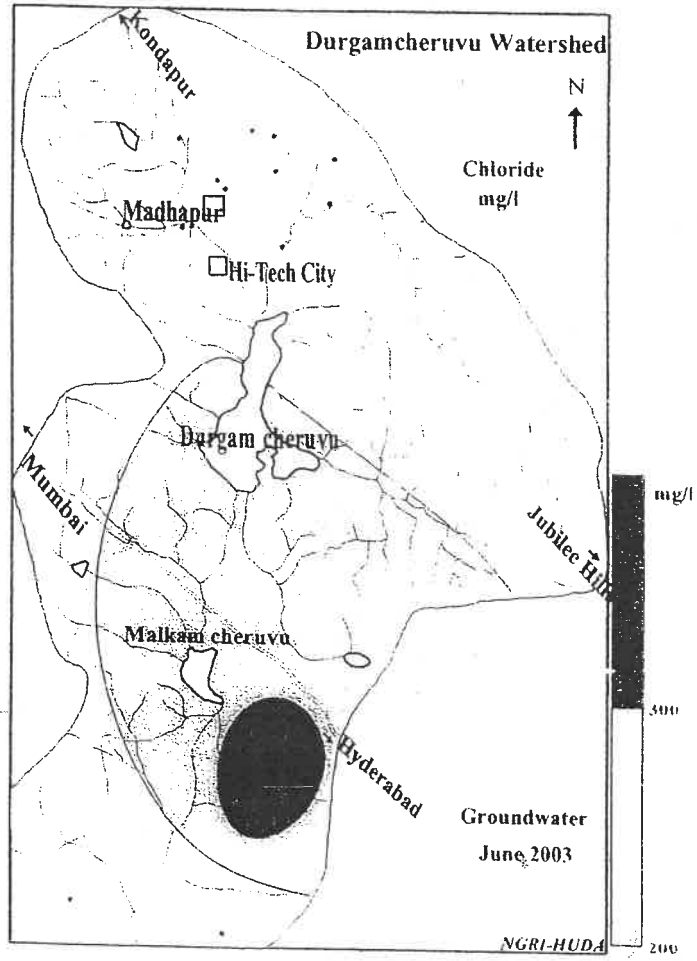


Fig.32b : Chloride in Groundwater (mg/l) – June 2003

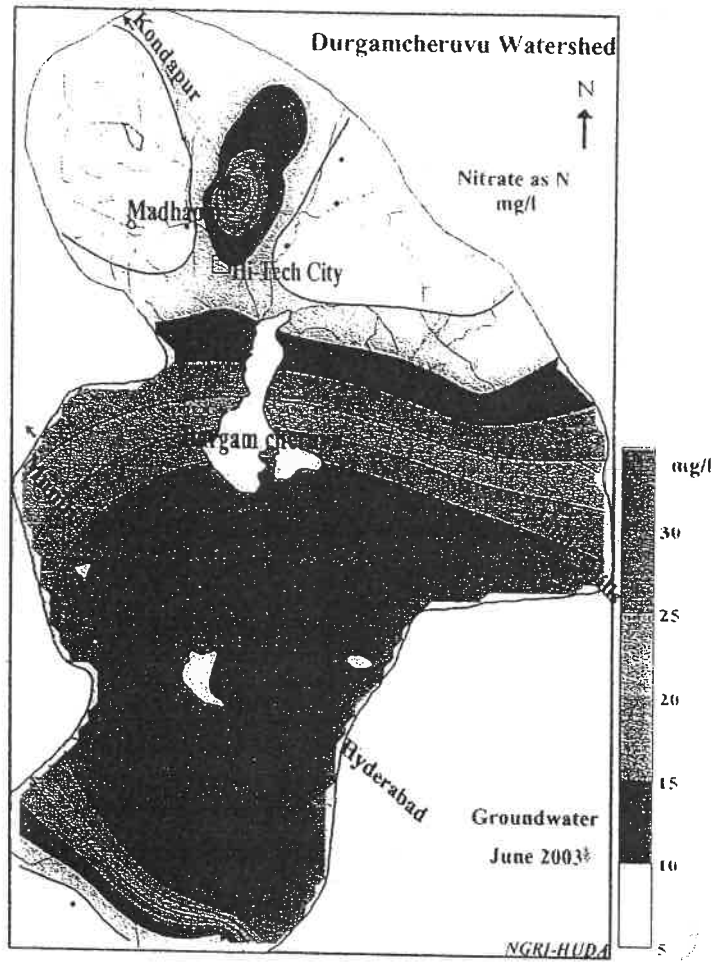


Fig.32c : Nitrate as N in Groundwater (mg/l) – June 2003

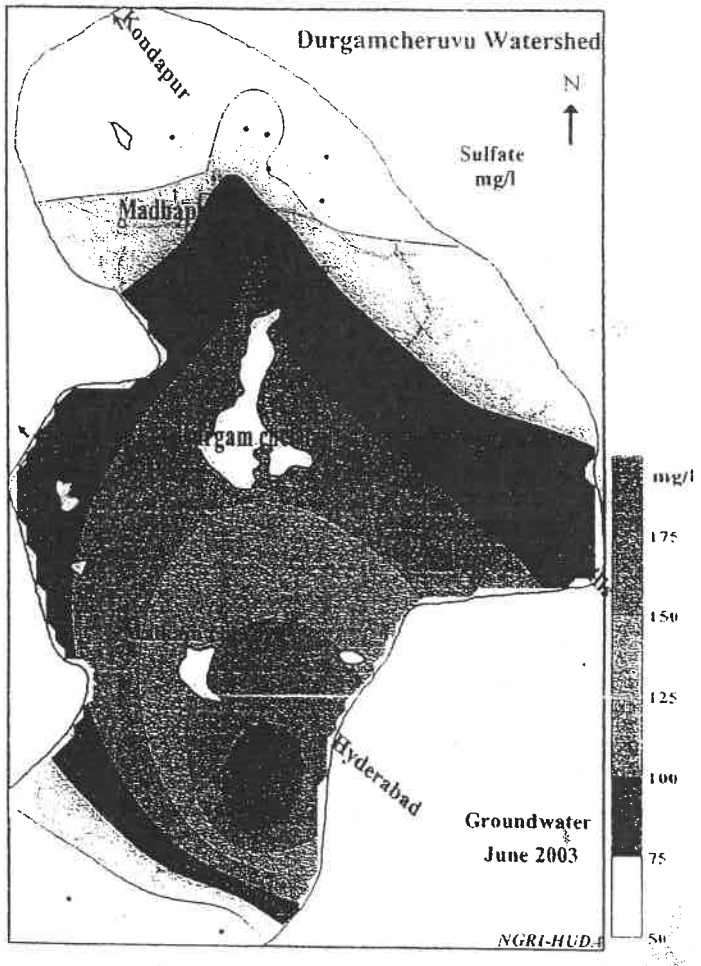


Fig.32d : Sulfate in Groundwater (mg/l) – June 2003

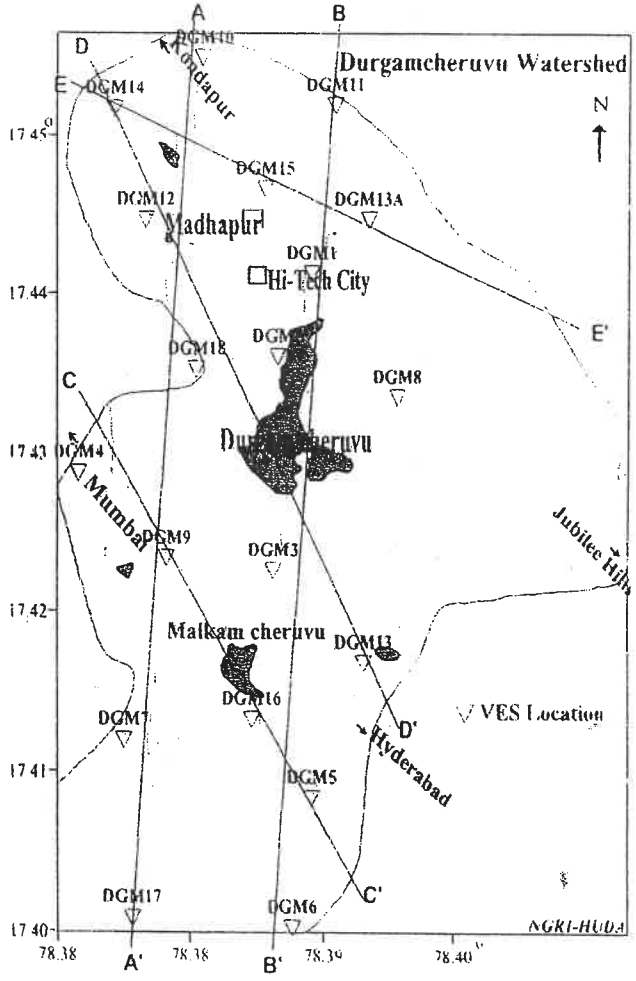
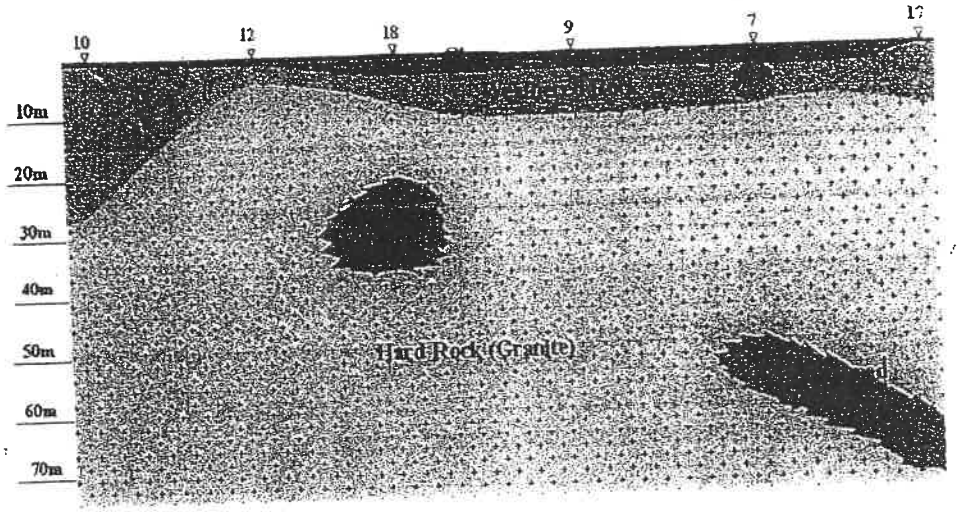
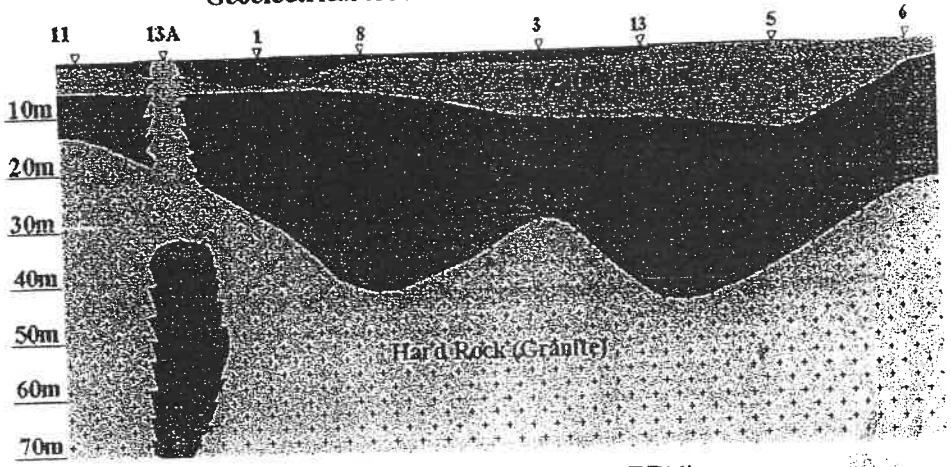


Fig.33 : Location of Vertical Electrical Soundings (VES)

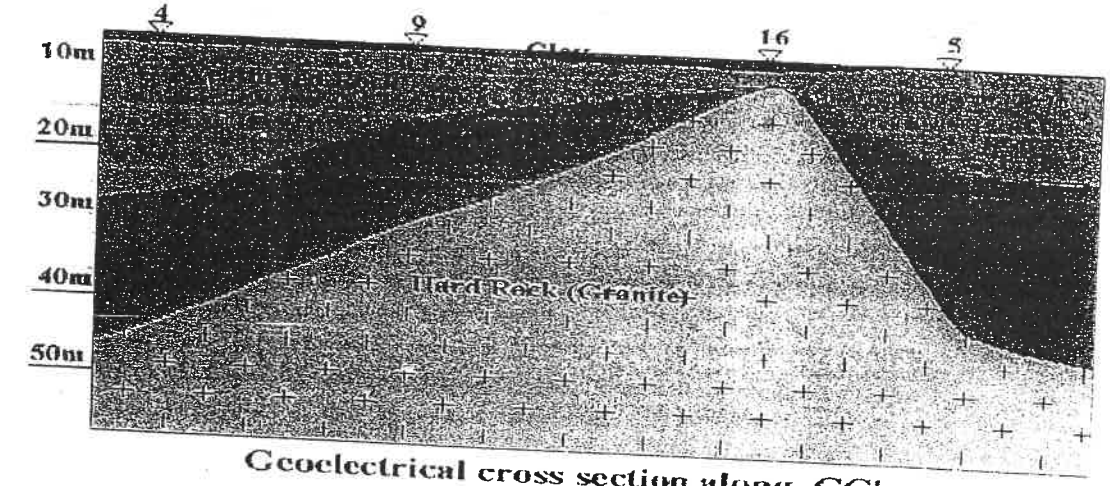


Geoelectrical cross section along " AA' "

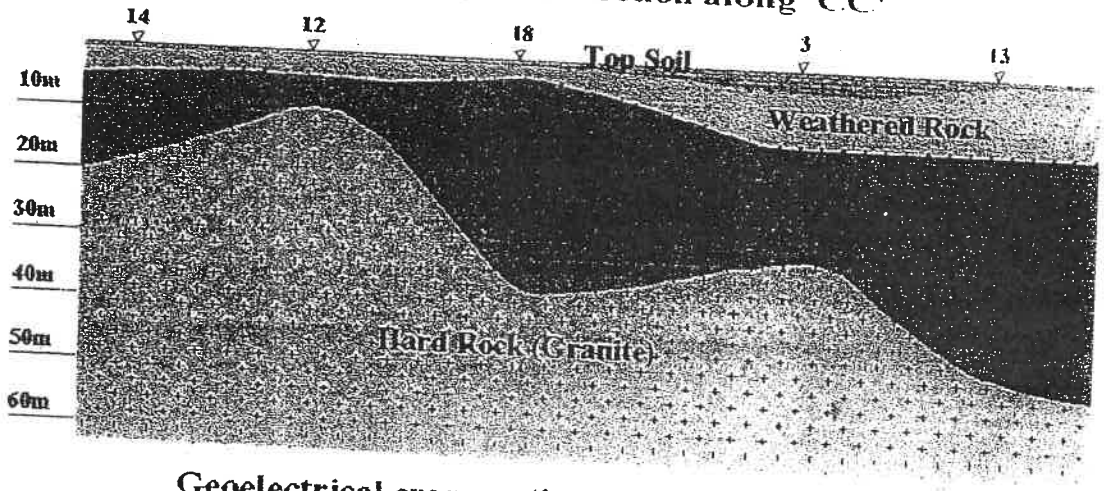


Geoelectrical cross section along " BB' "

Fig. 34 : Inferred Geological section from the VES – Durgamcheruvu Watershed



Geoelectrical cross section along CC'



Geoelectrical cross section along " DD' "

Fig.35 : Inferred Geological section from the VES – Durgamcheruvu Watershed

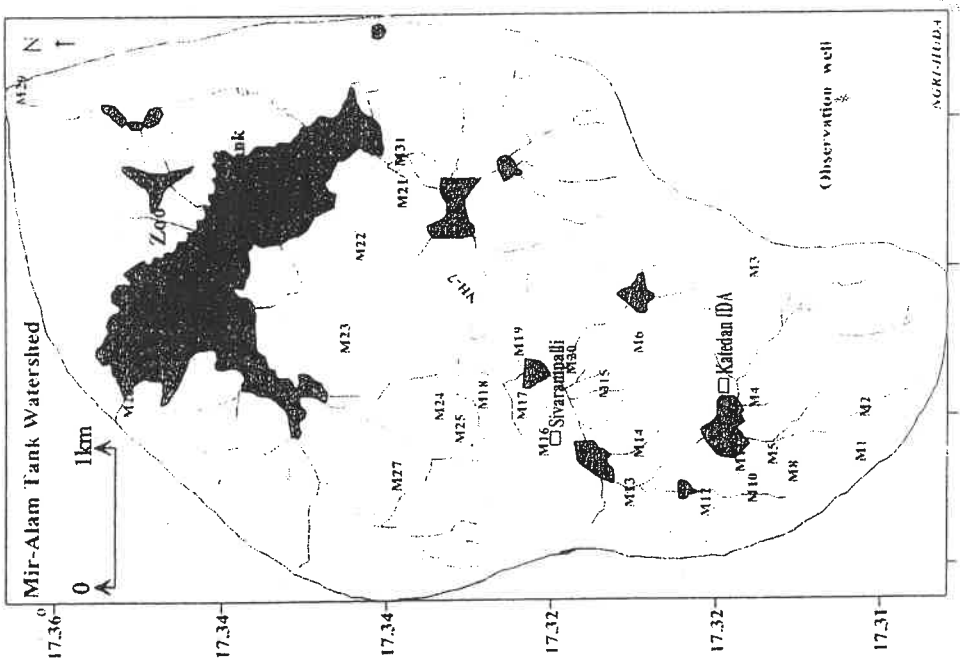


Fig.36 : Observation Wells in Mir Alam Tank Watershed

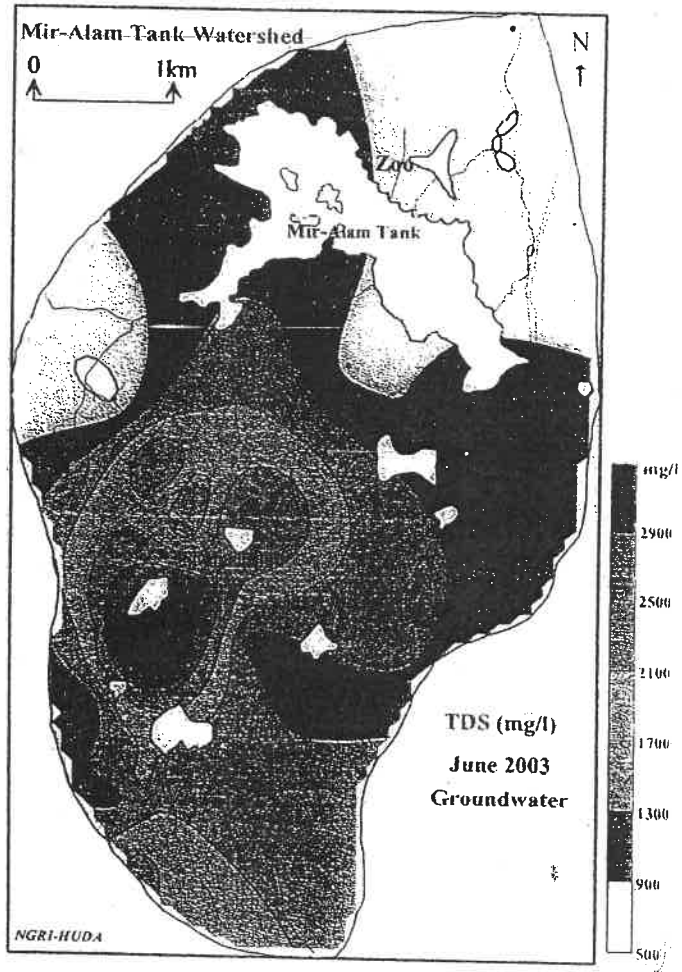


Fig..37a : TDS in Groundwater (mg/l) – June 2003

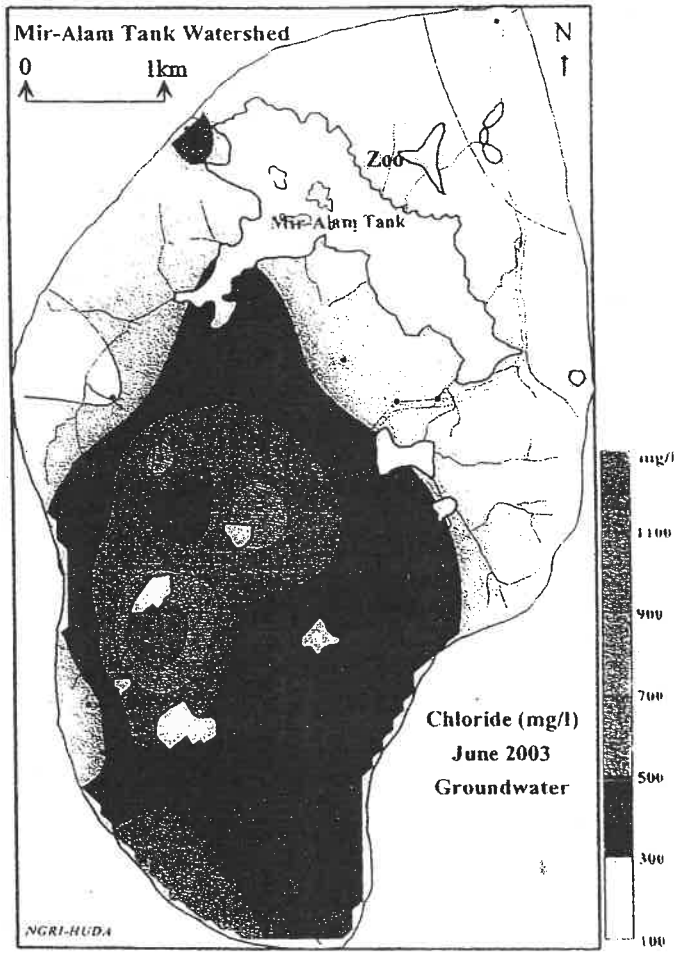


Fig. 37b : Chloride in Groundwater (mg/l) – June 2003

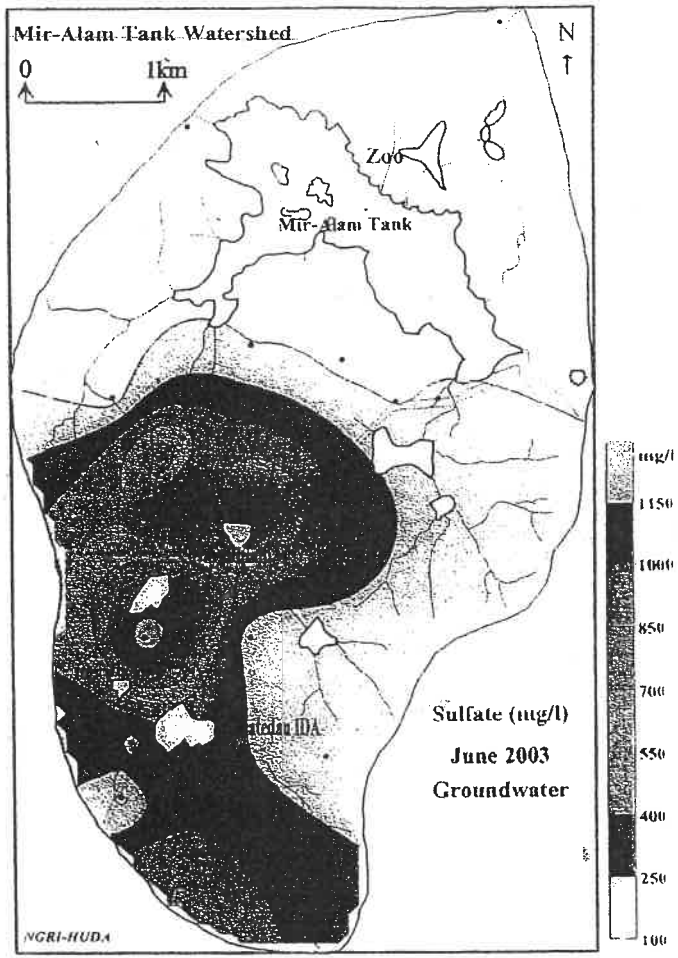


Fig.37c : Sulphate in Groundwater (mg/l) – June 2003

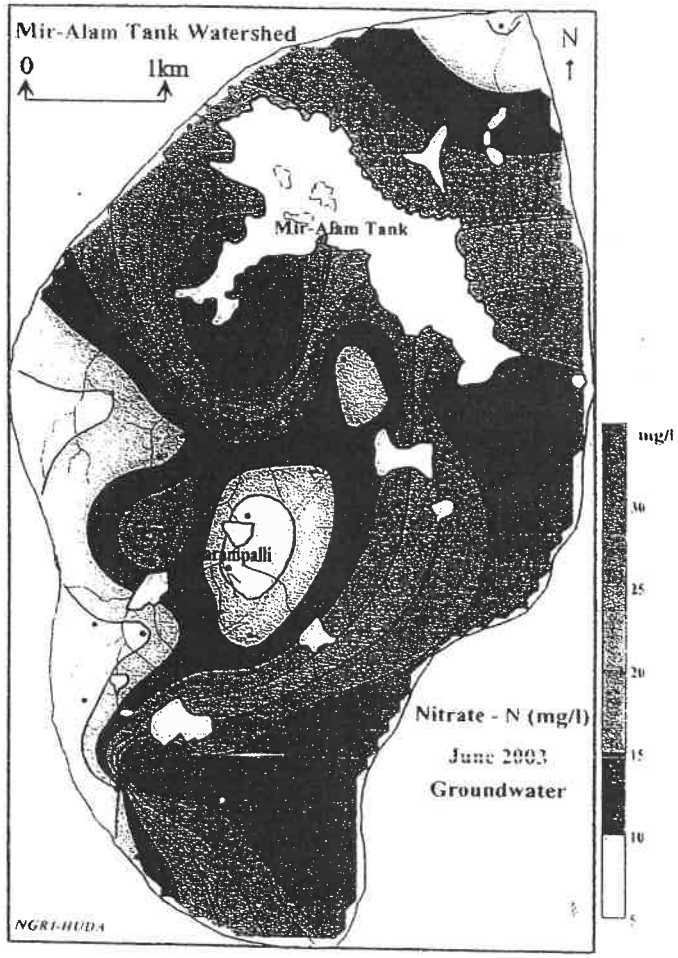


Fig. 37d : Nitrate as N in Groundwater (mg/l) – June 2003

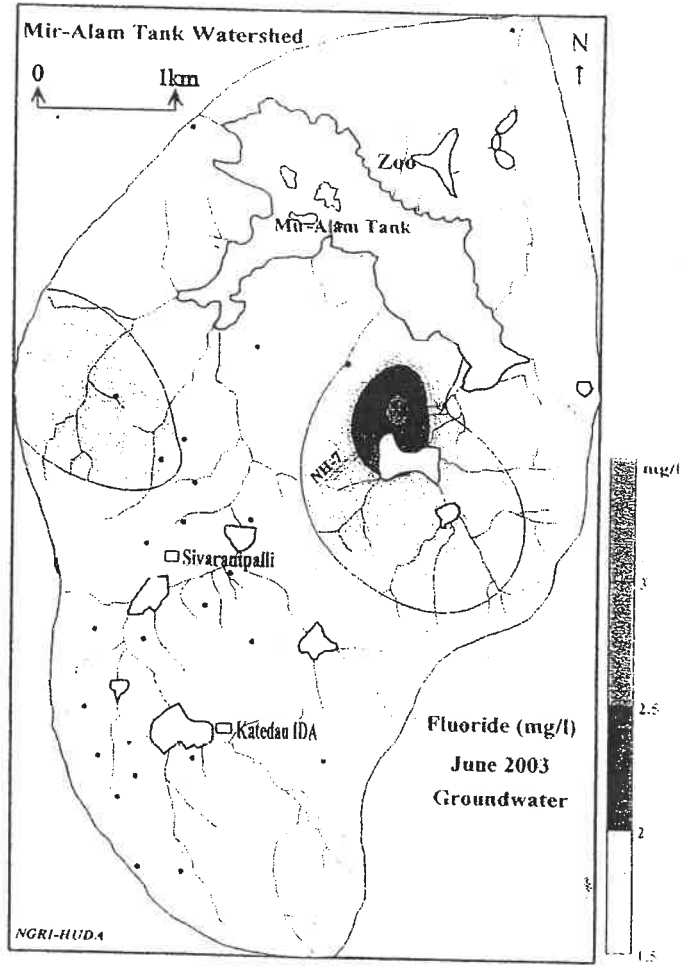


Fig.37e : Fluoride in groundwater (mg/l) – June 2003

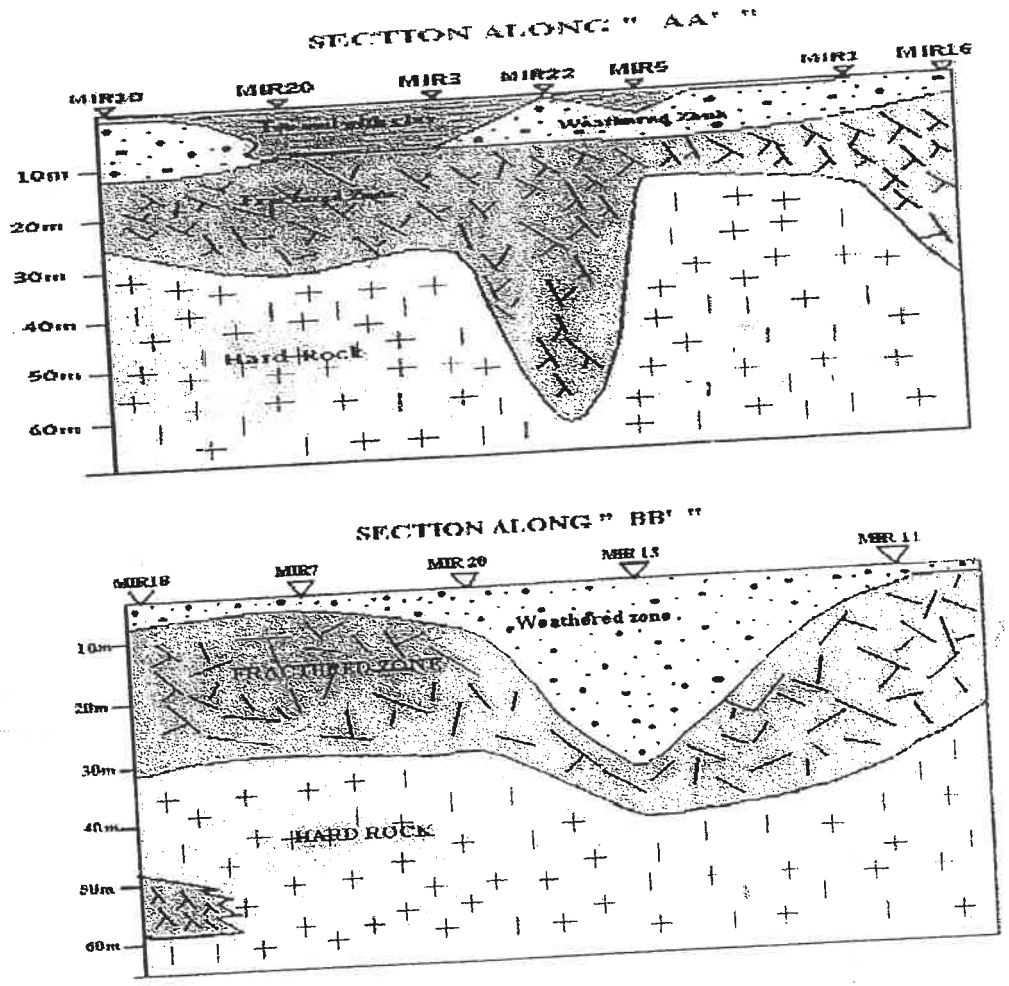


Fig.38 : Inferred Geological Section from the VES – Mir-Alam Tank Watershed

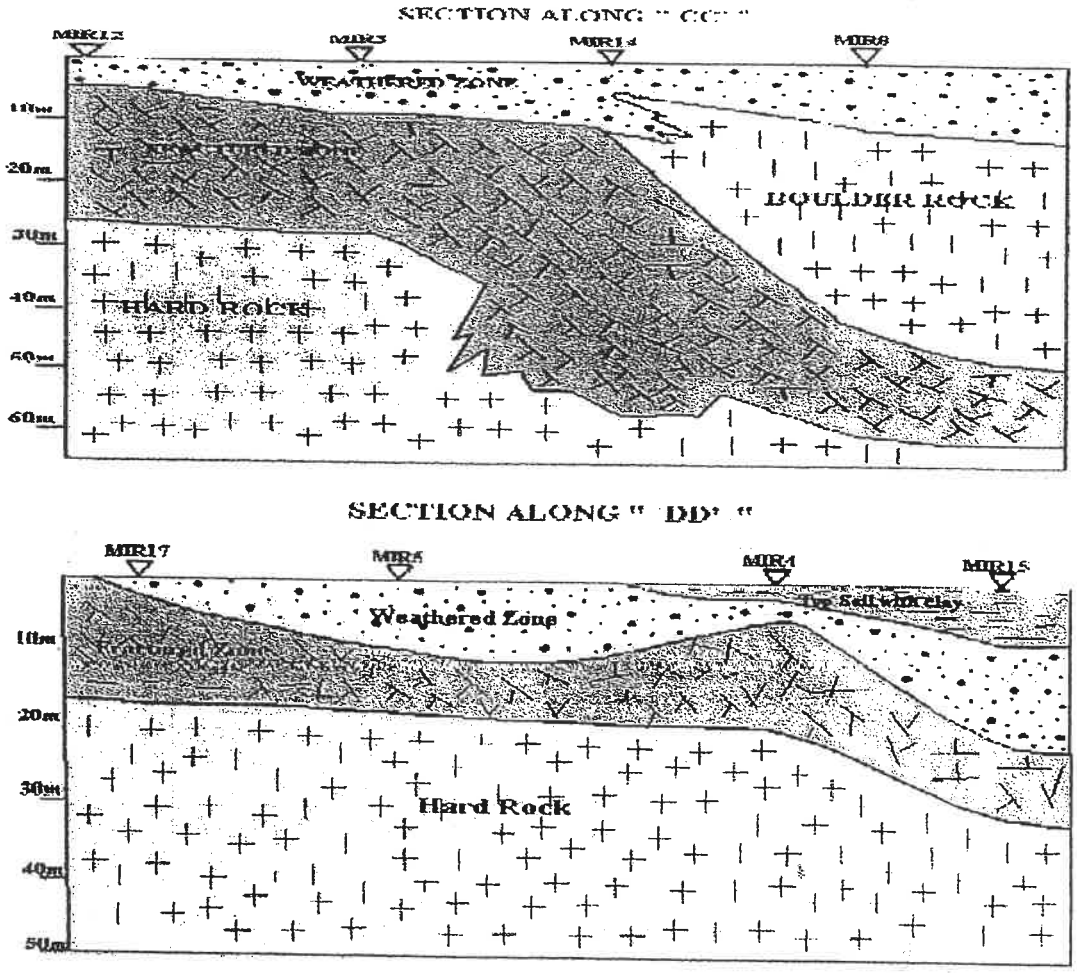


Fig.39 : Inferred Geological section from the VES – Mir-Alam Tank Watershed

1181

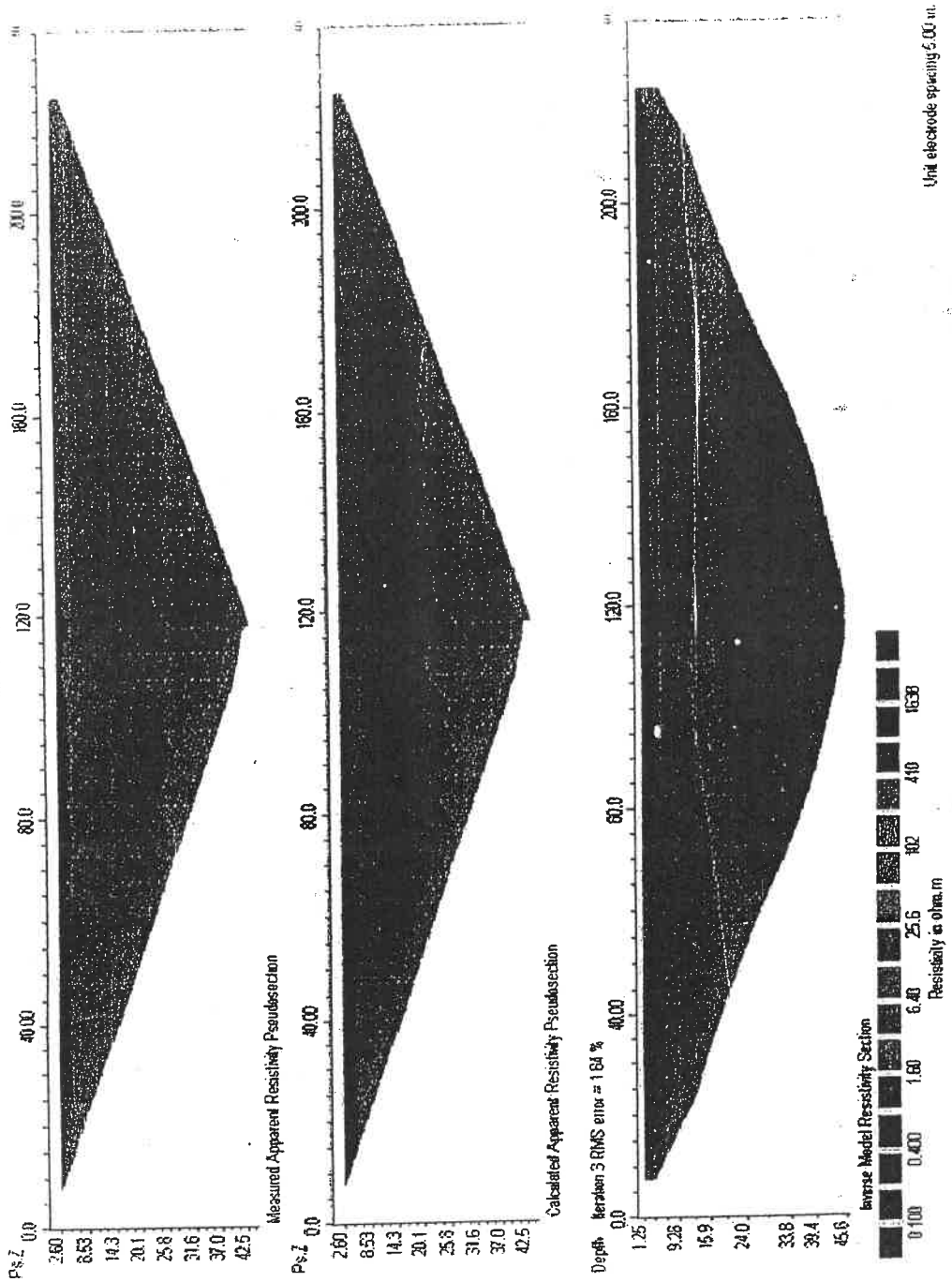


Fig. 40: Resistivity Tomography of Weathered and Fracture Zones (< 100 ohm.m) at Manikonda

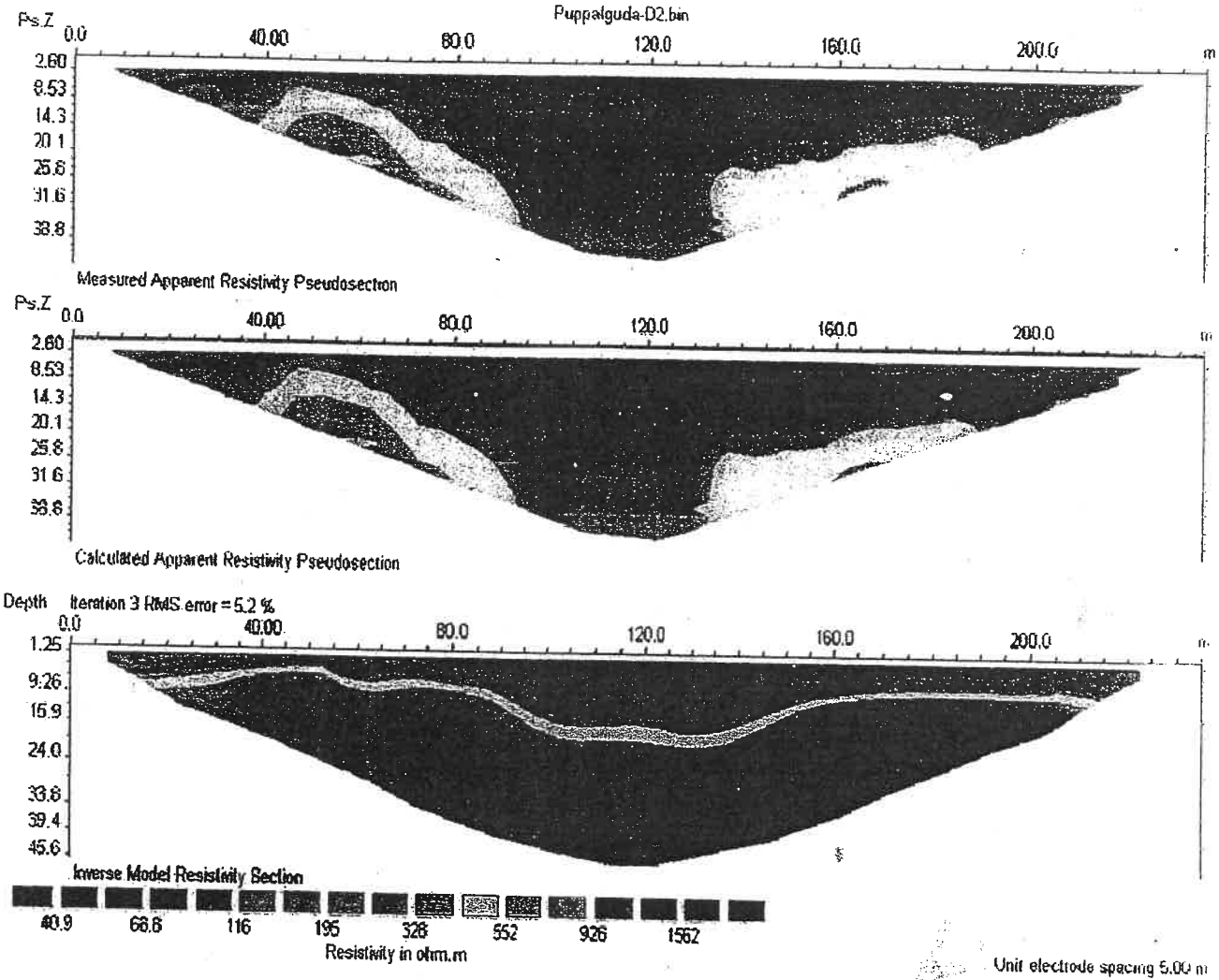


Fig.41: Resistivity Tomography of Weathered and Fracture Zones (< 100 ohm.m) at Poppalguda

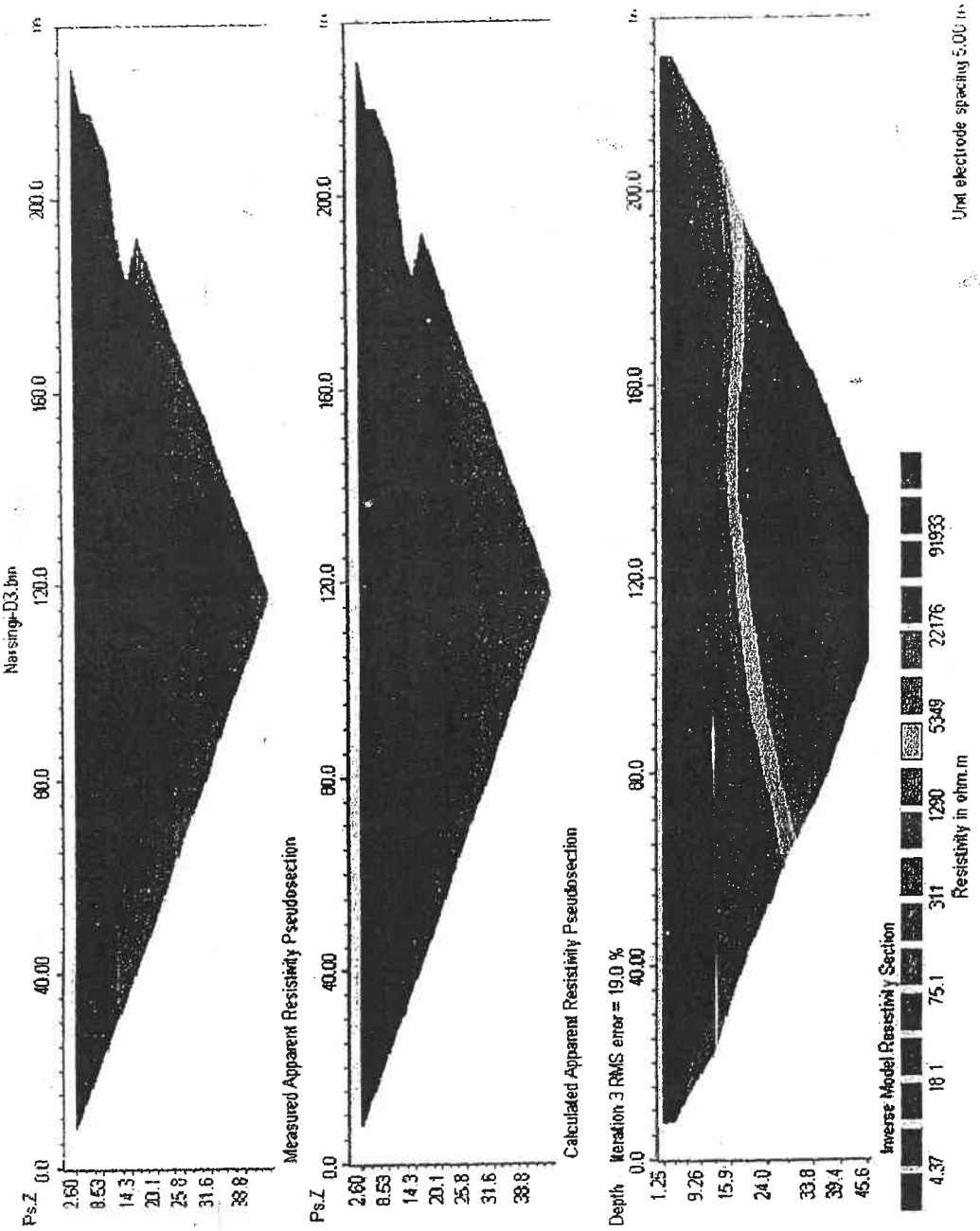


Fig. 42: Reisistivity Tomography of Weathered and Fracture Zones (< 100 ohm.m) at Narasingi

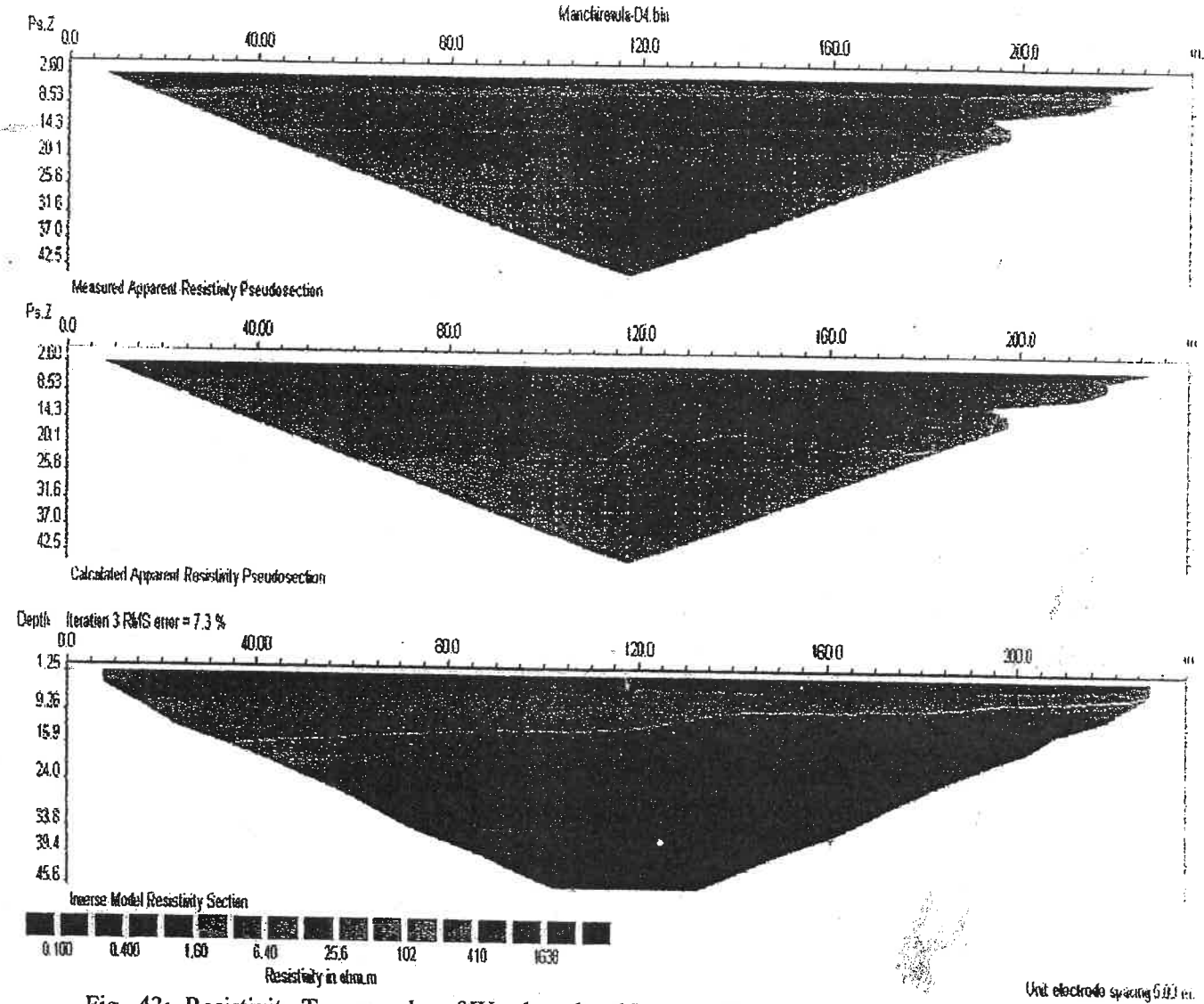


Fig. 43: Resistivity Tomography of Weathered and Fracture Zones (< 100 ohm.m) at Manchirevula

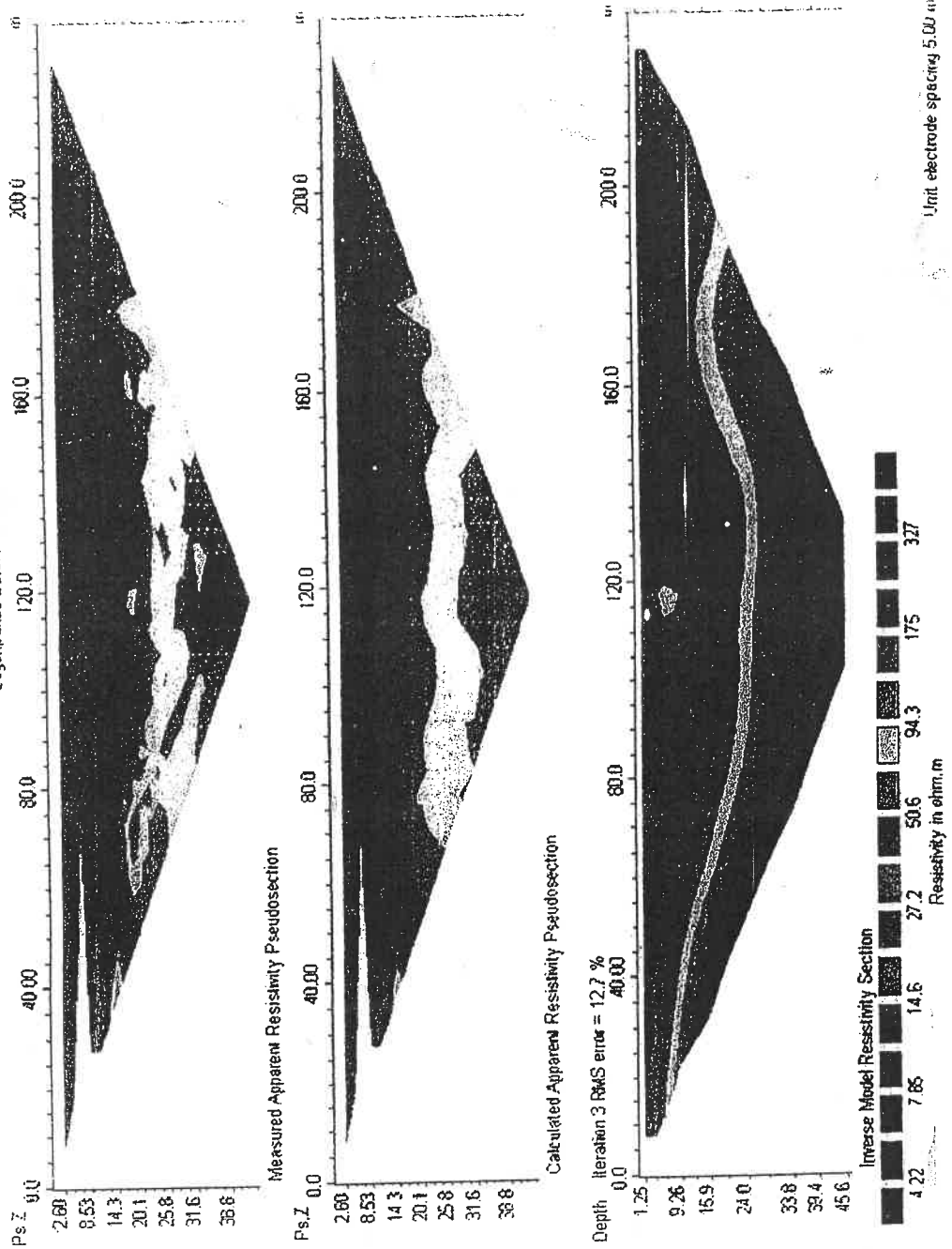


Fig. 44: Resistivity Tomography of Weathered and Fracture Zones (< 100 ohm.m) at Gaganpahad

Fig. 44 : Resisitivity Tomography of weathered and Fracture Zones (< 100 ohm.m) at Gaganpahad

6.7 AMBIENT AIR QUALITY OF THE STUDY AREA

6.7.1 Introduction to Ambient Air Quality:

The study area selected for Ambient Air Quality falls within 10 kms radius, downstream of Himayat sagar and Osman sagar lakes. Ambient Air Quality (AAQ) data was collected from APPCB (Andhra Pradesh Pollution Control Board) Head office and the same is utilized for the present study. APPCB is generating Ambient Air Quality at different locations in the twin cities and its surroundings. The locations at Rajendra nagar, Langar House, University of Hyderabad & Zoo Park were selected by APPCB under SAAQM program and they also fall under the present study area. The AAQ values are presented in the Table-XXVI to Table-XXIX. These tables show monthly average of SAAQM data for the year 2005.

As part of the Air Quality component, EPTRI has identified four locations at Osman sagar, Himayat sagar, Pirancheru and Kattedan. All these locations fall within 10 kms radius, downstream of Himayat sagar and Osman sagar. The AAQ values (daily averages) are presented in the Table –XXX to Table – XXIII during the study period 13th Februay 2006 to 14th March 2006.

All values are expressed in micro-grams per cubic meter (ug/m^3). The pollutants selected for the study are Total Suspended Particulate Matter (TSPM), Respirable Suspended Particulate Matter (RSPM), Sulphur dioxide (SO_2) and Nitrogen Oxides (NO_X).

6.7.2 Results and discussions:

6.7.2.1 Air Quality Monitoring Location –Rajendra nagar:

The Rajendra nagar monitoring location is close to the Osman sagar and lake. The monthly average values of TSPM pollutant range between 84 ug/m^3 to 213 ug/m^3.

The annual average of TSPM is 121 ug/m^3. The monthly average values of RSPM pollutant are range between 21 ug/m^3 to 95 ug/m^3. The annual average of RSPM is 44 ug/m^3. The monthly average values of gaseous pollutant Sulphur dioxide (SO_2) range between 3.3 ug/m^3 to 5.0 ug/m^3. The annual average of SO_2 is 4.3ug/m^3. The monthly average values of gaseous pollutant Nitrogen Oxides (NO_x) range between 12.9ug/m^3 to 17.4ug/m^3. The annual average of NO_x concentration is 15.0ug/m^3.

6.7.2.2.Air Quality Monitoring Location –Zoo Park:

The monthly average values of TSPM pollutant range between 83 ug/m^3 to 256ug/m^3. The annual average concentration of TSPM is 144ug/m^3. The monthly average values of RSPM pollutant are range between 26 ug/m^3 to 69ug/m^3. The annual average of RSPM is 48ug/m^3. The monthly average values of gaseous pollutant Sulphur dioxide (SO_2) range between 3.7ug/m^3 to 4.5ug/m^3. The annual average of SO_2 is 4.2 ug/m^3. The monthly average values of gaseous pollutant Nitrogen Oxides (NO_x) range between 12.4ug/m^3 to 21.0ug/m^3. The annual average concentration of NO_x is 15.1ug/m^3.

6.7.2.3.Air Quality Monitoring Location –Langar House:

The monthly average values of TSPM pollutant range between 217ug/m^3 to 430ug/m^3. The annual average concentration of TSPM is 297ug/m^3. The monthly average values of RSPM pollutant are between 63 ug/m^3 to 150ug/m^3. The annual average of RSPM is 104ug/m^3. The monthly average values of gaseous pollutant Sulphur dioxide (SO_2) are between 4.1ug/m^3 to 4.8ug/m^3. The annual average concentration of SO_2 is 4.4ug/m^3. The monthly average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 15.7ug/m^3 to 29.4ug/m^3. The annual average concentration of NO_x is 20.5ug/m^3.

6.7.2.4.Air Quality Monitoring Location –University of Hyderabad:

The monthly average values of TSPM pollutant are between 45ug/m^3 to 419ug/m^3. The annual average concentration of TSPM is 143ug/m^3. The monthly average values of RSPM pollutant are between 15ug/m^3 to 72ug/m^3. The annual average concentration of RSPM is 45ug/m^3. The monthly average values of gaseous pollutant Sulphur dioxide (SO_2) are between 3.8ug/m^3 to 4.8ug/m^3. The annual average concentration of SO_2 is 4.3ug/m^3. The monthly average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 12.8ug/m^3 to 23.0ug/m^3. The annual average concentration of NO_x is 17.5ug/m^3.

6.7.2.5.Air Quality Monitoring Location –Osman Sagar:

The daily average values of TSPM pollutant are between 46ug/m^3 to 363ug/m^3. The study period average concentration of TSPM is 167.5ug/m^3. The daily average values of RSPM pollutant are between 13ug/m^3 to 161ug/m^3. The study period average concentration of RSPM is 51.5ug/m^3. The daily average values of gaseous pollutant Sulphur dioxide (SO_2) are between 6.7ug/m^3 to 8.4ug/m^3. The study period average concentration of SO_2 is 7.5ug/m^3. The daily average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 10.4ug/m^3 to 11.7ug/m^3. The study period average concentration of NO_x is 11.0ug/m^3.

6.7.2.6.Air Quality Monitoring Location –Himayat Sagar:

The daily average values of TSPM pollutant are between 41ug/m^3 to 347ug/m^3. The study period average concentration of TSPM is 139.9ug/m^3. The daily average values of RSPM pollutant are between 10ug/m^3 to 71ug/m^3. The study period average concentration of RSPM is 33.6ug/m^3. The daily average values of gaseous pollutant Sulphur dioxide (SO_2) are between 6.9ug/m^3 to 13.8ug/m^3. The study period average concentration of SO_2 is 8.7ug/m^3. The daily average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 11.9ug/m^3 to 24.8ug/m^3. The study period average concentration of NO_x is 15.2ug/m^3.

6.7.2.7.Air Quality Monitoring Location –Pirancheru:

The daily average values of TSPM pollutant are between 91ug/m^3 to 201ug/m^3. The study period average concentration of TSPM is 147.5ug/m^3. The daily average values of RSPM pollutant are between 21ug/m^3 to 105ug/m^3. The study period average concentration of RSPM is 46.4ug/m^3. The daily average values of gaseous pollutant Sulphur dioxide (SO_2) are between 7.9ug/m^3 to 10.5ug/m^3. The study period average concentration of SO_2 is 9.4ug/m^3. The daily average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 14.5ug/m^3 to 25.7ug/m^3. The study period average concentration of NO_x is 17.9ug/m^3.

6.7.2.8.Air Quality Monitoring Location –Kattedan:

The daily average values of TSPM pollutant are between 79ug/m^3 to 440ug/m^3. The study period average concentration of TSPM is 222.3ug/m^3. The daily average values of RSPM pollutant are between 38ug/m^3 to 191ug/m^3. The study period average concentration of RSPM is 87.3ug/m^3. The daily average values of gaseous pollutant Sulphur dioxide (SO_2) are between 8.5ug/m^3 to 9.6ug/m^3. The study period average concentration of SO_2 is 9.1ug/m^3. The daily average values of gaseous pollutant Nitrogen Oxides (NO_x) are between 16.0ug/m^3 to 24.0ug/m^3. The study period average concentration of NO_x is 20.8ug/m^3.

MONTHLY AVERAGE VALUES OF SAAQM DATA
FOR THE YEAR-2005

Table XXVI

Total Suspended Particulate Matter (TSPM)
(All values are expressed in ug/m^3)

Period	*Langar House*	*Rajendranagar*	Uni.of Hyd	Zoo Park
JAN, 2005	430	84	169	182
FEB, 2005	249	85	112	256
MAR, 2005	245	86	104	205
APR, 2005	363	110	193	156
MAY, 2005	360	184	157	189
JUN, 2005	277	102	130	128
JUL, 2005	227	87	76	85
AUG, 2005	291	86	45	83
SEP, 2005	302	160	65	90
OCT, 2005	217	136	102	92
NOV, 2005	306	122	144	127
DEC, 2005	301	213	419	140
Annual Average	**297**	**121**	**143**	**144**

Table-XXVII

Respirable Suspended Particulate Matter (RSPM)
(All values are expressed in ug/m^3)

Period	Langar House	Rajendranagar	Uni.of Hyd	*Zoo Park*
JAN, 2005	135	35	71	65
FEB, 2005	88	29	39	59
MAR, 2005	63	21	37	69
APR, 2005	145	30	72	50
MAY, 2005	130	95	51	62
JUN, 2005	81	36	34	42
JUL, 2005	79	47	53	36
AUG, 2005	80	27	15	26
SEP, 2005	90	41	23	31
OCT, 2005	65	41	37	36
NOV, 2005	150	47	49	50
DEC, 2005	140	73	55	54
Annual Average	**104**	**44**	**45**	**48**

Table -XXVIII

Sulphur dioxide (SO2)
(All values are expressed in ug/m^3)

Period	*Langar House*	*Rajendranagar*	Uni.of Hyd	Zoo Park
JAN, 2005	4.1	3.3	3.8	4.1
FEB, 2005	4.2	3.9	4.0	3.7
MAR, 2005	4.1	4.2	4.3	4.1
APR, 2005	4.8	4.3	4.1	4.5
MAY, 2005	4.5	4.5	4.3	4.5
JUN, 2005	4.4	4.4	4.5	4.3
JUL, 2005	4.4	4.3	4.4	4.3
AUG, 2005	4.4	4.2	4.2	4.3
SEP, 2005	4.8	5.0	4.4	4.3
OCT, 2005	4.6	4.2	4.3	4.2
NOV, 2005	4.4	4.4	4.8	4.4
DEC, 2005	4.4	4.6	4.4	4.3
Annual Average	4.4	4.3	4.3	4.2

Table-XXIX

Oxides of Nitrogen (NOx)
(All values are expressed in ug/m^3)

Period	Langar House	*Rajendranagar*	Uni.of Hyd	Zoo Park
JAN, 2005	29.4	17.4	20.0	21.0
FEB, 2005	22.0	13.8	17.3	18.4
MAR, 2005	25.4	14.7	23.0	15.7
APR, 2005	18.8	15.3	21.4	15.2
MAY, 2005	24.5	14.3	17.6	15.2
JUN, 2005	20.5	16.7	16.8	15.4
JUL, 2005	17.4	13.9	13.3	13.0
AUG, 2005	17.3	12.9	19.2	12.4
SEP, 2005	21.4	14.7	12.8	12.5
OCT, 2005	17.0	15.4	14.6	12.8
NOV, 2005	16.4	15.0	18.6	14.0
DEC, 2005	15.7	16.3	15.9	14.5
Annual Average	**20.5**	**15.0**	**17.5**	**15.1**

DAILY AVERAGE VALUES OF SELECTED POLLUTANTS

Table XXX

Total Suspended Particulate Matter (TSPM)
(All values are expressed in ug/m^3)

Study Period	*Osman Sagar*	*Himayat Sagar*	Pirancheru	Kattedan
First Day	300	331	187	331
Second Day	124	347	144	440
Third Day	154	114	184	272
Fourth Day	171	98	154	275
Fifth Day	96	83	121	169
Sixth Day	46	63	98	108
Seventh Day	86	42	91	79
Eighth Day	363	41	201	104
Average	**167.5**	**139.9**	**147.5**	**222.3**

Table-XXXI

Respirable Suspended Particulate Matter (RSPM)
(All values are expressed in ug/m^3)

Study Period	*Osman Sagar*	*Himayat Sagar*	Pirancheru	Kattedan
First Day	161	71	105	139
Second Day	53	62	58	191
Third Day	72	49	63	95
Fourth Day	45	31	44	92
Fifth Day	13	18	25	53
Sixth Day	16	14	21	38
Seventh Day	13	14	22	42
Eighth Day	39	30	33	48
Average	**51.5**	**33.6**	**46.4**	**87.3**

Table -XXXII

Sulphur dioxide (SO_2)
(All values are expressed in ug/m^3)

Study Period	*Osman Sagar*	*Himayat Sagar*	Pirancheru	Kattedan
First Day	6.7	6.9	9.2	9.5
Second Day	7.4	7.4	7.9	9.1
Third Day	8.4	7.9	9.3	9.0
Fourth Day	7.0	8.0	9.3	9.6
Fifth Day	7.1	13.8	9.5	9.0
Sixth Day	7.9	7.7	10.4	8.6
Seventh Day	7.9	8.7	8.8	8.5
Eighth Day	7.7	8.9	10.5	9.4
Average	**7.5**	**8.7**	**9.4**	**9.1**

Table-XXXIII

Oxides of Nitrogen (NOx)
(All values are expressed in ug/m^3)

Study Period	*Osman Sagar*	*Himayat Sagar*	Pirancheru	Kattedan
First Day	10.4	11.9	17.4	18.9
Second Day	10.7	12.7	14.5	19.0
Third Day	11.3	13.0	17.6	19.4
Fourth Day	10.9	13.6	17.9	16.0
Fifth Day	11.7	24.8	16.4	22.7
Sixth Day	11.0	14.3	17.6	24.0
Seventh Day	11.4	15.6	16.1	22.9
Eighth Day	10.9	15.5	25.7	23.8
Average	**11.0**	**15.2**	**17.9**	**20.8**

7. CONCLUSION AND RECOMMENDATION

Conclusion

Surface Water

As pointed out in this report the study area represents 10 Km down stream of Osman Sagar and Himayath Sagar. In this area there are two Industrial Development areas namely Katedan and Gaganpahad. These two areas are housing 124 red category, 2 orange category and 36 green category of industries. There are more than 10 units whose product and raw material is unknown. The discharge from industries is around 300 m^3 of effluents per day into Noor Mohammed Kunta. Some of them are toxic, some are rich in organic and inorganic pollutants. The sewage from habitation accounts for 200 m^3 per day. The solid waste generated by industries as well as human habitation are dumped into the Noor Mohammed Kunta. Of the 400 acres catchment area consisting of green vegetation and grazing grounds, 250 acres have been converted to Industrial Estate. Most of the remaining catchment area has been occupied by human habitation. The run off from the catchment area is more than the capacity of the Kunta hence the over flow is polluting the down stream water bodies.

Water bodies which are falling under the study area are Osman Sagar, Himayath sagar, Noor mohammed Kunta, Sivarampally Cheruvu, ANGRAU Cheruvu, Meer alam Tank. Other than lakes and kuntas, Musi and Musa rivers are also present but are mostly dry except in the rainy season or after traveling for some distance carries sewage.

As regards to the surface water / effluents flow , from the studies it is clear that the waste water / effluent from Katedan and Gaganpahad IDAs does not move up stream and enter into Osman Sagar and Himayath Sagar (no back flow of effluents) hence there is no possibility of polluting the Osman Sagar and Himayath Sagar lakes from effluents in these areas. The surface water flow / migration of pollutants follow a definite route depending on the hydraulic

gradient in the water shed . As per the contours the surface elevation of Noor mohammed Kunta , Sivarampally Cheruvu and Meer Alam Tank falls are under 540, 525 and 510 m (amsl) respectively. The Meer alam Tank has formed on a third order stream in the valley bottom of the water shed. Sivarampally Cheruvu and Meer alam Tank forms the down stream of Noor Mohammed Kunta. The Noor Mohammed Kunta receives untreated industrial waste from Katedan Industrial area over flow of which enters into Sivarampally Cheruvu via ANGRAU campus and in turn drains into Meer Alam Tank. Small bunds and drains that used to drain in water from the catchment have been destroyed (Newstime 1994). These developments have totally reduced the influx of rain water on the one hand and addition of untreated domestic sewage from the encroached settlements on the other hand.

Ground Water

The main natural hazard is the depletion of groundwater due to reduced precipitation in the recent past. Hence the Ranga Reddy district experiences severe drought and intense problem for drinking water. The Hyderabad district, which is an urban area faces heavy vehicular pollution, groundwater pollution and air pollution in the suburbs due to industrial activities. Owing to rapid urbanization, felling of trees and reclamation of tanks, increase in the day time temperature is noticed.

In the upland areas of granitic terrain, the depth of drilling/construction of wells need not exceed in general 40 to 45 m. Usually four fracture zones are encountered within this depth. The first fracture has the maximum yield of 2 lps. The average depth of this fracture is about 22 m from ground level. The second and third fractures yield relatively less, each of them are encountered at a depth of 28 m and 36 m respectively. The fourth fracture yield is negligible. The available drawdown in the recharge areas is limited. The water level fluctuations are large. In the low lying granitic terrain, all the three fracture zones are encountered within a depth of 30 m yielding 5 lps. The fourth facture occurs at a depth of 36 m yielding 0.5 lps only. The depth of drilling or construction of wells in general can be limited 35 to 40 m bgl. The seasonal water

level fluctuation is minimum and available drawdown is large. Open well yields are 45 m^3/day (250 lpm) with average pumping of 3 hrs in a day in the catchment areas whereas the bore wells pumping for 8 hrs are yielding - 90 m^3/day (150 lpm). Groundwater department has categorized the Shamshabad mandal as semi critical.

The groundwater flow in all these watersheds is towards either Musi river or Musa river. In general the groundwater quality is slightly elevated for all parameters in Gaganpahad watershed compared to Golconda and inter-stream watersheds. The industrial areas in Katedan is contributing to the elevated ground-water concentrations particularly between Katedan and Sivarampally village through ANGARU campus. The industrial discharges act as point sources in Gaganpahad village also contribute to the elevated concentrations. The groundwater quality is good in northern part of Musi river under Golconda watershed and inter-stream region.

The entire down stream is poor in ground water potential and hence water intensive industries not recommended under any category. Even construction of multistory flats/ office complexes more than 10 floors may require requisite water for daily sanitary use. If one depends on surface water sources, the failures if any for more than 2-3 days will severely impact the general sanitation in the area. Thus the appropriate steps should be implemented while approving multistoried structures. Laying of sewer lines is a must other wise it would impact local areas and thus spread uniformly in the entire region.

Ambient Air Quality

Among all the Gaseous pollutants, Sulphur dioxide levels are low in the study area. Among all the locations, the air pollutant concentrations (except SO2 concentrations) at Rajendranagar are low. All the monitored pollutants are well with in the standards.

Lake Acidification

Regarding the chemical characteristics of rainwater in Hyderabad, Certain industries, as well as emissions from vehicles give rise to increase of sulphur dioxide and nitrogen oxides in the air. These emissions change to sulphates and nitrates under the influence of sunlight and moisture, and get converted into sulphuric acid and nitric acid, which comes down as acid rain.

Coal usually contains between 2-3% sulphur, and when it is burned, sulphur is released into the atmosphere. Electric utilities and other industries which burn coal cause emissions of sulphur dioxide. It should be noted that there are no major electric utilities in the Hyderabad area. Other industries which process raw ore containing sulphices in order to obtain copper, zinc, or nickel also cause an increase in sulphur dioxide levels in the atmosphere. The major source of emissions of nitrogen oxides into the air is from vehicles and places where fossil fuels are burned.

Natural rainfall has a pH around 6.0. This is due to the effect of carbon dioxide in the air, which combines with water to form carbonic acid. The effect of this is, however, negligible as it is neutralized in the soil by alkaline material. However, if pH of rain drops to below 5.5, it may be considered acidic, as the soil cannot neutralize the acidity of the rainwater.

In regard to possibility of acidification of lake waters due to acid rain, a study was conducted by Indian Institute of Chemical Technology, Hyderabad for three monsoon seasons from 1999 to 2001 to review such possibility. The study focused on chemical characterization of rain water and investigation of neutralization potential of rain water at Hyderabad. From the investigation, it was concluded that pH of rain water varies from 5.5 to 7.2 with an average of 6.4, which is in the alkaline range, considering the interaction of rainwater with carbon dioxide in air. **It may be assumed, therefore, that lake acidification is not of concern in the Hyderabad region.** The research paper is enclosed with this report for ready reference at **Annex IV.**

In view of the above base line data it is suggested that the area is suitable for establishment of non-polluting industries (Green category) and also Orange category in the Katedan and Gaganpahad IDAs. It is imperative to carry out periodical monitoring of water quality for keeping a watch on contamination etc.

The Rio de Jeneirio Conference has been a land mark in the history of Environment Protection, where in the concerns of Environmentalists were clubbed with Development initiatives and was endorsed by 178 countries of the world. Instead of promoting mere growth, the UN Commission Report on 'Environment and Development' 1987 suggested that thrust should be on **'TRUE DEVELOPMENT'**, which has been termed as **'SUSTAINABLE DEVELOPMENT'**. The concept of Sustainable Development requires a total change in the out look towards development and new planning approaches / techniques / methods / tools for bringing about better quality of life. Therefore a development with appropriate balance between the supportive capacity of resources and the assimilative capacity of the environment provides a good quality of life.

Rivers, lakes and wetlands are fundamental elements of the natural landscape. Areas surrounding them are most important areas for habitation, recreation and industrialization. They need to be protected in order to safe guard their ecological functions and natural resources. The use of water resources involves many conflicting interests. Hence we need to weigh these interests against each other when projects around water courses/ bodies are planned. We need to ensure an integrated holistic and environmentally sound management of water resources. It is a time to prevent further damage to water bodies and increase safety by introducing measures to protect and restore the water environment.

Recommendations

Based on the above surface water and ground water observations the following points and action plan with responsibilities is recommended / suggusted.

1. From the studies it is recommended that there is possibility of establishing non polluting industries in the study region that is down stream of 10 Km of Osman sagar and Himayath sagar lakes since there is no possibility of polluting of these two lakes due to any accidental discharges as presented in the report.

2. There is possibility of establishing non polluting industries / green category of industries in Katedan and Gaganpahad Industrial Estates. However other lakes in the area may get effected , the action plan to take remedial measures is presented at serial number five below.

3. Green and Orange category of industries can be permitted if the industries strictly adopts cleaner production/ waste minimization/ recycling/ reuse and forced evaporation systems there by ensuring zero discharge from their premises.

4. All the industries have been examined and grouped into red, orange and green category. All the green category of industries can be permitted. Regarding orange category these also can be permitted provided they follow the point numbers three and five.

5. Action plan to be carried out by the industries/ plan that could be implemented by government/ Urban bodies is as follows.

   a. **Action Plan:** Re locating of Red category of industries from Katedan and Gaganpahad industrial estates. Or in the absence of this if it is impossible then the textiles and other highly polluting industries to install Reverse Osmosis Plant. The other small scale industries to join and treat their effluents in a Common Effluent Treatment Plant which should have compatible units (physical, chemical and biological). All the industries to have dedicated pipe lines to reach the CETP. If the effluents are transferred in tankers there is ample chance that the waste may be dumped in any other place. Physical investigation / industrial inventory has to be made for the industries whose data on product which is not available and also fresh inventory on all the industries to be made specifically on their environment management plans .

Responsibility : For relocating of Red category of industries the APIIC may help the industries in finding suitable locations to re locate the industries after carrying out EIA for the individual watershed of industrial estate. If relocation is impossible then the individual industries have to install RO and commission and operate it regularly.

The Commissioner of industries Dept. to collect appropriate amount for establishing CETP, laying pipe line for the transport of effluent. The industries may form association and run the CETP and assign the task of installation, commission and operation of the CETP. The profit generated from the amount collected for treatment of the waste may be used for area development and improvement of the environmental quality of the region.

Primary data on industrial inventory to be generated by Andhra Pradesh Pollution Control Board (APPCB) or consultants like EPTRI etc. may be hired. APPCB and Industries Department to coordinate with each other and attempt periodic monitoring of environmental quality of the region.

b. **Action Plan :** Non polluting industries / green and orange category of industries may be allowed to come up in the Katedan and Gagan Pahad industrial estates. The list of non polluting / green category and orange category of industries is placed at **Annex III**. Care must be taken to ensure that all the infra structure is provided. Appropriate amount may be collected from all the industries for area development. In each estate 5-10 industries join together to have a common canteen , toilet facilities etc. which should be sewered and treated in STP to avoid ground water pollution. The CETP to degrade the waste to the desired quality to be disposed off. All these non polluting industries either curtail waste water or should adopt cleaner production / waste minimization. The industries should be zero discharge industries.

Responsibility: The Commissioner of industries to declare the type of industries (non water polluting) / zero discharge which can come up in the IDAs after getting EIA

done for the above estates and also collect appropriate amount to provide common canteen/ toilets for each industrial estate. The industries may take advise of environmental institutes on cleaner production.

c. **Action Plan :** The water bodies to be declared as per designated best use as per 'Classification of Inland Surface Water IS: 2296 depending on their usage and quality. If the quality is not meeting the specified standards , remedial measures to be taken to make the water fit for the designated purpose. **Osman Sagar and Himayath Sagar** to be declared as Class A or C **(drinking water source). Noor Mohammed Kunta** to be declared as Class E (irrigation, industrial cooling and **controlled waste disposal), Sivarampally cheruvu** as Class E for **irrigation purpose and Meer alam Tank** as Class B **(Out door bathing organized / recreational)** . Appropriate lake management plan for these lakes, regeneration may be taken up.

Responsibility : The authority which has been constituted under Water , Land and Trees Act 2002 may declare the designated best use for all the water bodies.

d. **Action Plan :** If Osman Sagar and Himayath Sagar have to be designated as drinking water source , as per IS 2296 the quality of water to be ensured with the following standards. Dissolved Oxygen 5 mg /l , BOD 2 mg / l, T. Coli 50 MPN / 100 ml, TDS 500 mg /l, Chloride 250 mg /l, Colour 10 Pt. Co. Scale, SO4 400 mg/l, NO3 20 mg /, pH in the range of 6.5 to 8.5, Arsenic as 0.05 mg /l, Fe 0.3 mg / l, Fluoride 1.5 mg / l, Pb as 1.5 mg /l, Cu 0.1 mg /l and Zinc as 1.5 mg /l.

Responsibility: Conservation action to be taken by Water, Land ands Trees Authority and issue directives to the District Collectors / HUDA / MCH / concerned organization.

e. **Action Plan:** If the water of Noor Mohammed Kunta is to be used for controlled waste disposal purpose and Sivarampally Cheruvu for irrigation, as per IS 2296 standards on Classification of Inland Surface Water, the values for the following parameters should not exceed the following concentration. pH 6.0 to 8.0 , Total Dissolved Solids as 2100 mg / l, Chlorides 600 mg /l, Sodium 26 mg /l, Boron as 2 mg / l, Sulphate as 1000 mg / l and Conductivity as 2,250 mhos / cm.

Responsibility: Action to be taken by Water, Land ands Trees Authority and give directives to the District Collectors / HUDA / MCH / concerned organization to take up remedial measures.

f. **Action Plan:** If the water of Meer Alam Tank is to be used for out door bathing, organized / recreational purpose, as per IS 2296 standards on Classification of Inland Surface Water, the values of the following parameters should be with in the following concentrations. Dissolved Oxygen 5 mg / l, Bio Chemical Oxygen Demand as 3 mg / l, Total Coliform 500 MPN / 100 ml, Colour as 300 Pt. Co. Scale, pH range to be in between 6.5 to 8.5, Arsenic as 0.2 mg /l and Fluoride as 1.5 mg / l.

Responsibility: Action to be taken by Water, Land ands Trees Authority and give directives to the District Collectors / HUDA / MCH / concerned organization to take up remedial measures.

g. **Action Plan:** The Restoration, reclamation and conservation of water bodies to be taken up. For all the water bodies FTL and MWL contours to be demarcated . Plantation of proper species to be planed in the belt between FTL and MWL. Restore the weir, raise the bunds where ever necessary. All the industrial areas to have drainage pipe line connecting to the proposed CETP / individual ETP. After ensuring the quality of waste water as per standards then it is to be disposed off. Sewage treatment facilities to be provided where ever there is

encroachment of colonies also introduce EXNORA scheme for house to house collection of municipal solid waste.

Responsibility: Water , Land and Trees Authority to direct the District Collectors / HUDA / MCH / concerned organization to demarcate FTL and MWL. Plantation to be taken up by Forest department. Public Health Engineering department or the concerned department may take action to restore weir, raise the bunds where necessary. HMWS&SB to lay pipe line to carry waste water. STP to be constructed and maintained by HUDA / MCH/ PHE/ HMWS&SB. Private parties to be encouraged to take up municipal solid waste management.

h. **Action Plan:** The thickness of weathered and fracture zone does not exceed 5-8 m in the down stream area except around Gaganpahad water shed. In view of this buildings does not possess sustainable ground water back up supplies. In the case of break down of surface water system (Krishna water supply, piped system), there is very meager ground water availability which may effect the sustainable sanitary function of the building , in view of this the high rise building may be restricted to 10 floors. It is also suggested to provide ample space for installation of water harvesting structures.

Responsibility: State Ground Water Department has to do periodical monitoring of ground water level and potential availability of ground water in the up coming development area. APSIDC should not allow high rise buildings for industrial development.

i. **Action Plan:** No heavy withdrawal of ground water should be allowed in the down stream area as the ground water potential is poor.

Responsibility: The Water , Land and Trees Authority to direct the Ground Water Department / any other authorized Government Department to impose restriction on

the heavy ground water withdrawal and also to monitor the ground water withdrawal and the quality of water at periodical intervals.

6. Zonation of the IDAs to be planed. No residential area to come up with in 500 m around the IDAs. MCH/ HUDA / concerned Authority to take the responsibility of observing that no residential zone to be declared within a vicinity of 500 m of the IDAs.

Environment awareness campaigns to be organized for the industries and residential colonies near water bodies. All the govt. plans regarding lake restoration plans etc. to be announced. NGOs and EPTRI can play vital role in creating awareness.

EPTRI would be happy to be associated in conducting detailed studies of the Water bodies and also in formulating remedial measures for the same.

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Annexures

Annex I : Industrial in Kattedan IDA

1. M/s Chimanlal Silk Mills Pvt. Ltd (RED category)
Plot No 129 - A, Road No 25, IE, Kattedan, R.R. District
Industry produces 5000 m/day printed cloth from grey cloth;

Parameter	(at outlet of ETP)
pH	8.2
SS (103 - 105^{0}C)	4 mg/L
TS (103 - 105^{0}C)	1860 mg/L
TDS	1856 mg/L
Sulphates	202 mg/L
Chlorides	480 mg/L
BOD	38 mg/L
COD	11 mg/L

CETP consists of Primary and Secondary treatment followed by RO plant for tertiary treatment of effluents. CETP consists of the following components: oil & grease trap - collection tank - primary settling - aeration - secondary settling - collection tank - sand filter - activated carbon - final collection tank - sludge drying beds. Solid wastes produced finally are: ETP sludge - 100 kg/day; Ash - 300 kg/day.
Revocation of closure orders till 05-07-2002

2. Hydro Mechanic Transmission (India) Pvt. Ltd. (GREEN category)
Shed No. E - 22, IDA Kattedhan, Rajendranagar, R.R. District

Hydraulic pumps - 10 nos./month. Hydraulic motors - 10 nos./month (Testing of pumps & motors)

Domestic water consumed: 250 lt./day

Wastewater generated: Domestic 150 lt/day

Wastewater treatment accomplished by: Septic tank - Soak pit - Domestic waste

No other details given

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3. M/s Bhavani Batteries Pvt. Ltd. (**RED** category)

6-6-66/B Kattedan Industrial Area, R.R.Dist.

Products: Lead - 2000 kgs/day; Battery cabinets 200 nos/day

Raw material: Sulphex, Lime, stearic acid, rubber and carbon powder, scrap.

Water consumed: Domestic - 200 lt/day

Wastewater generated: Sanitary/Domestic - 150 lt/day

Wasterwater treatment done by: Septic tank + Soak pit - Domestic waste.

Solid/Hazardous waste produced: Non reactive scrap (non-ferrous) 2500 Kg/day is sold out.

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4. M/s. Dhanya Laxmi Industries. (**GREEN** category)

Plot No. 75/2, IDA Kattedhan, R.R.Dist.

Manufacturers 1.5 T/day Plastic granules from 1.6 T/day Plastic Scrap.

Water consumption: Process & wash: 1000 Lt/day; Cooling: 500 lt/day (reused); Sanitary: 200lt/day

Wastewater produced: Process & wash: 1000lt./day; cooling: 500 lt/day; sanitary: 160 lt/day.

Sanitary waste: Septic tank followed by soak pit; cooling water used for gardening purpose.

Trimmed plastic pieces - 50 Kg/day reused in the process.

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5. M/s. Super strapping Plastic industries (GREEN category small scale)

6-6-69/1, Babul reddy nagar, Kattedhan I.E. R.R.Dist.

Manufacturers Plastic box straps (15 T/month) from plastic scrap.

Water consumption: Domestic - 150 Lt./day

Wastewater generation: Domestic/sanitary : 120 lt/day

No other info given.

6. M/s. Ratna Plast. (Green category)

E - 18 SEIE, Kattedhan, Hyd - 252

Plastic egg trays & household articles - 6 MT/month

Raw material used: HDPE granules

Water consumption: Domestic - 200 Lt./day

Wastewater generation: cooling : 100 lt./day

Plastic waste 10 kg/day from moulding section

Wastes Recycled into the process.

7. M/s. Santosh metal industry. (RED Category)

7-3-132/1 old kurnool road, Kattedhan, R.R.Dist.

Lead Ingots 300 kg/day

Raw material used: Old batteries / Lead scrap - 500 Kg/day

Water consumed: Domestic - 0.5 KLD

Wastewater generated: Domestic - 0.3 KLD

Solid waste: mud 360 Kg/day. Disposed by landfill in the premises

8. M/s. Ashok packaging (P) Ltd. (GREEN category)

Plot No. 60/A, Kattedhan, Hyd 252

Product: Corrugated sheets and boxes - 8.5 MT/month.

Waste generated: 20Kg/day waste paper sheets; Disposed by selling

No other details given.

9. M/s. Jacks Pigments (RED category /small scale)

Plot No. 89/B-2, SEIE kattedan, R.R.Dist

Industry manufacturers lead dust from raw lead metal pieces

Water consumed only for domestic purposes

Wastewater generated: 200 L/day (only sanitary)

Sanitary waste treated in Septic tank followed by soak pit.

No other details given.

10. M/s. Bhagyalaxmi industries (RED category)

D.No. 6-6-52, IE kattedan, R.R.Dist.

Industry manufacturers Lead - 350 Kg/day from Old batteries scrap - 1400 Kg/day

Water consumed: Domestic 200 Lt/day;

Wastewater generated: Sanitary/Domestic - 150 lt/day

No ETP - only domestic wastes

Solid waste produced: From melting furnace - Non reactive scrap 30Kg/day

11. M/s. Sukhija industries. (ORANGE category)

8-1-207, Laxmi nagar, mailardevpally, Kattedan, R.R.Dist

Product: cattle feed - 300 MT/month (liquid, semi solid, powder and cake)

Raw material: Wheat, molasses, turmeric, etc.

Water consumed: Domestic - 400 lt/day

Treatment in Septic tank as domestic waste only.

During inspection unit was not in operation.

12. M/s. A.K.Engineering Industries (GREEN category)

SEIE Kattedan, Shed No. E-16, R.R.Dist.

Product: HDPE tape : 250Kg/day; Raw material: HDPE granules : 8T/month

Water consumed: Cooling: 200 lt/day (circulation);Domestic; 200 lt/day.

Wastewater produced: Domestic: 150 lt/day.

Treatment methodology: Septic tank + soak pit for domestic waste

13. M/s. Jai Durga Sai Textiles (RED category)

Plot No. 48/1, IDA kattedan, R.R.Dist

Textile processing : 6,500 mts/day

Water consumed: Process & washes: 45000 lt/day; Boiler feed: 20000 lt/day;

Sanitary:

2000 lt/day; Total: 67000 lt/day

Wastewatet generated: Process & wash: 45000 lt/day; Sanitary: 1700 lt/day; Total: 46700 lt/day

No ETP

14. M/s. Effochem (RED category)

Plot No. 109, Rd No.32, IDA kattedan, R.R.Dist

Product: Metallic stearates 2.5 - 3 T/month Solid fuel - 5T/month

Raw material: (Stearic acid, caustic soda, Aluminium sulphate, Magnesium sulphate, Zinc

sulphate) 3T/month

Water consumed: 2500 L/day [Process & wash: 1500L/day; Boier: 500 L/day; Sanitary: 500L/day]

Wastewater generated: Process & wash: 1200L/day; Sanitary: 400L/day.

No ETP for process water.; NA. Septic tank for sanitary water.

Process wastes dumped outside factory premises.

15. M/s.Leo rubber industry (GREEN category)

S.No. 47/2 Mylardevpally, Kattedan, R.R.Dist

Product: Rubber parts 6 T/month; Raw material: Natural rubber 5.5MT/month Nupin Natral

Water consumed: Cooling: 200 lt/day (recycled); sanitary: 200 lt/day.

Wastewater generated: Sanitary - 100 L/day

Wastes treated in Septic tank followed by soak pit

Solid wastes generated: cut pieces of rubber sheet lumps

16. M/s. Mega pulverisers (RED category)

Shed No. D-3, Road No. 5, APIIC Ltd, Kattedan

This industry is a mini clinker pulverising unit, manufacturing cement by pulverising the cement clinker with gypsum in ballmill. The industry has provided closed mesh system and bag at outlet of ballmill.

The industry produces 200 mT cement/month.

17. M/s.Supreme pigments (P) Ltd. (RED category/ Small scale)
Plot No 149, Rd No 25, IDA kattedan, R.R.Dist.
Product: Lead - 600Kg/day; Raw material: Battery scrap - 1500 Kg/day
Water consumed: Sanitary - 300 L/day
Wastewater generated: Sanitary - 250 L/day
Wastes treated in Septic tank + soak pit
Solid wastes: 15 Kg/day from bag filters(non reactive fugitive slag, coal ash + lead particles disposed by selling.
Water used only for domestic & sanitary purposes.

18. M/s. Astha textile company Ltd (RED category)
Plot No. 22, IDA kattedan, R.R.Dist.
Doubled polyester yarn - 20 T/month
No other data given.

19. M/s. Naresh industries Pvt. Ltd. (RED category)
Plot no. 73, 7-3-100, Kattedan, R.R.Dist (estd:1990)
Product: Sunflower/cottonseed refined oil - 15.0 T/day, Soap stock - 1.0 T/day
Raw material: crude oil - 15T/day caustic flakes-15Kg/day Bleaching tonsil- 30 Kg/day
carbon - 15Kg/day
Water consumed: washings - 3.0KLD; Boiler feed 7.5KLD; Domestic - 0.5KLD; Total - 11.0KLD
Wastewater generated: washings - 3.0KLD; Boiler feed 6.075KLD; Domestic - 0.3KLD;
Solid wastes generated: Spent earth - 100Kg/day; Ash - 200Kg/day; ETP - 10Kg/day.
Disposal: Burnt in boiler and sold to brick manufacturers.
The industry is not in operation since 1 may, 2004 and during inspection on 16-6-2005, 24-8-2004 and 28-4-2005

20. M/s. Deendayal Oil Industries. (GREEN – Oil expelling)

Plot# 79, Rd No. 33, Kattedan, Rangareddy dist.

Product: Castor seed oil-12T/day; castor cake - 15 T/day

Raw material: Castor seed 25T/day

Waste produced: Domestic 0.8KLD

Treatment: Collection tank, septic tank

Waste generated: Seed powder 200 Kg/day is recycled.

Doors locked during inspection; Unit not in operation.

21. M/s. Mico pulverisers (RED category/ small scale)

Shed No: G-5/A, APIIC, Kattedan, R.R.Dist.

Industry manufacturers 200 mT/month cement

Water consumed: 400 L/day – sanitary

Wastewater produced: 300 L/day – sanitary is treated in Septic tank

No other details given

22. M/s. Sri Tirumala Srinivas Industries (RED category/ small scale)

Plot No: 111/1, Kattedan (D.No: 6-8-111/1) R.R.Dist.

Industry manufacturers Brass sheets 1.5T/month from Old brass utensils 2T/month

Domestic wastes produced: Domestic - 200 L/day; Treated in septic tank

Solid waste produced: Brass slag 10 - 15 Kg/day is sold/reused.

Unit not existing in the premises - not in operation in Apr. 2005.

23. M/s. Sri Kedarnath Silk Mills. (RED category)

Plot Nos. 59 & 110, Opp Neem metal, Kattedan, Hyd.

Industry manufacturers Printed cloth - 10000 m/day.

Raw material: Grey cloth-10000m/day; oxalic acid, caustic soda, soda ash, acetic acid, softener, polysol, dyes, emulsifier, etc. Water consumed: Process & washings 30KLD; Boiler feed 10KLD; Domestic 2KLD Wastewater generated: Process & washings 30KLD; Boiler blow down 1KLD; Domestic 1KLD

Treatment process: Oil & grease tank, collection tank, chemical dosing, primary settling tank, aeration tank, secondary settling tank, collection tank, sand filter, activated carbon filter, Final collection tank.

Treated water from the outlet of RO is used for boiler. Rejects being sent to M/s-JETL.

ETP sludge 50 Kg/day. Ash 610 Kg/day.

MLSS (feb '05): 538 mg/L. Range:2500 to 4000 mg/L.

24. M/s. Neocure therapeutics Ltd. (**ORANGE** category– Pharmaceutical formulations)

G - 4/B SEE kattedan, Hyd-57

Products: Tablets & capsules - 1 lakh/day; vitamin syrup 1000 bottles/day

Raw material: Paracetamol 50Kg/day Ibuprofen 40Kg/day Vitamin starch 10Kg/day

Water consumed: Floor washing - 200 L/day; Domestic: 400L/day.

pH	SS	TS	TDS	Cl	SO4	BOD	COD
7.7	440 mg/L	2340 mg/L	1900 mg/L	549 mg/L	80 mg/L	181 mg/L	340 mg/L

Treatment units: Collection; Neutralization; Sludge drying beds; Sand filters.

Effluent reused as : Gardening /septic tank

Unit in operation during inspection: Name changed to EVINZ drugs Pvt. Ltd.

25. M/s. Prince chemical laboratories (**ORANGE** category)

119/B I.E. kattedan, R.R.dist.

Product: Magnesium stearate (IP grade) - 50Kg/batch. 1 - 2 batches per day.

Raw material: Stearic acid - 40 Kg/batch; Magnesium carbonate -8Kg/batch; water - 2 lt/batch

Wastewater produced: Domestic - 150L/day; Filtered waste - 70L/batch

Septic tank for domestic waste

Unit not in operation

26. M/s. Tirumala Industries (RED category)

Plot No. 75/B, IDA Kattedan, R.R.Dist

Product: OPC 400 MT/month
Raw material: Gypsum + clinker
Water consumed: Sanitary - 100 L/day
Wastewater generated: Sanitary - 100 L/day

27. M/s. Priyanka leather industries (**GREEN** category)
IDA kattedan, Rajendranagar (M), R.R.Dist.
Industry manufactures Bicycle paddles 700 pcs./day from Tanned leather: 35sheets/day
Water consumed: Process (waxing of saddles) 150L/day; sanitary 100L/day.
Wastewater generated: Process: 100L/day; Sanitary: 100L/day
Wastewater treated in Septic tank/ sanitary wash
Solid waste: Trimmed leather cuttings - 20 Kg/day is sold out.

28. M/s.Ravi steel tubes (**GREEN** category)
Plot No.153 Kattedan, R.R.Dist
Industry manufacturers 12MT/day steel tubes
Water consumed: Cooling water 500L/week; Sanitary 250 L/day.
Wastewater generated: Cooling water - 4KL/weel; Sanitary 210 L/day; Wastewater is let into the APIIC drain. Treatment of wastes is done by Septic tank/ soak pit. Solid waste: Metal scrap 50 Kg/day is sold out.

29. M/s. Jamuna cement (**RED** category)
Plot No. 85/B, IDA kattedan, R.R.Dist.
Industry manufactures cement from gypsum and clinker
Water consumed: Garden 500 L/day; Sanitary 500 L/day.
Wastewater generated: Sanitary 400 L/day. Septic tank for sanitary waste.
No other information provided.

30. M/s. Indu detergents pvt Ltd. (ORANGE category)
Plot No. 12, I.E. kattedan, R.R.dist
Industry manufacturers Detergent cake - 900 MT/annum Detergent Powder - 900 /annum
Raw material: Zeolite, sodium sulphate, urea, soda ash, china. clay, acid slurry, etc.
During inspection it was observed that no industry was existing in the name of M/s. Indu detergents at this location. At present, an industry in the name of M/s. Sri Swamy Ramanand Metal Works was existing. The process involved is mechanical engineering works viz, sheet cutting, folding, punching, simming and despatch. No process effluents are generated. No boiler, no stack. As per government category list this is listed under green category, i.e, light engineering (small scale). The board has given directions to the industry that no other product shall be manufactured without its permission. No industrial activity shall be undertaken/continued at the site vide ordemo. CA Nos. 368-373/TF-HYD/2002-2224, dated 29-01-2002. A copy of the order was sent to industry through speed post but it was returned as there was no unit by this name.

31. M/s. Sri Venkateshwara Textiles (ORANGE/ small scale)
Shed No. 14, M-Type, SEIE, APIIC, katedan, R.R.Dist
Industry manufacturers Cotton or polyester grey cloth - 7750MT/month
Details of water & air pollution & other details mentioned as NA.

32. M/s. Hemakrishna plast Pvt. Ltd. (GREEN category)
D - 6, Kattedan I.E, Rajendranagar (M), R.R.Dist
Industry manufacturers HDPE blow moulded bottles - 600 nos./day
Raw material: HDPE granules 720 Kg/day
Water consumed: Cooling: 500L/day (recycled); sanitary: 500 L/day
Wastewater generated: Sanitary: 450 L/day
Septic tank / Soak pit for sanitary waste.
Plastic scrap 50 Kg/day is recycled into the process.

33. M/s. Shree vigneshwara petro products Pvt. Ltd. (RED category)
S.No.901, SEIE kattedan, R.R.Dist. (estd:1990-91)
Product: Refined waste oil-10 KLD and Blended waste oil- 10KLD
Raw material: Base oil
Water consumed: Washings - 2.5KLD Cooling (make up) 2KLD; Domestic & others 1KLD
Wastewater generated: coolings - 0.5KLD; Boiler blow down-0.5KLD; Domestic: 0.5KLD
Treatment units: Oil & grease traps; Neutralization tank & collection sump.
Storing hazardous waste: 100 containers; TSDF 10.8 tons/yr.
During inspection the unit was not in operation. Closure orders issued on 29-4-2005.

34. M/s.Swastik traders (GREEN category)
Plot No. 42, Kattedan, R.R.Dist.
Trading of empty barrels (collection, reception, treatment & storage of empty barrels, batteries and oils
Water consumed: Domestic 200 L/day; Wastewater generated: Domestic 200 L/day
Industry proposed to install D.G set of 5KVA capacity for lighting purposes.
No other details given.

35. M/s.Mohsin rubber industries (GREEN category)
Plot No. 13 SEIE, kattedan, Rajendranagar (M), R.R.Dist.
Product: Hawai rubber sheets - 15T/month
Raw ma terial: Rubber powder, china clay 400kg/day
Water consumed: Domestic 200 L/day; Wastewater generated: Domestic 200 L/day
Waste treated in Septic tank - domestic waste
No other details given.

36. M/s. Electroflo batteries Pvt. Ltd. (RED category)
E-4, Kattedan industrial estate, R.R.Dist
Automotive and stationary batteries - 1200Nos./month

Water consumed: process - 0.2KLD; Domestic & others: 1.0KLD
Wastewater generated: Domestic - 0.5KLD
Solid waste: lead slag 600Kg/yr; Used lead acid batteries 8000nos./yr; Waste oil 100 L/yr. disposed by selling to private parties.
No other information.

37. M/s. Prakash Terry Towels (P) Ltd. (ORANGE category)
Plot no. 22, IDA kattedan, R.R.Dist.
Product: Cloth - 500Kg/day
Raw material: 500 Kg cotton yarn/day
Water consumed: Humidification: 2000L; Sanitary: 500L/day
Wastewater generated: Sanitary: 500L/day
No other info given.

38. M/s.Dhariwal precured re-treading company (ORANGE category)
Plot No. 5-125/1, I.E. Kattedan, R.R.Dist.
Product: Pre-cured re-treaded tires 10-15 nos./day
Raw material: Tread rubber 1300Kgs/month Cushion gum 600Kgs/month
Water consumed: Boiler feed- 800L/day; Domestic: 600L/day.
Wastewater generated: Boiler blow down: 80L/day; Domestic: 500L/day.
Wastewater is trewated in septic tank. Buffing rubber powder 30Kg/day - Stored in polythene bags and sold to rubber dealers. Coal ash 12 Kg/day - Disposed to outside parties.
The industry is being monitored.

39. M/s. Harsh steel Industry (RED category/ Hazardous)
Plot no. 48/4, Babul reddy nagar (V), Kattedan, R.R.Dist.
Product: M.S.Ingots - 350MT/month
Raw material: M.S. scrap 400MT/month
Wastewater generated: Domestic: 400L/day.
Septic tank / Soak pit for domestic waste. Slag – 0.5 T/day is recycled into the process.

Water consumed: cooling: 300L/day; Domestic: 500L/day.

Unit not in operation on 5-11-2002 & 13-5-2003.

40. M/s. V.K.Industries. (GREEN category)

Plot No. 26/A, IDA kattedan, R.R.Dist.

Product: Book binding cloth - 7500m/day

Raw material: Grey cloth 7500m/day; starch 300 Kg/day; China clay 960 Kg/day;Refined cotton seed oil 20 lts/day; vegetable colour 12 Kg/day.

Water consumed: Process - 1200L/day; washing - 800L/day; Boiler feed - 1KLD; Domestic - 600L/day

Wastewater generated: Process & washings - 2KLD; Boiler blow down 100L/day; Domestic - 300 L/day

Treatment process: Chemical dosing; clarifier; 2 mixing tanks; sludge drying bed (5', 5', 4); sand filter; carbon filter.

Solid waste generated: ETP sludge 1Kg/day; Ash 50Kg/day.

Recycled as informed by the representative of the industry.

At the time of inspection on 20-10-2004 the unit was not in operation.

41. M/s. South India Spices (ORANGE category)

Shed No: 95/A, Road No. 17, I.E. Kattedan, R.R.Dist.

Product: Mirchi powder 500Kg/day; Turmeric powder 250Kg/day; Mirchi 550Kg/day; Coriander powder 250Kg/day; Mirchi 550Kg/day; Turmeric 250Kg/day; Coriander 250Kg/day

Water consumed: Domestic - 180L/day

Wastewater is treated in Septic tank

It was observed during inspection that no industry is existing in the name of M/s.South India spices at this site. An industry in the name of M/s.Shri surya food products is existing. They produce "PAPADS".

42. M/s. Peeti securities Ltd. (GREEN category)

Plot No. 164; Road No. 5, IDA kattedan, R.R.Dist.

Product: Textured and twisted yarn 900Kg/day

Raw material: Partially oriented yarn & textured

Water consumed: 200L/day; Wastewater generated: Sanitary 200L/day

Wastewater is treated in septic tank. Yarn waste - 6Kg/day

No other details given.

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43. M/s.Ashok woven sacks Pvt. Ltd. (GREEN category)

Plot No. G-5, Kattedan Industrial Area, Rajendranagar (M), R.R.Dist.

Product: Polythene bags/HDPE 8000 per day

Raw material: HDPE granules 2T/day

Water consumed: Cooling - 400L/day; Domestic - 700L/day; Gardening - 300L/day;

Wastewater generated: Sanitary 400 L/day

pH	SS 105 C	TS 105 C	Cl-	SO4	BOD	COD
7.0	315 mg/L	3056 mg/L	776 mg/L	583 mg/L	368 mg/L	1067 mg/L

No other details given.

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44. M/s.Tirupati Rubber Industries (GREEN category)

Kattedan IDA

Rubber moulding product: 1 to 1.5 T/day

Raw material: Natural & synthetic rubber 0.5 to 0.75 T/day; china clay powder 0.5 to 0.75 T/day;

Lubricants (grease) 210 to 15 kg/day.

Water consumed: Sanitary: 100L/day; Cooling water: 2400 L/day; Boiler water: 500 L/day

Wastewater generated: Sanitary effluents are discharged into septic tank and overflow is used for gardening.

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45. Sri Balaji Industries (RED category)

3-123/1, Mailardevpally, Kattedan, R.R.Dist.

Product: Lead - 150Kg/day

Raw material: Battery scrap - 500 Kg/day

Water consumed: 200 L/day (recycled)

Solid Waste: Battery scrap residue disposed by selling to outside parties

No other information given.

46. M/s.Modern Electrodes (ORANGE non-hazardous)

6-5-186 Babul reddy nagar, Kattedan, R.R.Dist.

Product: Welding electrodes

Raw material: M.S. steel rediflex

Wastewater generated: Domestic 500 L/day treated in septic tank

No other information given

47. M/s.Sri Ram Electrodes Industry (ORANGE category)

Plot No. 22& 24, Kattedan, R.R.Dist.

Product: New arc welding electrodes - 1T/day

Raw material: M.S. 750 Kg/day; Rediflex 250Kg/day

Wastewater generated: Process & wash: 50L/day; Domestic: 100L/day treated in septic tank.

There was no unit existing by this name presently.

48. M/s. Sanjay Chemicals (GREEN category)

143-A, IDA kattedan, R.R.Dist.

Product: Detergent cakes - 25 MT/month

Water consumed: 500 L/day for domestic purposes.

Wastewater generated: Sanitary 350 L/day treated in Septic tank/ Soak pit, sanitary waste.

No other information given.

49. M/s.Raj Agro Product Pvt. Ltd. (GREEN category)

Plot No. 58/B/2, IDA kattedan, R.R.Dist

Product: Biscuits - 3500 Kg/day

Raw material: Sugar 1000Kg/day; Maida 3000Kg/day Vanaspati 500Kg/day.

Water consumed: Process & wash - 800L/day; Domestic -1500L/day

Wastewater generated: Process - 500L/day; Domestic: 1250L/day
Treatment units: Septic tank and soak pit
process - 15Kg/day sold as cattle feed; Mix scrap 15 Kg/day sold
No other details given, CFO pending in view of GO Ms 111 (since 2004)

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50. M/s.Badami foods. (GREEN category)
Sl. No: 73 & 74 madhuban colony road, Kattedan, R.R.Dist.
Product: Biscuits
Raw material: Sugar - 1660Kgs/day; Maida- 8400Kgs/day; Vanaspati- 720Kg/day; Flavours.
Water consumed: Process 3000 L/day; Domestic 2500 L/day
Wastewater generated: Process 3000 L/day; Domestic 2000 L/day
Treatment units: Septic tank followed by soak pit.
Solid waste: Biscuit carton containers 50 to 30Kg/day ; Sold for cattle feed.

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51. M/s. Ankit Biscuits (GREEN category)
7-4-12/A, Madhuban colony Rd, Kattedan, R.R.Dist
Product: Biscuits; cream
Raw material: Sugar-1680Kg/day; Maida-8400Kg/day Vanaspati- 720Kg/day; flavour
Water consumed: Process 3000 L/day; Domestic 2500 L/day
Wastewater generated Process 3000 L/day; Domestic 2000 L/day
Treatment units: Septic tank followed by soak pit.
Solid waste: Flour waste & burnt biscuit - 50Kg/day; Mix scrap 30 Kg/day is sold.

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52. M/s. Harsh Bakers (GREEN category)
Plot No: 121, IE, Kattedan, R.R.Dist
Product: Biscuit
Raw material: Sugar 2000Kg/day; Maida 6000Kg/day; Vanaspati 1000Kg/day
Water consumed: Process 350 L/day; Domestic 750 L/day
Wastewater generated: Process 200 L/day; Domestic 700 L/day
Treatment units: Septic tank followed by soak pit.

Solid waste: Flour waste & burnt biscuit - 20Kg/day; Mix scrap 50 Kg/day Gunny bags, cartons, containers is sold out.

53. M/s. Prakash oil refinery (RED category)

Plot No: 20/A, I.E. Kattedan, R.R.Dist.

Product: Cotton seed refined oil-10 TPD Soap stock-1TPD

Raw material: Cotton seed crude oil - 11TPD Caustic flakes-11Kg/day; Bleaching earth – 11Kg/day; Activated carbon - 16.5 Kg/day

Water consumed: Washings 3.0 KLD; Boiler feed 7.0KLD; Domestic 0.5KLD. Total-10.5KLD

Wastewater generated: Washings 3.0 KLD; Boiler feed 0.7KLD; Domestic 0.3KLD; Total-4.0KLD

Treatment units: Oil & grease trap - collection - neutralization - settling - aeration - settling tank - treated water – sump.

Spent earth - 0.3TPD; Ash 1.0TPD

water to be recycled in the cooling tower

Solid waste is sold

The unit was not in operation during inspections on 16-6-2005, 24-6-2005 and 28-6-2005.

54. M/s. Balaji Plastics (GREEN category)

6-6-82, Babul Reddy Nagar, Rajendranagar, Kattedan, I.E, R.R.Dist.

Product: Plastic processed - granules - 5T/month

Raw material: Waste plastic - 6 - 7 T/month

Water consumed: Sanitary - 200L/day

Wastewater generated: Sanitary - 200L/day

Treatment units: Septic tank and soak pit.

No other information given.

55. M/s. Pahal Foods Pvt. Ltd. (GREEN category)

7-4-112/1/A, Madhuban colony road, Kattedan, R.R.Dist.

Product: Wafers -2000Kg/day;

Raw material: Sugar 1500Kg/day; Maida 2000Kg/day; Vanaspati - 4000Kg/day.

Water consumed: Process 100 L/day; Domestic 600 L/day

Wastewater generated: Process 100 L/day; Domestic 500 L/day

Treatment units: Septic tank and soak pit.

Solid waste: Flour waste and burnt biscuit 15Kg/day; Mix scrap 20 Kg/day; Process waste sold for cattle feed.

No other Information given.

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56. M/s. Kamadhenu polypacks. (**GREEN** category)

7-3-29/1, Kattedan, R.R.Dist.

Product: HM/HDPE/PP film bags-13T/month

Raw material: Plastic granules master batch

Water consumed: Domestic 1000L/day

Wastewater generated: Domestic 900L/day

Treatment units: Domestic effluent discharged into septic tank/ soak pit; Waste generated from cutting section will be reused

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57. M/s. Johny & welbright chemicals (**ORANGE** category/ non-hazardous)

119/B, IDA kattedan, R.R.Dist

Product: Solid fuel (dishwarmer)

Raw material: Hexane, Stearic acid, caustic soda, lye, methanol

Water consumed: Process 10 L/day; Boiler feed 50 L/day; Domestic 200 L/day

Wastewater generated: Domestic - sanitary 150L/day.

Treatment of wastes: Domestic wastewater is discharged into septic tank followed by soak pit

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58. M/s.Maruti Latex footwear Pvt. Ltd. (**GREEN** category/ small scale)

4-93/60 IDA, Kattedan, R.R.Dist.

Product: Hawai chappal - 550 dozen/day

Raw material: [Raw rubber, Synaprens, Scrap rubber, china clay, wax, stearic acid, zinc oxide] 48 batches ~ 1344 Kg/day

Water consumed: Wash: 200L/day; Cooling 100 L/day; sanitary 80 L/day
Wastewater generated: Wash: 200L/day; sanitary 80 L/day
Treatment units: Septic tank & soak pit
Solid waste: Rubber waste 200Kg/dayCoal ash 500Kg/day
Coal ash sold to outside parties

59. M/s. Avam retreads (ORANGE category/ hazardous)
Sl. No. 852 Premavathipet, Kattedan, R.R.Dist
Product: Pre-cured retreaded tires 11nos./day
Wastewater generated: Domestic - 400 L/day
Treatment units: Septic tank - Domestic only
Unit is not in operation.
No other details given

60. M/s. Pavan poly packs (GREEN category)
Plot no. 73-D/1, I.E., Kattedan, R.R.Dist - 52
Product: Printed & plain polythene bags - 200Kgs/day
Raw material: 3Kg grease/yr. 10Kg gear oil/yr. Polythene cranuls 200Kg/day;
Printing inks - 6Kg/day
Water consumed: Domestic - 50L/day; Cooling 200L/day (recycled)
Treatment units: Septic tank followed by soak pit, No other details given.

61. M/s. Abhinav Industries (GREEN category/ small scale)
6-6-46 Babul reddy nagar, Kattedan I.R, R.R.Dist.
Product: Rubber Hawai chappals
Raw material: Recycled rubber, china clay, gum, rubber powder scrap.
Water consumed: Cooling 2KLD; Domestic 200 L/day
Wastewater generated: Domestic 150 L/day; cooling - recirculated.
Treatment units: Septic tank/soak pit for domestic waste.
No other details given

62. M/s.Amar Industries (RED category)

Plot No. 5/B IDA kattedan, R.R.Dist
Product: Alkid - 1000Kg/day
Water consumed: cooling water (re-used) 200 L/day;Sanitary 200L/day
Wastewater generated: Sanitary 200L/day
Treatment units: Septic tank/soak pit for domestic waste. No other details given.

63. M/s. Ravi foods Pvt. Ltd. (GREEN category)
7-4-112/1, Madhuban colony Rd, Kattedan, R.R.Dist.
Product: Biscuits & cream 300 TPM
Raw material: Sugar - 2000Kg/day; Maida - 8000 Kg/day; vanaspati - 1000 Kg/day; flavours.
Water consumed: Process 2500L/day; washing 1000 L/day; Domestic 3500 L/day
Wastewater generated: Process 500L/day; Domestic 3000 L/day
Treatment units: Process & domestic waste- Septic tank+soak pit
Flour waste & burnt biscuit from process 50 Kg/day; Misc. scrap (gunny bags, cartons, containers); Process waste sold for cattle feed and misc. scrap sold to dealers
No other information given

64. M/s. Sri Sai Industries (RED category)
7-3-127/4, Gagarpahad.
Product: Lead - 5MT/month
Raw material: melting of scrap of lead waste & casting
No other details available.

65. M/s. Vinyl paints & Synthetic resins (RED category – small scale)
E-34, IDA kattedan, R.R.Dist.
Product: Alkyd resins - 1000 Kg/day; Enamel paints - 400 lt/day; Primers - 200lt/day
Water consumed: Cooling - 9600L/day; Domestic: 400L/day
Wastewater generated: Domestic: 350L/day
Treatment units: Septic tank & soak pit for domestic effluent
Other wastes: Paint & resin waste - 30 to 40 Kg/month

Stored in barrels and sold.

No other details given

66. M/s. Nigiri Oil & allied industries (GREEN category)

Survey No: 4-54, Mailardevpally village, Kattedan I.E, R.R.Dist.

Product: Coconut oil (15 - 20 T/day)

Raw material: Dry coconut core.

Water consumed: Boiler - 1.5KLD; sanitary - 600L/day; source: Borewell

Wastewater generated: Boiler blowdown 400L/day;sanitary 500L/day

Treatment units: Septic tank / soak pit (sanitary waste); Boiler blowdown wastewater used for gardening.

67. M/s.S.K.Industries (RED category – Hazardous)

Plot # 5A, Rd # 5, IDA Kattedan, R.R.Dist.

Product: Lead manufacture 4.4 T/month; Lead 3.5 T/month

Raw material: Old batteries scrap - 17.5 MT/month

Water consumed: Domestic 200L/day

Wastewater generated: Domestic 180L/day

No CETP. Only domestic wastewater generated.

Treatment units: Septic tank / soak pit

Solid waste: Lead smelting furnace 40Kg/day slag (lead, coal ash); Bag filter dust 25 Kg/day.

Slag recycled and sold. Bag filter dust reused for extraction of lead and disposed.

Unit not in operation during inspection on 27.5.2003.

68. M/s.Saibaba Refineries (RED category)

I.E.Kattedan, plot No. 140

Product: Cotton seed oil, Refined cotton seed oil - 24MT/day

No other information given.

69. M/s. A.S.Pulverisers (ORANGE category)

Plot No. 70, Shed No:48, APIIC, kattedan
No other information given

70. M/s. Charminar Bottling Co. (P) Ltd.
IDA kattedan, Shifted to premises at sangareddy since 1996.
No other information given

71. M/s. Sree Ram Industry.
IDA Kattedan, R.R.Dist.
Unit issued closure orders in 1997.
No other information given

72. M/s. Jai Bhagwati Plastic (GREEN category)
4-92/6, Kattedan, Rajendranagar, R.R.Dist.
Product: Pre-tubing & HDPE pipes
No information given

73. M/s.Bajrang Industries.
Old Kurnool road, Kattedan
Not on operation during inspection on 6-11-2002
No information given

74. M/s. Sri Vishnu Synthetic (RED category)
Plot # 133/A, Rd # 25, Kattedan
Product: Warp yarn from synthetic yarn.
No other details given

75. M/s. Mangaldeep metals
7-3-125, Old kurnool rd, kattedan, R.R.Dist.
Unit not in operation

76. M/s. Veekay Metalloys
D-5 I.E. Kattedan, R.R.Dist
Unit not in operation

77. M/s. J.K.Batteries (Vikas batteries)
Inspected and found battis were dismantled. Lead plate manufacturing at the corner of the industry site was taken on lease for this purpose. No other details given - unit not in operation since November 2002.

78. M/s. Madhusudhan Textiles
Kattedan, R.R.Dist.
No information given.

79. M/s. Deepak chloro chemicals (P) Ltd.
APIIC, IDA Kattedan, R.R.dist.
Unit not operating since 1989; no other information given.

80. M/s. S.A.Haleem (Lead extraction unit)
Rd No. 9, I.E.Kattedan
No other details given

81. M/s. S.S. Enterprises now renamed as M/s. Swastic enterprises
Plot No. 23, I.D.A. Kattedan, R.R.Dist.
No other details given

82. M/s. Goutham Industries
7-3-124/1, Old kurnool Road, Kattedan, R.R.Dist.
No other information given

83. M/s. Skyway recovery
Plot No. 5-3-68/6, I.E. Kattedan, R.R.Dist.

No other information given

84. M/s.Maharaja Minerals
Plot No: 150/B2, I.E. Kattedan, R.R.Dist.
Industry was not in operation. No information.

85. M/s. Shree sanchiya soap Industries
Plot No: 150/A, Road no: 25, I.E. kattedan, R.R.Dist.
Industry was not in operation. No information.

86. M/s. K.C. & co
Plot No:149, Road no: 25, Kattedan, R.R.Dist.
No information

87. M/s. Gaurav Industries
Plot No: 150/B2, I.E. Kattedan, R.R.Dist.
No information

88. M/s. AMP Containers (GREEN category)
8-13/8/27, Mailardevpally, Kattedan, R.R.Dist.
Product: Metal containers 20 TPM
Raw material: Tin plates/MS/TFS sheet - 25 TPM; coatings & printing ink - 1000L/month
Water consumed: Washing & boiler feed 200L/day; Domestic - 2000L/day
Wastewater generated: Wash & boiler blow down 100L/day; Domestic 500 L/day
Treatment units: Only domestic waste, water from washings is reused; Septic tank + soak pit for domestic wastes; crap generated is sold outside
No other information. (consent till 31.3.2002)

89. M/s. Shree Ram & Co. (REDcategory)
7-3-110, Madhuban colony road, Kattedan, R.R.Dist.
Product: Reconditioning & detoxified containers. - 60 Nos/day

Raw material: Old MS & plastic drums.
Water consumed: Washing 100L/day; Domestic: 200L/day
Wastewater generated: Washing 100L/day; Domestic: 100L/day
Effluents from washing to collection tank to oil & grease tank to settling tank to solar evaporation pond (10m, 7m, 0.2m)
Detoxified carboys 60 Nos/day Stored in shed.
CFO's not being issued within 10 Km radius of lakes.

90. M/s. Tirupathi electrodes (GREEN category)
Shed No.: D/2, Plot No: 22 I.E Kattedan, R.R.Dist
Product: Welding electrode rods - 25 TPM
Raw material: M.S. wire -15TPM; Rhulite sand - 5TPM; Minerals - 5TPM.
Water consumed: Domestic - 300 L/day
Wastewater generated: Domestic - 200 L/day
Treatment units: Septic tank followed by soak pit
Solid waste: 500Kg/month - M.S.wire, scrap, gunny bags; Sold.

91. M/s.Gupta Metral Industries (RED category)
7-3-127/2 Old Kurnool Rd, Kattedan, R.R.Dist.
Product: Lead ingots - 200 Kg/day
Raw material: Lead scrap/Used lead acid batteries 400 Kg/day
Solid waste: Plastic/ PVC casing/ Hard rubber casing; 50 Kg/day lead slag; Lead acid batteries and other lead scrap 400Kg/day; Process waste recycled and used for landfill
No CFO's issued/renewed within 10 Km radius of lakes. No other information given.

92. M/s. Annapurna Chemical Industries (RED – hazardous)
Road No 32, IDA Kattedan, Rajendranagar (M), R.R.Dist.
Products: Barium Nitrate 4.5TPD; Strontium Nitrate 1 T/batch; SrCl2 1 T/batch; Barium salts 0.4T/batch; Strontium salts 0.4T/batch; Bye-products; Sodium Nitrate 0.15T/batch; Sodium sulphate: 0.15T/batch
Raw material: Barium carbonate 3.6T/day; Nitric acid 5.5 T/day; Celcsite 1.5 T/day;

Soda ash 0.825 T/day; HCl 15 T/day; NaOH 0.12 T/day; Na2Cr2O7 0.1 T/day; LFO 0.16 T/day.

Water consumed: Process - 7.0KLD; washings: 3.5KLD; Boiler feed: 1.0KLD; Domestic 3.0KLD.

Wastewater generated: Process & washings 7.5KLD

Waste generated: Mineral waste 50 Kg/day; Waste oil 20 L/yr.

Disposal: Mineral waste is packed in HDPE bags and waste oil is stored in 200 L barrels.

No other information given

93. M/s. Reliance rotoprints (GREEN category)

73/D/2, I.E. Kattedan, R.R.Dist.

Product: Flexible packaging material (pouches, wrappers) 8TPM

Raw material: Flexible film, Inks, Adhesives

Water consumed: Cooling 5L/day (500 ltrs. Under circulation) Domestic 150 ltrs/day

Wastewater generated: Domestic 100 ltrs/day

Domestic effluent is discharged into septic tank followed by soak pit.

Misprint film 20Kg/month is Sold to kite manufacturers

94. M/s. Balaji Metals (RED category)

31/A, Road No.8, Kattedan, R.R.Dist.

Product: Lead Ingots 300Kg/day

Raw material: Lead scrap/Used lead acid batteries.

Water consumed: Domestic & others 200L/day

Wastewater generated: Domestic & others 100L/day

Lead acid batteries and other lead scrap about 600 Kg/day. Lead slag (ash) about 50 to 60 Kg/day collected into HDPE bags and stored in the shed.

95. M/s. Ramakrishna Homeo Pharmaceuticals (P) Ltd.

(ORANGE category– pharmaceutical formulation)

L-22, I.E Kattedan, R.R.Dist.

Product: Tablets 50Kg/day; Tonics 200L/day; Dilutions: 50 L/day; mother tinture: 40 L/day.

Raw material: Sugar of milk: 50Kg/day; Sugar: 70Kg/day; Herbal medicine: 20L/day; Rectified spirit: 80 L/day.

Water consumed: Process 150 L/day; Bottle washing 350L/day; Domestic 1000 L/day

Wastewater generated: Bottle washings - 350L/day; Domestic 500 L/day.

Treatment process: Septic tank followed by soak pit for domestic effluents & bottle washings

No other information given.

96. M/s. Andhra glass udyog (RED category)

Plot no: 15, I.E. Kattedan, R.R.Dist.

Product: Glass marbles 1TPD

Raw material: Glass scrap

Water consumed: Boiler feed 500 L/day; Domestic 200 L/day

Wastewater generated: Boiler blowdown 50 L/day; Domestic 100 L/day.

Spent oil 10 L/annum; Bottom sludge containing waste oil - 50 Kg/annum

Used in furnace for firing

Consents not being given as industry is within 10 Km radius of himayatsagar & Osmansagar lakes

97. M/s. Kalpana metal (RED category)

G - 7&8, IDA Kattedan, R.R.Dist.

Product: Making of brass sheets & utensils 432 T/annum

Water consumed: Domestic & other 1000 L/day.

Wastewater generated: Domestic & other 800L/day

Solid waste: Brass scrap 450T/yr. is recycled

Consents are not being issued/renewed in 10 Km radius of Himayatsagar and Osmansagar lakes

No other information given

98. M/s. Vishnu industries (GREEN category)
Plot no:26, IDA kattedan, Rajendranagar (m), R.R.Dist.
Product: Book binding cloth -5000M/day.
Raw material: Grey cloth 5000 m/day; Starch 200 Kg/day; China clay 760 Kg/day; Refined cotton seed oil 10L/day; vegetable colour: 7Kg/day
Water consumed: Process 1KLD; washing 0.5KLD; Boiler feed 1KLD; Domestic 600 L/day.
Wastewater generated: Process & washings 1500 L/day; Boiler blow down 100 L/day; Domestic 300 L/day.
Treatment units: Effluent collection tank; Chemical dosing; Clarifier cum mixing tanks; Settling; Sludge drying beds
Solid waste: ETP sludge 5Kg/day; Ash 100 Kg/day

99. M/s. Oswal udyog (formerly M/s.Surana soaps (RED category)
Plot no:132, Road no:25, IDA kattedan, R.R.Dist.
Product: Washing soap 2T/day
Water used: Domestic & others 100L/day
Wastewater generated: Domestic & others 80L/day
Consents are not being issued/renewed in 10 Km radius of Himayatsagar and Osmansagar lakes

100. M/s. Andhra Glass & Chemical works (RED category)
Plot No: 14, I.E. Kattedan, R.R.Dist.
Product: Sodium silicate 5TPD
Water used: Boiler feed 1200L/day; Domestic 1000L/day.
Wastewater generated: Boiler blowdown 120L/day; Domestic 800L/day.
Sludge containing silica 100 Kg/day.; Used for landfill
Consents are not being issued/renewed in 10 Km radius of himayatsagar and osmansagar lakes

101. Guru Venkateshwara Agro tech pvt. Ltd.(RED category)
Plot No.: 39, H.No 6-8-137, I.E. Kattedan, R.R.Dist.

Product: Refined oil 6TPD; Soap stock 0.5TPD.

Raw material: Crude cotton seed oil 6.5TPD

Water used: Process washings 2KLD; Boiler feed 5KLD; Cooling 2KLD; Domestic 0.5KLD

Wastewater generated: Process washings 2KLD; Boiler feed 0.5KLD; Cooling 0.2KLD;

Domestic 0.3KLD

Treatment units: Collection tank; Neutralization tank; Acid oil tank; Aeration; Inter aeration primary settling tank cum settling tank; filter press; pressure sand filter; Activated carbon filter; collection tank; Gardening

Solid waste: Spent earth 0.2 TPD;Ash 0.5 TPD; ETP sludge 10 Kg/day

Spent earth and ash are sold while ETP sludge is used for landfill.

During inspections on 16.6.2005, 24.6.2005 and 28.6.2005, the unit was locked.

102. Powermark (**GREEN** category)

6-8-322/A SEIE Kattedan, R.R.Dist.

Product: Assembling of D.G.set

Raw material: D.G.set parts

Water used: Domestic 1.0 KLD

Wastewater generated: Domestic 0.8 KLD

Waste generated: From D.G.set servicing section; Waste oil generated during servicing is returned to the parties

Industry located within 10 Km radius of Himayatsagar & Osmansagar lakes. No consent had been issued/renewed. Industry had not obtained authorization under Hazardous waste rules (M&H) for disposal of waste oil. No other information given.

103. Virani company (**RED** category)

Plot No.255-A, Road no: 25, I.E. Kattedan, R.R.Dist.

Product: Base oil 20KL/month

Raw material: Waste oil, Base oil & additives

Fuel used: Firewood @ 200 Kg/day

Water used: Washing 0.5KLD; Domestic 0.5 KLD

Wastewater generated: Process 0.5 KLD; Washing 0.5 KLD; Domestic 0.3 KLD.

Treatment units: Process & washings to oil & grease trap; collection & neutralization tank; Settling tank; Domestic effluent to septic tank followed by soak pit.

Unit not in operation during inspection

Annexure II : List of Industrial in Gaganpahad IDA

1. M/s. Biological E Ltd.

Gaganpahad (V), Rajendranagar (M), R.R.Dist.

Water consumed: Process & washings 10KLD;Cooling 2KLD; Boiler feed 10KLD; Domestic & others 14KLD.

Wastewater generated: Process washing 5KLD; Boiler blowdown 0.1KLD; Domestic 4KLD.

Water analysis (18.2.2003)	WW 1	WW2
pH	7.3	7.4
Temperature (C)	26.5	26.8
TDS (180 C)	3140	3060
TSS (105 C)	10	10
COD	30	20
BOD (5 day, 20 C)	5	4
Oil & grease	<1.0	<1.0

Hazardous waste generated: Spent oil @ 100 L/annum; Stored in 200 L/barrel

2. M/s. Bhagwan Das Satyanarayana Silk Mills (P) Ltd. (RED category)

7-3-153/4, S.No: 246, Gaganpahad, R.R.Dist.

Product: Printing & Dyeing of grey cloth 13000 m/day

Raw material: Grey cloth 15000 m/day; Dispersed dyes 350Kg/month

Water consumed: 45 KLD

Wastewater generated: 40 KLD (28 KLD recycled into process); 12 KLD subjected to R.O.treatment; 2.5 KLD rejected.

Water analysis (26.2.2005)	ETP outlet	R.O.plant outlet
pH	7	6.6
SS	47	1

TS	5000	540
TDS	4953	539
SO4--	952	24
Cl-	1389	203
BOD (3 @ 27C)	37	
COD	160	4

Treatment units: Collection tank; Primary sedimentation tank; Aeration tank; Secondary sedimentation tank; Carbon/sand filter; R.O. plant.

Effluent treated in JETL

Solid wastes produced: ETP sludge and Boiler ash @ 600 Kg/day sold to brick manufacturers.

Hazardous wastes @ 20 Kg/day sent to TSDF.

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3. M/s. Vishnu batteries (RED category)

7-4-150/2, S.No: 246, Gaganpahad, R.R.Dist.

Product: Lead ingots 300 Kg/day

Raw material: Old batteries 300 Kg/day

Water consumed: Domestic 0.5KLD

Wastewater generated: Domestic 0.3KLD

Solid waste produced: 200 Kg/day is Landfilled

No other information given. Unit not in operation.

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4. M/s. Mamata oil refineries (RED category)

7-3-123/4 Gaganpahad, Rajendranagar (M), R.R.Dist.

Product: Refined edible oil 10TPD

Raw material: Crude oil, caustic flakes, Bleaching tonsil, carbon

Water consumed: process 3KLD; Boiler feed 8KLD; Cooling 2KLD; Domestic 2KLD.

Wastewater generated: Process 3KLD; Boiler feed 0.8KLD; Cooling 0.2KLD; Domestic 1.5KLD.

Treatment units: Oil & grease trap; collection tank; Primary settling tank; Aeration tank; Secondary settling tank; Sludge drying beds; sand filter; Final collection tank; Effluents wastes used for Gardening & ash quenching.

Solid wastes generated and their uses:

ETP sludge	6 Kg/day	Used as fuel in the boiler
Ash	500 Kg/day	Sold to brick manufacturers
Spent earth	200 Kg/day	Sold to brick manufacturers

The unit was found to have been dismantled

5. M/s. Shyam Tex Print (P) Ltd. (**RED** category)

S.No: 42,43,44,45 Gaganpahad, R.R.Dist.

Product: Dyeing & printing of fabrics 10000 m/day

Raw material: Grey cloth 10000 m/day

Water consumed: Process & wash 172 m3/day; cooling 8 m3/day

Wastewater generated: Process & wash 55-60m3/day;sanitary 5m3/day

pH	6.5 - 10
TSS	540 mg/L
TS	3150 mg/L
VS	980 mg/L
Oil & grease	70
Alkalinity	2% max
BOD	940
COD	1830

Septic tank for sanitary waste

Land application for green belt development

No other details given

6. M/s. Lohiya Industries (RED category/ Small scale)

Plot No:6-66, Sy. No: 165, Gaganpahad; R.R.Dist.

Product: Refined sunflower oil 35 T/day

Raw material: Sunflower oil

Water consumed: 19.0 KLD

Wastewater generated: 2.0 KLD

pH	7.9
SS	2 mg/L
TS	1180 mg/L
TDS	1178 mg/L
SO4--	206 mg/L
Cl-	245 mg/L
Oil & grease	0.7
BOD	-
COD	26 mg/L

Treatment units: Oil & grease trap, equalization tank, Primary settling tank, anaerobic filter, aeration tank, secondary setting tank, carbon & sand filter, sludge drying beds.

Effluents are applied on land

ETP sludge 20Kg/month used as fuel for boiler and Boiler ash 4T/day sold to brick manufacturers.

7. M/s.Dulchand Industries (RED category)

7-4-25, Opp railway gate, Gaganpahad, R.R.Dist.

Product: Refined oil - 20 T/day

Raw material: Vegetable raw oil

Water consumed: 16 KLD

Wastewater generated: 3.0KLD

Water quality on 2.5.2005	Outlet of sand & activated carbon filter
pH	7.64
TSS (103 - 105C)	18 mg/L
TS	5797 mg/L
TDS	5779 mg/L
SO4--	712 mg/L
Cl-	1774 mg/L
Oil & grease	1.68
BOD (3 @ 27C)	14
COD	72

Treatment units: Oil & grease trap at plant; collection tank; chemical dosing tank; settling tank; Aeration tank, Husk bed; Carbon, sand filter; Sludge drying beds

After treatment, partly used for ash quenching and partly for wet scrubber ETP sludge 40Kg/month. Used as feed for boiler; Boiler ash 40T/month is sold to brick manufacturers.

8. M/s. Venkateshwara silk mills (RED category)
Sy.No. 246, Gaganpahad, R.R.Dist.
Product: Dyeing & printing of cloth - 10000 m/day
Raw material: Grey cloth - 10000 m/day
Water consumed: Washings 55KLD; Boiler feed 10KLD; Domestic 1KLD.
Wastewater generated: Washing 55KLD; Boiler feed 1KLD; Domestic 0.5KLD
Treatment units: Oil & grease trap;collection; neutralization; primary settling tank; dosing tank; aeration tank; secondary settling tank; Sand filter; activated carbon filter; R.O.plant

Part of the treated water from ETP is recycled, used for green belt & the treated water from RO plant is recycled into the process.

ETP sludge 0.3TPD; Ash 2.0 TPD; Ash is sold and dried sludge is stored in HDPE bags.

Waste in HDPE bags is sent to TSDF. During inspection unit was in operation.

9. M/s. Swastik Oleochems Ltd (RED category)

Sy.No: 69, Gaganpahad, R.R.Dist.

Product: Refined oil (palm) 20 TPD; Stearic acid 10TPD; Glycerin 1.5TPD; vanaspati 5TPD

Raw material: Vegetable oil (Rice bran, Sunflower, cotton seed); Hydrogen 20m3 per ton; stearic acid, Bleaching earth;

Activated carbon, Nickel, Fatty acid.

Water consumed: Process - 4KLD; Boiler feed 18KLD; Cooling - 8KLD; Domestic - 2KLD.

Wastewater generated: Process - 4KLD; Boiler feed - 4KLD; Domestic - 2KLD

Parameters	Wastewater quality at ETP inlet on 2-5-2005	Wastewater quality at ETP outlet on 2-5-2005
pH	5.86	7.45
SS (103 C – 105 C)	811	9
TS (103 C – 105 C)	4540	3300
TDS	3729	3291
SO_4^{2-}	151	459
Cl	970	1018
BOD (3d @ 27 C)	802	12
COD	2974	111

Treatment Units: Oil & grease trap; collection tank; neutralization tank; primary settling tank; Aeration tank; Secondary settling tank; Sludge drying beds; Sand filter; Final collection tank

Effluent used for Gardening and ash quenching.

Solid waste utilized as: ETP sludge 2TPA; sold to farmers & soap industries.

Ash 3TPD; sold to brick manufacturers. Spent earth 400Kg/day; sold outside for oil recovery. Spent Nickel 2TPA; sold to catalyst manufacturers.

10. M/s. Dhananiwala Textiles (P) Ltd. (GREEN category)

Plot. 246,252, Gaganpahad, Rajendranagar (M), R.R.Dist.

Product: Texturised & twisted polyarn 2.055 mT/day

Raw material: 126, Denier polyester, partially oriented yarn, 2.5 mT/day

Water consumed: Cooling- 6000 L/day; Sanitary- 1000 L/day; Garden- 1000 L/day.

Wastewater generated: Sanitary-800 L/day.

Treatment units: Septic tank/ Soak pit.

Solid waste: Cotton waste of 445Kg/day is sold.

No other information given.

11. M/s. Pelican Textiles Pvt. Ltd. (GREEN category)

Sy No: 240, Pedamma Gadda, Gaganpahad, R.R.Dist.

Product: Grey cloth weaving (power loom) 5000 m/day

Water consumed: Sanitary - 300 L/day

Wastewater generated: Sanitary - 270 L/day

Treatment units: Septic tank/ Soak pit (sanitary wastewater)

No other information given.

12. M/s.Intervet India (P) Ltd. (YELLOW category/ Bio-hazard)

Sy.No.:258 & 259, Gaganpahad, R.R.Dist.

Product: Poultry vaccines 1Lakh vials per month

Raw material: Specific pathogen free (SPF) eggs

Water consumed: Washing (glassware)- 2KLD; Boiler feed- 3KLD;

Cooling- 0.5KLD; Domestic- 5.5 KLD

Wastewater generated: Washes- 2KLD; Boiler bleedoff- 1KLD;
Cooling bleedoff- 0.5KLD; Domestic- 5KLD.
Wastewater analysis by Ramky Engineers Pvt. Ltd. 10.7.2000

Treatment units: Only neutralization tank - No ETP.
Washings after neutralisation are applied on land. Septic tank for domestic effluents
Solid waste: Egg shells, Rotten eggs-200 Kg/week disposal by Incineration
Hyderabad factory closed by 31.12.2003 due to commercial non viability of operation.

13. M/s. Maruthi oil industries (RED category)
Sy. No: 74, Kattedan I.E, Gaganpahad, R.R.Dist.
Product: Castor oil
Raw material: Castor seed 450 mT/month
Water consumed: Boiler feed- 1KLD; Sanitary- 300 L/day
Wastewater generated: Sanitary- 250 L/day
Solid waste: Bye-product of castor seed 4TPD is sold.
No other information given

14. M/s. Mahaveer textiles (GREEN category)
Sy No.: 252, Gaganpahad, R.R.Dist.
Product: Weaving of grey cloth (power loom) 75000 m/month
Water consumed: Sanitary 1500 L/day
Wastewater generated: Sanitary 1350 L/day.
Treatment units: Sanitary waste treated in septic tank/ soak pit.
No other information given

15. M/s. Uni sankyo Ltd. (RED category)
Sy. No: 258, 259 & 219, Gaganpahad, R.R.Dist.
Product: Lacto Bacillus species & hormone injectable preparations

Pollutech laboratory & consultancy services. 12-9-2005

Parameter	Raw	Treated
pH	6.2	7.6
SS	80	40
TDS	4200	1900
Cl-	1060	398
SO4--	300	180
Oil & grease	10	6
BOD (5 day 20 C)	140	80
COD	400	250

Treated water used for gardening and green belt development

No other information given

16. M/s. N.M.Ispath Pvt. Ltd. (RED category)

Sy. No: 246 Gaganpahad, R.R.Dist.

Product: CTD boards of size 8mm, 6mm

Raw material: Iron scrap

Wastewater generated: Domestic - 700 L/day

During inspection unit was not in operation. No other information given.

17. M/s. Avon textiles Pvt. Ltd. (GREEN category)

Sy. No: 240 peddamme Gadde, Gaganpahad, R.R.Dist

Product: Twisting of poly yarn 23mT/month

Raw material: Grey cloth weaving - 60000 m/month

Water consumed: Sanitary- 300 L/day

Wastewater generated: Sanitary- 270 L/day

Treatment units: Septic tank / soak pit (for sanitary wastewater)

No other information given.

18. M/s.Sheetal refineries (RED category)

Sy.No. 340 & 341, Gaganpahad, R.R.Dist.

Product: Refined edible oil - 18 TPD

Raw material: Raw edible oil- 22 TPD

Water consumed: 22 KLD; Washings- 6 KLD; Boiler feed- 10 KLD; Cooling- 3 KLD; Domestic- 1KLD.

Wastewater generated: 5 KLD; Washings- 6 KLD; Boiler feed- 1 KLD; Cooling- 0.5 KLD; Domestic- 0.5 KLD.

Industry was monitored on 29.04.2005

Parameters	Inlet of	Inside the aeration tank	Outlet ETP
pH	1.24	7.86	7.9
TSS (103 - 105 C)	7160	179	15
TS (103 - 105 C)	31960	4000	3610
TDS (103 - 105 C)	24800	3821	3595
SO4--	13926	620	361
Cl-	1968	1328	764
BOD (3 day 27 C)	16300	58	12
COD	43038	287	80

Treatment units: Trap chamber- Oil & grease trap; Primary settling tank; Anaerobic filter; Aeration tank; Secondary settling tank; Treated water sump; Pressure sand filter; Activated carbon filter; Sludge drying beds

Effluents used for green belt development. Solid wastes used as shown in table below

Spent earth	0.3TPD	Sold
Ash	1.5TPD	Sold to brick manufacturers

ETP sludge	2.5 TPD	Dried in sludge drying beds

19. M/s. Sheetal Refineries Pvt. Ltd.(**RED** category)

7-4-135/1, Gaganpahad, R.R.Dist.

Product: Edible refined oil

Wastewater generated: Process: 3.3m3/day; Boiler: 15.5 m3/day;

Domestic: 1.1m3/day

Parameter	Wastewater quality	Standard value
pH	8.2	5.5 - 8.5
SS	9	10
TDS	2390	2100
Cl-	752	1000
SO4--	528	1000
Oil & grease	10	1.2
BOD	10.1	100
COD	22	250

Treatment units: Neutralisation tank, Primary settling tank, Anaerobic tank, Aerobic tank, Secondary settling tank, Sand filter, carbon filter, sludge drying beds.

Solid waste generated: Coal ash 370 T/yr.; ETP sludge 2.78 T/yr.

Spent earth (reused) 65 T/yr. disposed by selling; ETP sludge to TSDF

20. M/s. Surajbhan Synthetics Pvt. Ltd. (**RED** category)

Sy. No.:33 & 34 Gaganpahad

Product: Printing & dyeing 18000 m/day

Raw material: Grey cloth 18000 m/day

Water consumed: 60000 L/day; washings- 73 KLD; Boiler- 5 KLD;

Domestic 5 KLD

Wastewater generated: 55000 L/day; Washings- 73 KLD; Boiler feed- 1.5 KLD; Domestic- 4 KLD.

APPCB lab on 17-5-2005	Outlet of ETP	Reject of R.O. system	Outlet of R.O.system
pH	6.9	6.92	6.78
TSS (1C3 105 C)	30	24	3
TS	3860	4660	2480
TDS	3830	4636	2477
SO4--	370	526	326
Cl-	1034	1461	728
BOD (3 day @ 27C)	14	-	-
COD	189	38	19

Treatment units: Oil & grease trap; collection tank; chemical tank; dosing tank; chemical tank; aeration tank; chemical tank;sludge drying beds (5 nos.); collection tank; sand filter; activated carbon; collection tank; R.O.plant.

Solid waste: ETP sludge 50 Kg/day is disposed in TSDF. Ash 1.5TPD is sold.

RO rejects to M/s. JETL. Treated water from RO plant used for boiler. Domestic wastewater is let into septic tank followed by soak pit.

21. M/s.Balaji Industries (RED category)

7-3-134/1 Gaganpahad, R.R.Dist.

Product: Welding electrodes(MS) 2 - 600MT/month

Raw material: Pentile OGR, M.S.wire, Iron powder

Water consumed: Domestic - 100 gallons

Wastewater generated: Domestic - 100 gallons

No other information given

22. M/s. ECMAS polyesters pvt. Ltd.(RED category)
Sy. No. 284, Gaganpahad, R.R.Dist.
Product: Unsaturated polyester resins
Raw material: Propylene glycol, Maleic anhydride;
pthalic styrene anhydride monomer; Dionol -33; Isopthalic acid
Water consumed: Cooling - 500 L/day; Sanitary- 100 L/day
Wastewater generated: Process & wash- 100L/day; Cooling - 50L/day;
Sanitary- 100L/day.
No other information provided.

23. M/s. Kailash wood panels (RED category – hazardous/ small scale)
Sy. No. 149 to 152, Gaganpahad, R.R.Dist.
Product: Plywood sheets- 3000 sq.ft/day.
Raw material: Wood chips, resin
Water consumed: Domestic- 1000 L/day
Wastewater generated: Domestic- 800 L/day
No ETP; Only domestic wastewater.
Treatment unit: Septic tank/ soak pit
Solid waste: Wood chips- 100Kg/day, used as fuel. Ash- 200 Kg/day, sold
No other information is given.

24. M/s. Maniyar Industries (RED category)
Sy. No: 276, 277 & 278/P, Gaganpahad, R.R.Dist.
Product: Refined oil (cottonseed oil) 14 TPD
Raw material: Crude oil
Water consumed: 20 KLD
Wastewater generated: 1.4 KLD (Domestic + process)
Effluent characteristics at ETP outlet 2.5.2005

pH	6.72
TSS (103 - 105 C)	35 mg/L
TS (103 - 105 C)	8360 mg/L
TDS	2325 mg/L
SO4--	1188 mg/L
Cl-	2474 mg/L
Oil & Grease	5.5 mg/L
BOD (3 @ 27 C)	160 mg/L
COD	719 mg/L

Treatment units: Equalization tank, Primary settling tank, Husk filter, Aeration tank, Secondary settling tank, Sand filter, Collection tank.
Effluent is used in cooling tower after treatment.
Solid waste: ETP sludge 5Kg/day; Boiler ash 800 Kg/day;
Spent earth carbon 230 Kg/day
No other information given.

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25. M/s.Madina metal works (RED category)
Door No. 6-4-39, A.G.college main gate, Gaganpahad, R.R.Dist. Rajendranagar (M)
Product: M.S. rods (6mm) 1 TPD
Raw material: M.S. scrap 1.2 TPD
Water consumed: Cooling- 2KLD (recycled); Domestic 1KLD.
Wastewater generated: Domestic- 0.8KLD
Cooling water is recirculated & domestic wastewater is treated in septic tank/soak pit

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26. M/s. Sri Laxmi metal Industries (RED category)
Sy. No. 6869; Gaganpahad, Rajendranagar, R.R.Dist.
Product: Brass sheets & utensils - 432T/annum
Water consumed: Domestic & others- 1000 L/day
Wastewater generated: Domestic & others- 800 L/day

Solid waste: Brass scrap 450 T/annum; Recycled

Consents are not being issued or renewed in 10 Km radius of Himayatsagar and Osmansagar lakes.

27. M/s. Venkateshwara Flexo - pack Pvt. Ltd.(GREEN category)

Sy. No. 252, Gaganpahad, R.R.Dist.

Product: Multilayer laminated films & PVC shrink films 1 TPD

Raw material: LDPE, HDPE, PVC resin, solvents, colors, printing inks.

Water consumed: Cooling 100 L/day; Domestic 1500 L/day.

Wastewater generated: Domestic 1000 L/day

No ETP, only domestic wastewater

Treatment units: Septic tank/ soak pit

Solid waste: Plastic, laminated waste, misprint films 30Kg/day disposed by selling.

No other information given.

28. M/s. Akash chemico.(RED category)

Sy. No: 657, Satamrai, Shamshabad (M), R.R.Dist.

Product: Sodium silicate 3TPD

Raw material: Silica sand- 3 TPD; Soda ash- 160Kg/day

Water consumed: Process- 5 KLD; Boiler- 3 KLD; Domestic- 2 KLD

Wastewater generated: Boiler blow down- 0.3KLD; Domestic- 1.5KLD

Boiler blowdown is disposed on land; Domestic waste is sent to septic tank

Residue of 160Kg/day is collected in 20'x5'x5' MS storage tank

29. M/s. Shri Ranl Sati Battery Industries (GREEN category)

7-4-117/3/D2 Gaganpahad, R.R.Dist.

Product: PVC separators (insulating material) 75000 Nos./day

Raw material: PVC resins

Water consumed: Domestic 500 L/day

Wastewater generated: Domestic 300 L/day

No ETF. Wastewater generated from domestic section only.
Septic tank/ soak pit.

30. M/s. Binjusaria Metal Box (RED category)
Sy. No. 139, 141, Gaganpahad, R.R.Dist.
Product: Ingots- 20 TPD; MS rods- 19TPD
Raw material: Metal scrap- 25 TPD
Water consumed: Cooling- 8.0KLD; Domestic- 5.0KLD.
Wastewater generated: Domestic- 3.0KLD
Treatment unit: Septic tank followed by soak pit.
Solid waste: Mud- 5TPD; Scrap- 1TPD;
Mud is used for landfilling and scrap is reused

31. M/s. Meena chemicals (RED category)
Sy. No. 182, Gaganpahad (V), Rajendranagar (M), R.R.Dist.
Present capacity- 30 T/month; 2 T/month
Raw material: Soda Ash; Silicate acid slurry; Taic powser, color, perfume etc
Water consumed: Process- 200L/day; Domestic- 200L/day
Wastewater generated: Domestic- 150 L/day
Treatment unit: Septic tank; Domestic effluent is discharged into septic tank followed by soak pit.
No other information given.

32. M/s. Universal foot care industries(GREEN category)
7-3-24, Gaganpahad, R.R.Dist.
Product: Chappals- 48000 Nos/month
Raw material: Leather- 48000 sqft./annum; PVS unit sole 48000/annum;
Rubber solution, thread, lace, sacks, etc.

Water consumed: Domestic 200 L/day

Wastewater into septic tank followed by soak pit

Solid waste: Rubber cuttings- 100Kg/day; Sold to outside parties

No other information given.

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33. M/s. Sainath Agro Industries.(ORANGE category)

Sy. No: 274, Gaganpahad, R.R.Dist.

Product: Plywood- 300Nos/day (Orange); Resin- 2TPD(Red)

Raw material: Vemeer wood; urea; formaldehyde and caustic

Water consumed: Process- 0.2 KLD; Domestic- 2.0 KLD

Wastewater generated: Domestic- 1.5 KLD

Domestic section is let into septic tank;

During inspection the industry was in operation.

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34. M/s.Krishika Industries (RED category)

Sy. No: 657, Patamrai, Gaganpahad, R.R.Dist.

Product: Lead ingots- 300 to 350 Kg/day

Water consumed: Domestic- 200 L/day

Wastewater generated: Domestic- 100 L/day

Solid waste: Lead acid batteries and other lead scrap about 600 Kg/day.

Lead stap (ash) about 60 Kg/day collected in HDPE bags and stored in the shed.

Consents not being issued/ renewed within 10 Km radius of Himayatsagar & Osmansagar lakes.

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35. M/s. Padmavathi ply pvt. Ltd. (RED category)

Sy. No. 267 & 268 Gaganpahad, R.R.Dist.

Product: Plywood @ 300 T/month

Raw material: Verneer- 11.5TPD; Formaldehyde- 700 Kg/day

Water consumed: Domestic- 600 L/day; Sanitary/Domestic- 500 L/day
Wastewater generated: Domestic- 500 L/day
Treatment unit: Septic tank, No ETP. Wastewater generates from domestic section only.
Domestic effluent is discharged into septic tank followed by soak pit.
Solid waste: Wood chips 500Kg/day is sold.

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36. M/s. Arun Industries (RED category)
7-3-111, Plot No. 81109, Gaganpahad, R.R.Dist.
Product: Cotton seed refined oil 10TPD; Soap stock- 9.8TPD to 0.2TPD
Raw material: Raw cotton seed oil- 10TPD; NaOH- 10 Kg/day; Activated carbon & earth- 60 Kg/day
Water consumed: Process- 10KLD; Domestic- 300L/day; Gardening/Irrigation- 300 L/day
Wastewater generated: Process- 2KLD; Domestic- 200L/day
Solid waste generated: ETP sludge- 20Kg/day,
spent earth & Activated carbon- 60Kg/day; coal & wood ash- 800Kg/day.
Used for land levelling; sold to outside parties; sold to brick manufacturers.

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37. M/s. Arun Industries(RED category)
7-3-111, Plot No. 81109, Gaganpahad, R.R.Dist.
Product: Cotton seed refined oil 10TPD; Soap stock- 9.8TPD to 0.2TPD
Raw material: Raw cotton seed oil- 10TPD; NaOH- 10 Kg/day; Activated carbon & earth- 60 Kg/day
Water consumed: Process- 10KLD; Domestic- 300L/day;
Gardening/Irrigation- 300 L/day
Wastewater generated: Process- 2KLD; Domestic- 200L/day
Solid waste generated: ETP sludge- 20Kg/day, spent earth & Activated carbon- 60Kg/day; coal & wood ash- 800Kg/day.

Used for land levelling; sold to outside parties; sold to brick manufacturers.

38. M/s. L.B. Metal works (**RED** category)

7-3-121/2, Old Kurnool Rd, Gaganpahad, Kattedan, R.R.Dist.

Product: Lead ingots- 300 to 350 Kg.day

Raw material: Lead scrap/ used lead acid batteries

Water consumed: Domestic- 200 L/day

Wastewater generated: Domestic- 100 L/day

No information

39. M/s. Prayagh Nutri products (**GREEN** category)

Sy. No: 279 & 280 Peddammagadda, Gaganpahad, R.R.Dist.

Product: Confectionery & toffees- 6 to 9TPD

Raw material: Sugar, Glucose, liquid glucose, flavours & colour

Water consumed: 12 KLD

Wastewater generated: 2 to 3 KLD

Treatment units: Collection tank, Equalisation tank, Aeration tank, Settling tank, Multistage filter

pH	8.26
TSS (103 - 105 C)	46
TDS	954
TS (103 - 105 C)	1000
SO4--	205
Cl-	163
COD	27

Effluent is applied to the land after treatment.

Composting is done within the industry premises.

No other information given.

40. M/s. Food Fats & Fertilizers Ltd.(**GREEN** category)

Sy. No: 246, Gaganpahad, R.R.Dist.

Product: Natural coloured food products- 100TPA; Vegetable oil wax- 360 TPA

Raw material: Vegetable oil wax- 600 TPA; Anato seeds/ curcumin chillies- 2000TPA

Water consumed: Washing- 0.5KLD; Cooling- 5KLD; Boiler feed- 8KLD; Domestic- 2KLD

Wastewater generated: Washing- 0.5KLD; Cooling- 0.5KLD; Boiler blowdown- 1.0KLD; Domestic- 1KLD.

Hazardous waste: Waste mineral oil/ spent oil- 70L/annum is stored in 200 L barrels.

Consents not being issued/renewed as the industry is within 10 Km radius of Himayatsagar & Osmansagar lakes.

41. M/s. Shiv shakti nutri foods (P) Ltd.(GREEN category/ small scale)

Sy. No:153(P), Gaganpahad, R.R.Dist.

Product: Misri- 10TPD; Refined sugar- 10TPD

Raw material: Sugar- 20 TPD

Water consumed: Boiler feed- 10 KLD; Cooling- 1 KLD; Domestic- 300 L/day

Wastewater generated: Boiler blowdown- 1KLD; Domestic- 200 L/day

Treatment units: Septic tank/ soak pit for domestic waste

Solid waste: Gunny bags- 200 Nos/day is reused for packing finished product

42. M/s. P E licon Rubber Pvt. Ltd. (RED category)

Sy. No: 240 Peddammagadda, Gaganpahad, R.R.Dist.

43. M/s. Suvarna Sizing Pvt. Ltd.

Sy. No: 73 Gaganpahad, R.R.Dist.

No industry existing at the site - site was vacant

44. M/s. Manjushree Polymers (P) Ltd. (RED category)

6-48/1, Gaganpahad, R.R.Dist.

No information given.

45. M/s. Bajranglal (GREEN category)
Sy. No: 73 (P), Gaganpahad, R.R.Dist
No manufacturing activity. Only storage
Water used for domestic purposes only- 200 L/day
Wastewater generation: 150 L/day
Treatment units: Septic tank + soak pit

46. M/s. S.B.Consumer Products (GREEN category)
Sy. No: 148, 7-4-28/1 to 51, Gaganpahad, Rajendranagar (M), R.R.Dist.
No information given.

47. M/s. Ganesh Chemicals(RED category)
Sy. No: 222, opp M/s.Intervet India (P) Ltd. Gaganpahad, R.R.Dist.
No information given.

48. M/s.Vijay Industries
7-3-124/1, Plot No: 127, Gaganpahad, R.R.Dist.
No information given.

49. M/s. Premier elastics
Sy. No: 72 & 75, Gaganpahad, R.R.Dist.
No information given.

50. M/s. Bright Industries Corporation
Plot No: 7, Gaganpahad, R.R.Dist.
No information given.

51. M/s. Aditya Industries (**RED** category)
Sy. No: 337, Gaganpahad, R.R.Dist.
Product: Manufacture of castor oil (non edible)
No information given.

52. M/s. Shyam Phenochem Pvt. Ltd.(**RED** category)
S. No: 246, Gaganpahad, R.R.Dist.
Manufacture of cardonol- 100T/month
No information given.

53. M/s. Param Polymers (**RED** category)
Plot No: 7-4-100, Gaganpahad, R.R.Dist.
No information given.

54. M/s. Sri Balaji Industries. (formerly called M/s. Sri Sai Metal Industries)
(**RED** category/ small scale)
7-3-137, Old Kurnool Rd., Gaganpahad, R.R.Dist.
Product: Brass utensils- 2T/month; Brass sheets
Raw material: Brass scrap
Water consumed: Domestic- 200L/day
Authority not issuing CFO's within 10 Km radius of Himayatsagar & Osmansagar lakes. No other information given.

55. M/s. Utility packaging Pvt. Ltd.(**RED** category)
Sy No: 71, Gaganpahad, R.R.Dist.
Product: Plastic containers - 300000 pieces/month

Raw material: Poly propylene co-polymers

Water consumed: Cooling- 300 LPD; Sanitary- 200 LPD

Wastewater generated: Sanitary- 150 LPD.

Treatment unit: Septic tank followed by soak pit

No other information given

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56. M/s.R.M.Gupta Textiles Pvt. Ltd. (**RED** category)

Sy. No: 335 & 336, Gaganpahad, R.R.Dist.

Product: Printing and dyeing - 13000m/day

Raw material: Grey cloth 13000 m/day

Water consumed: Washing- 60 KLD; Boiler feed- 20 KLD; Domestic- 1 KLD

Wastewater generated: Washing- 60 KLD; Boiler feed- 2 KLD; Domestic- 0.5 KLD

Parameter	Wastewater quality at ETP inlet	Wastewater quality at Sewer drain near compound wall
pH	7.24	2.64
TSS (103 - 105 C)	404	223
TDS	4996	8689
TS (103 - 105 C)	5400	8912
SO4--	1327	2845
Cl-	1458	2333
BOD (3 day @ 27 C)	690	543
COD	2217	1566

Treatment unit: Collection tank; Primary settling tank; Aeration tank 1 & 2; Secondary settling tank 1 &2; Collection tank; Sand filters; Activated carbon; final collection tank; R.O.plant

Domestic waste to septic tank and soak pit

R.O.outlet recycled to boiler, R.O.rejects sent to M/s.JETL

ETP sludge - 0.5 TPD sent to TSDF; Ash- 2TPD sold

No other information given

57. M/s. Saraswathi Metal Industries (**RED** category)

7-3-113, Gaganpahad, R.R.Dist

Product: Brass sheets- 1.5TPD

Raw material: Brass scrap- 1.5TPD

Water consumed: Cooling- 500 L/day; Domestic- 500 L/day

Wastewater generated: Domestic- 400 L/day.

Treatment unit: Septic tank/ soak pit for sanitary wastewater

No other information given.

58. M/s. Sri Sai Industries (**RED** category)

7-3-127/4, Gaganpahad

Product: Lead- 5 MT/month

Raw material: Melting of scrap of lead waste & casting

Water consumed: Sanitary- 300 L/day

Wastewater generated: Sanitary- 250 L/day

Treatment unit: Septic tank followed by soak pit

Solid waste: Furnace bottom (inorganic); Bag filter section- 300 Kg/day; Stored/ sold out

No other information given.

59. M/s. Sunder Synthetics Private Ltd. (**RED** category)

Plot No: 231, Gaganpahad, Rajendranagar (m), R.R.Dist.

Product: Decorative and industrial laminates

Raw material: Craft paper, Design paper, Tissue paper, Formaldehyde, malamine and phenol

Water consumed: Boiler- 9KLD; Domestic- 500L/day

Wastewater generated: Boiler blowdown- 200L/day; Sanitary- 400L/day

Treatment unit: Septic tank, soak pit

Solid waste: 1.2 TPD of coal ash at full production capacity; Sold to brick manufacturers.

---

60. M/s. Lohiya Refineries (formerly M/s. Durga Agro Industries) (**RED** category)
7-3-12/182, Gaganpahad, R.R.Dist.
During inspection, the unit was not in operation. No other information given.

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61. M/s. Shiv shakti silk mills (**RED** category)
Sy. No: 68, Gaganpahad
Product: Dyeing & printing of cloth- 10000m/day
Raw material: Grey cloth, dispersion dyes, pigment dyes, caustic, soap, acetic acid, HCl, soda ash
Water consumed: 60 KLD
Wastewater generated: 40 KLD
Treatment units: Effluent collection tank, primary clarifier, Aeration tank, Secondary clarifier, treated effluent collection tank, pressure sand filter, activated carbon filter, sludge drying beds, R.O.plant
Solid waste: ETP sludge- 150Kg/month; Packed in HDPE sacks & stored. Proposed to send to TSDF

---

62. M/s. Ravi foods pvt. Ltd. (**GREEN** category)
Sy. No: 76, Gaganpahad, R.R.Dist.
Product: Biscuit manufacturing
Raw material: Maida- 10T; Vanaspati- 1T; Sugar- 3.2T
Water consumed: Sanitary- 100 L/day

Treatment unit: Septic tank

No other information given

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63. M/s. Avon Polyplast (**RED** category)

Sy. No: 164, Gaganpahad (V), Rajendranagar (M), R.R.Dist.

Product: HM-HDPE films / bags- 700Kg/day

Raw material: HM-HDPE granules- 750Kg/day

Water consumed: Cooling- 1KLD; Sanitary- 0.5KLD

Wastewater generated: Sanitary- 450 L/day

Treatment unit: Septic tank / soak pit

Solid waste: Plastic scrap- 50Kg/day; Sold to scrap dealers

---

64. M/s. Sri Annapurna Roller flour mill (Orange/ non hazardous)

7-4-96/1, Gaganpahad

Product: Wheat flour, Ravva, Maida, Bran etc- 40TPD

Raw material: Wheat- 40TPD

Water consumed: Domestic- 1.5KLD

Wastewater generated: Domestic- 1KLD

Only domestic wastewater is generated. Septic tank and soak pit

Mud from process- 150Kg/day; Misc. waste from process- 350 Kg/day

Mud is sent to landfill & misc. waste is sold.

No other information given

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65. M/s. Sri Venkateshwara Industries (**GREEN** category)

Sy. No: 252, Gaganpahad, R.R.Dist.

Product: Paper cones- 2Lakh/month

Raw material: Kraft paper- 21T/month

Water consumed: Process- 50 L/day; Sanitary- 150 L/day;

Wastewater generated: Sanitary- 150 L/day

Treatment unit: Septic tank followed by soak pit

No other information given

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66. M/s. Sree Sai Roller flour mill pvt. Ltd.(**GREEN** category)

Sy. No: 656, Gaganpahad, Shamshabad (v), R.R.Dist.

Product: Maida, Ravva, Atta- 30 MT/day

Raw material: Wheat- 30TPD

Water used: Process- 1KLD; Sanitary- 500 L/day

Wastewater generated: Washings- 600 L/day; Sanitary- 400 L/day

Treatment unit: Septic tank followed by soak pit proposed for sanitary waste

Wheat soaked water about 1000 L/day will be utilised for gardening purposes

No other information given

---

67. M/s. K.H.synthetics (**RED** category)

Sy. No: 173, Gaganpahad, R.R.Dist

Product: Propylene filament yarn 500 to 1000 Kg.day

Raw material: Polypropylene granules

Water consumed: Cooling- 3000 L; Sanitary- 500 L

Wastewater generated: Sanitary- 500 L

Treatment unit: Septic tank followed by soak pit

---

68. M/s. Sachi Textiles pvt. Ltd.(**GREEN** category)

Sy. No. 141/1, Gaganpahad, R.R.Dist.

Product: Polyester yarn- 2YPD

Raw material: POY (partially oriented yarn)- 550 T/yr.

Water used: Sanitary- 2 KLD

Wastewater generated: Sanitary- 1.8 KLD

Solid waste: Hollow cardboard bundles- 50 Kg/day; Sold to scrap merchants.

No other information given

69. M/s. Leo Laminates pvt. Ltd.(**RED** category)

Sy. No: 252, Gaganpahad, R.R.Dist.

Product: Paper based laminated sheets- 3500 sheets/month

Water consumed: Process- 0.2 KLD; Washings- 0.1 KLD; Cooling- 5.0 KLD;
Boiler feed- 10.0 KLD; Domestic- 2.0 KLD

Wastewater generated: Process- 0.2 KLD; Washings- 0.1 KLD; Cooling- 0.2 KLD;
Boiler blowdown- 1.0 KLD; Domestic- 1.0 KLD

Solid waste produced: Waste oil/ spent oil- 200L/yr and is disposed by selling

70. M/s. Mayur Luggage Industries (**GREEN** category)

Plot No. 148 & 149; Sy. No: 69, Gaganpahad, R.R.Dist.

Product: Briefcases & suitcases

Raw material: P.P.Granules

Water consumed: Sanitary- 150 L/day; Gardening- 150 L/day

Treatment unit: Septic rank - sanitary effluents

No other information given

71. M/s. Prince Industries (**RED** category/ small scale)

Plot No: 114 & 115, Sy. No: 72 & 75, Gaganpahad, R.R.Dist.

Product: Lead alloy- 2MT/day

Raw material: Scrap batteries- 3TPD; coal- 300 Kg/day

Water consumed: Sanitary- 200 L/day

Wastewater generated: Sanitary- 200 L/day

Treatment unit: Septic tank/ soak pit for sanitary effluents

No other information given

72. M/s. Mahaveer Chemical Industries (**Orange** category)
Gaganpahad, R.R.Dist.
Product: Bleaching powder- 1TPD; Liquid bleach- 100L/day
Raw material: Hydrated lime; chlorine gas; caustic soda
Water consumed: Cooling- 200 L/day; Domestic- 100 L/day
Wastewater generated: Sanitary- 100 L/day
Treatment unit: Septic tank followed by soak pit
No other information given

73. M/s. Bahubali Textile mills.(**GREEN** category/ small scale)
Sy. No:246, IDA Gaganpahad, R.R.Dist.
Product: Polyester or Grey cloth
Raw material: Polyester & cotton yarn
Water consumed: process- 500 L/day; sanitary- 500 L/day
Wastewater generated: Sanitary- 450 L/day
Septic tank for sanitary effluent
No other information given

74. M/s. Shiv Shankar Fabrics (**GREEN** category/ small scale)
Sy. No: 74, Gaganpahad, R.R.Dist.
Product: Polyester grey cloth- 1000m/month
Raw material: Polyester yarn
Water consumed: sanitary- 200 L/day
Wastewater generated: sanitary- 200 L/day
Treatment unit: Septic tank followed by open drain
No other information given

75. M/s. Revathi Industries (**GREEN** category/ small scale)

Sy. No: 73, 74 Gaganpahad, R.R.Dist.
Product: Drums & barrels
Raw material: CR / MS sheet
Water consumed: sanitary- 500 L/day
Wastewater generated: sanitary- 500 L/day
Treatment unit: Septic tank followed by open drain
No other information given

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76. M/s. Sri. Shyam Oil Industries (**RED** category)
Gaganpahad, R.R.Dist.
Product: Castor oil: commercial grade- 15 T/month
Raw material: Castor seed (By-product: castor oil cake)
Water consumed: Process & wash- 3000 L/day; sanitary- 500 L/day; Others- 500 L/day
Wastewater generated: 2500 L/day
No other information given

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77. M/s. Kiran Enterprises (**RED** category)
No: 7-3-134/8/A, Gaganpahad, R.R.Dist.
Product: Lead ingots- 15T/month
Water consumed: Process- 250 L/day; Domestic & other- 1200 L/day
Wastewater generated: Domestic & other- 1000L/day
Lead slag/ash- about 1500 Kg/month used for filling of ducts of roofs in the construction purpose. Used lead acid batteries/lead scrap- 30 TPM
Lead scrap is recycled
Consents are not being issued/ renewed within 10 Km radius of Himayatsagar and Osmansagar lakes.

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78. M/s. Vinedale Distilleries Ltd. (**RED** category)
Gaganpahad, R.R.Dist.
Product: Beer- 22000 bottles (650ml) per day; Liquor- 1000KL/annum
Raw material: Barley, Maize and sugar
Water consumed: Industrial- 450 KLD; Domestic- 8 KLD
Wastewater generated: Industrial- 380 KLD; Domestic- 5 KLD.
Treatment unit: Previously, the washings were collected in two sumps of dimensions 5x3x1m. The overflow was being discharged into premajipet tank without any treatment.
Not in operation since 11.9.2001 (vide closure orders 11.9.2001)

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79. M/s. A.J. packaging Ltd. (**GREEN** category)
7-3-111/2, Madhuban colony road, Gaganpahad, R.R.Dist.
Product: Metal containers- 60000 Nos./day
Raw material: Tin plates - 10TPD
Wastewater generated: Domestic- 500 L/day
Treatment unit: Septic tank
Solid waste: Metal scrap- 20 Kg/day; Sold
Unit not in operation during inspection.

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80. M/s. Bhavani Fertilizers (**ORANGE** category)
3/16 Gaganpahad, R.R.Dist.
Product: Methyl Parathion- 5 TPM; Quinalphos- 7TPM
Raw material: Solvent aromex, Emulsifier, Butachlor
Water consumed: Washing- 200L/day; Domestic- 1KLD
Wastewater generated: Washing- 200L/day; Domestic- 800 L/day
Treatment unit: Washing - Neutralization tank - SEP; Domestic - septic tank - soak pit. Unit not in operation. Machinery not existing. No other information given.

Annexure III : List of Industries under ORANGE Category

Sl.No	Industry / Product / Activity
1.	Manufacture of mirror from sheet glass and photo framing.
2.	Cotton spinning and weaving
3.	Automobile servicing and repairs stations.
4.	Hotels and restaurants.
5.	Flour mills (excluding Domestic Aatta Chakki)
6.	Malted food
7.	Food including fruits and vegetable processing
8.	Pulping and fermenting of coffee beans
9.	Instant tea/coffee, coffee processing.
10.	Non- alcoholic beverages (soft drinks)
11.	Fragrances and industrial perfumes
12.	Food additives, nutrients and falvours
13.	Fish processing
14.	Organic nutrients
15.	Surgical and medical products not involving effluent / emission generating processes.
16.	Laboratory-wares
17.	Wire drawing (cold process) and bailing straps
18.	Stone crushers
19.	Laboratory chemicals involving distillation, purification process
20.	Tyres and tubes vulcanisation, vulcanisation, retreading moudling.
21.	Pesticides/Insecticides/Fungicides/Herbicides/Agrochemical formulation.
22.	NPK Fertilisers/ Granulation
23.	Pharmaceuticals formulation
24.	Khandsari sugar.
25.	Pulverizing units.

List of Industries under GREEN category

Sl.No	Industry / Product / Activity
1.	Wasting of used sand by hydraulic discharge
2.	Atta-Chakkies
3.	Rice mullors
4.	Steeping and processing of grains.
5.	Mineralised water
6.	Dal mills
7.	Bakery products, Biscuits confectionery.
8.	Groundnut decorticating (dry)
9.	Supari (Betelnut) and masala grinding
10.	Chilling plants and cold storages.
11.	Ice-cream or Ice-making
12.	Tailoring and garment making
13.	Cotton and woolen hosiery
14.	Apparel making
15.	Handloom weaving
16.	Shoelace manufacturing
17.	Gold and silver thread zari work
18.	Gold and silver smithy
19.	Leather footwear and leather products excluding tanning and hide processing.
20.	Musical instruments manufacturing
21.	Sports goods.
22.	Bamboo and cane products (only dry operations)
23.	Cardboard or corrugated box and paper products (paper or pulp manufacturing excluded)
24.	Insulation and other coated papers (Paper or pulp manufacturing excluded)

25.	Scientific and mathematical instruments.
26.	Furniture (wooden and steel)
27.	Assembly of domestic electrical appliances
28.	Radio assembling.
29.	Fountain pens.
30.	Polythene, plastic and PVC goods through extrusion moudling.
31.	Rope (cotton and plastic)
32.	Carpet weaving
33.	Assembly of air coolers, conditioners.
34.	Assembly of bicycles, baby carriage and other small non-motorised vehicles.
35.	Electronics equipment (Assembly)
36.	Toys
37.	Water softening and demineralised plants.
38.	Paint (by mixing process only)
39.	Candles
40.	Carpentry (excluding saw mill)
41.	Oil ginning/expelling (no hydrogenation/refining)
42.	Jobbing and machining.
43.	Manufacture of steel trunks and suitcases.
44.	Paper pins and U-clips
45.	Block making for printing
46.	Optical frames.
47.	Powerlooms/ handlooms (without dyeing & bleaching)
48.	Printing press.
49.	Garments stitching, tailoring
50.	Thermometer making
51.	Footwear (rubber)
52.	Plastic processed goods

53.	Medical and surgical instruments.
54.	Electronic and Electrical goods
55.	Rubber goods industry.

Annexure – IV

Chemical Characteristics Of Rainwater At An Urban Site of South-Central India
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ABSTRACT

The pH variation and chemical characteristics of rainwater have been studied during monsoons from 1999 to 2001 at Hyderabad, a city south-central India. The pH varied from 5.5 to 7.2 with an average of 6.4 which is in alkaline range considering 5.6 as the neutral pH of cloud water with atmospheric CO_2 equilibrium. Out of 28 rain events, only two events were observed in acidic range (<5.6) which occurred after continuous rains. the equivalent concentrations of components followed the order: $Ca^{2+} > Cl^- > SO^-_4 > NH^+_4 > Na^+ > HCO^-_3 > NO^-_3 > K^+ > Mg^{2+}$. The ratios of components with respect to sea water ratios were observed to be higher, indicating the significant influence of non marine sources at this site.
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Keywords: Acid rain: Alkaline pH; Ion balance; Neutralization factor; Calcium sulphate

1. Introduction:

Rain water chemistry has been the subject of intense research for the last two decades because of increased awareness towards environmental problems caused by acid rain. Due to rapid economic development and consequent increase in energy consumption, concerns about air pollution have emerged to be important role in scavenging and helps us to understand the relative contribution of different sources of atmospheric pollutants. The chemical composition of rain water varies from site to site and region to region due to influence of local sources. If the source is influenced by anthropogenic activities, the nature of rain water becomes acidic because anthropogenic activities contribute acidic gases like SO_2 and NO_x and a basic gas like NH_3. When these acidic gases are dissolved in clouds, sulphuric and nitric acids are formed, respectively. In countries like India, dust particles are an important part of the atmosphere, which contains significant base cations. These base cations neutralize the acidity of rain water before being deposited on the ground surface. Therefore, both anionic and cationic indexes are necessary to evaluate the qualitative characteristics of ions in rainwater.

Considering the importance of acid rain and greater concern for the rapidly growing hi-tech of Hyderabad, rainwater study has been carried out at our institute. This study reports 3 years continuous observations during the monsoon from 1999

to2001 with the objectives of summarizing chemical characteristics of rainwater at this site of south-central India.

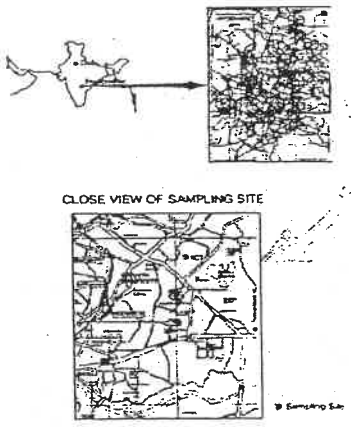
2. Experimental

2.1. Sampling site

Hyderabad is an urban city in the Andhra Pradesh state of India. It lies in the south-central India (17.5°N, 78.5°E) about 536m above sea level. It is the fifth largest city in India with an area of 260 Km². Land use has 93% urban (including industrial), 1.7% agricultural and 5.3% water spread characteristics. Fig.1 shows the location of sampling site. The samples were collected at the terrace of the main building of our institute, i.e., Indian Institute of Chemical Technology (IICT) at a height of around 11m. In the immediate vicinity of the site, there is another research institute and commercial complexes. At a distance of around 400m from the site, a busy road is running which has a traffic density of around 10^4 - 10^5 vehicles per day.

2.2 Sample collection :

The samples were collected using a remote controlled rainwater collector which has been developed by us at IICT. This collector is very helpful in collecting desired rain event without ant manual contamination. The collector is opened from the laboratory whenever rain occurs and closed after the event is over with the help of the remote controller kept inside the laboratory. This collector is fitted with a polypropylene funnel (dia = 20 cm) and a polypropylene bottle of 21 capacity. The samples were collected on event basis.



2.3 Analysis:

Immediately after collection, the pH of rain water samples was measured. samples were analyzed for Cl^-,$SO^2_4^-$ and No^-_3 by high performance capillary electrophoresis (Prince, the Netherlands,-model 450)using chromate buffer, while Na^+, k^+ ,Ca^{2+}, Mg^{2+} and NH^+_4 were determined using crown ether buffer. Blank of washing of collector was collected after thorough washing of funnel. Also, a dry deposition blank was collected using 60 ml deionized water by washing the funnel after 6 h to check the interference of dry deposition. Both the blanks were analyzed for major anions and cations. In analysis, all major ions were found below limits in both the blanks.

2.4 Data quality:

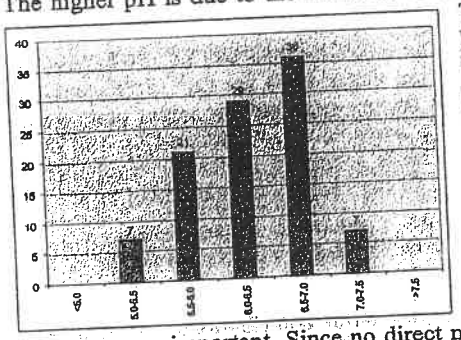
Ion balance is an important parameter for data quality assessment. It gives an indication of the quality of analysis as well as the possibility of any missing parameter. The acceptable USEPA range of ion difference in rainwater samples is 15-30% for samples having ion sum >100μeq/l(Ayers, 1995). In this study, the average percentage of ion differences has been observed to be 18.2% which is within the acceptable range.

3. Results and discussion:

3.1 pH variation and ionic composition

Fig.2 shows the percent frequency distribution of pH for 28 rain events collected during the monsoons of the years 1999, 2000 and 2001. Out of 28 events, 93% reflects the pH of rainwater to be in the alkaline range as compared to 5.6 pH of cloud water at equilibrium with atmospheric CO2. The observed alkalinity of rainwater is due to the high loading of particulate matter in the atmosphere commonly abundant in Indian conditions. The suspended particulate matter which is rich in carbonate/bicarbonate of calcium, buffers the acidity of rain water (kulshrestha et al., 1996; khemani, 1993). The variation of pH during (3 years) 1999-2001 has been shown in fig.3. It is clear from the figure that there have been two acidic (7% of total rain events), which occurred in the year 2001 after continuous rains when the dust in the atmosphere settled down resulting in low buffering potential. The acid rain events have been discussed further under section 3.6.

Concentrations of cations and anions along with rainfall heights for all 28 samples are given in Table 1.The average pH of rainwater has been observed to be 6.4 which is in the alkaline range. The concentration of major ionic species has the following order: the $Ca^{2+} > Cl^{-} > SO^{2-}_4 > NH^{+}_4 > Na^{+} > HCO^{-}_3 > NO^{-}_3 > K^{+} > Mg^{2+}$. The higher pH is due to the influence of dust particles suspended in the atmosphere. These dust particles are rich in calcium bicarbonate/carbonate which is a major buffering agent for acidity generated by sulphuric acid and nitric acids. The mean SO^{2-}_4 is observed to be greater then NO^{-3}. These observations are similar to that reported at other Indian sites (kulshrestha et al., 1996; Jain et al., 2000; Parashar et al., 2001).



Due to the highly alkaline nature of soil in India, the role of HCO^{-3} becomes very important. Since no direct method is available for the measurement of HCO^{-3} the concentration of HCO_3^-

Fig. 2. Frequently distribution of pH of rainwater collected during 1999 – 2001 monsoons.

(Kulshrestha et al., 1996). Table 2 shows the rations of cl^-, SO^{2-}_4, K^+, Ca^{2+}, and Mg^{2+} With respect to Na^+. All ratios have been found to be higher at this site than the recommended sea water ratios. These elevated values may be due to the contribution of anthropogenic and crustal sources. Similarly, high ratios of these components with respect to Na^+ suggest a non marine of these components (Khemani, 1993; kulshrestha et al., 1996). The sea salt fractions and non sea salt fractions have also been calculated, which again indicates that nearly all components, e.g., SO^{2-}_4,ca^{2+}, k^+,Mg^{2+} and Cl^-, appear to be non marine contribution. In addition, enrichment factors (EF) of different species with respect to Na were

Table: 1

Concentration of chemical components (μeq/l) in rain water at Hyderabad.

Sample	Rainfall (mm)	Cl^-	SO^{2-}_4	No^-_3	HCO^-_3	NH^+_4	K^+	Ca^{2+}	Na^+	Mg^{2+}	H^+
2-6-99	0.6	65.4	52.1	8.2	63.1	-bd-	8.9	28.4	30.7	18.0	0.1
6-7-99	6.0	34.1	21.3	9.2	25.1	47.2	26.4	48.5	25.2	9.2	0.3
26-9-99	5.7	33.0	39.2	22.6	31.6	35.0	22.8	60.5	24.8	8.8	0.2
27-9-99	5.7	17.7	22.9	16.0	31.6	25.6	4.1	32.0	4.8	2.5	0.2
29-9-99	1.2	30.7	20.2	47.1	31.6	12.2	5.6	31.0	5.7	5.0	0.2
6-5-2K	27.0	40.0	26.5	-bd-	15.8	12.8	13.8	87.0	29.6	7.5	0.4
23-5-2K	10.5	63.7	39.2	-bd-	2.5	13.9	8.5	77.5	18.7	11.7	2.5
2-6-2K	33.0	23.1	9.0	14.2	5.0	7.8	10.3	15.0	11.7	5.0	1.3
11-6-2K	50.4	10.4	7.7	333.9	6.3	16.7	-bd-	12.0	5.2	2.5	1.0
17-6-2K	24.0	21.4	3.8	-bd-	100.0	13.9	7.2	120.5	44.8	17.5	0.1
20-6-2K	15.0	65.6	21.9	-bd-	31.6	15.6	23.1	56.5	20.0	6.5	0.2
20-6-2K	6.0	85.9	20.4	13.9	39.8	16.7	25.6	368.0	28.7	60.0	0.2
20-6-2K	6.6	491.8	13.1	6.5	12.6	11.7	19.5	13.0	6.1	2.5	0.5
20-6-2K	2.7	282.3	45.6	18.9	63.1	66.1	3.3	61.0	33.0	11.7	0.1
23-6-2K	7.5	53.0	17.9	-bd-	25.1	44.4	7.4	73.5	39.6	12.5	0.2
30-6-2K	48.0	4.2	1.5	-bd-	5.0	3.3	6.4	9.0	7.0	1.7	1.2
30-6-2K	24.0	42.8	28.8	-bd-	12.6	81.1	2.1	17.0	17.4	10.0	0.6
18-9-2K	24.0	4.2	1.5	4.0	6.3	20.0	2.1	64.0	1.3	26.7	1.1
18-9-2K	1.5	4.2	5.0	15.5	10.0	36.1	2.1	20.5	5.2	1.7	0.7
18-9-2K	7.5	4.2	2.3	7.3	20.0	19.4	2.1	11.0	6.1	-bd-	0.3
19-9-2K	9.0	17.7	18.5	32.6	50.1	84.5	19.2	79.0	95.7	18.3	0.1
5-7-01	12.4	64.3	57.5	29.2	20.0	34.4	22.3	150.5	57.8	24.2	0.3
1-8-01	2.8	99.7	64.4	12.4	100.0	10.0	39.0	216.0	83.0	20.8	0.1
4-8-01	0.9	61.4	31.5	15.5	2.0	7.2	117.2	99.0	42.6	22.3	3.2
4-8-01	27.0	9.3	10.8	3.7	2.0	13.9	11.8	20.5	10.0	16.7	3.2
8-8-01	18.0	39.2	20.6	3.7	15.8	10.6	22.8	37.0	39.1	16.7	0.4
5-10-01	24.0	34.9	28.1	3.7	7.9	6.7	20.3	302.5	33.0	25.0	0.8
7-10-01	18.0	19.2	13.8	3.7	4.0	6.7	17.7	9.0	16.1	16.7	1.6
Blank	-	-bd-	-bd-	-bd-	-	-bd-	-bd-	-bd-	-bd-	-bd-	-
Dry deposition blank	-	-bd-	-bd-	-bd-	-	-bd-	-bd-	-bd-	-bd-	-bd-	-
Detection Limit	-	1.3	1.5	2.1	-	1.9	2.1	1.6	1.0	1.3	-
% Uncertainty in analysis	-	4.3	4.3	4.8	-	4.8	0.9	0.6	0.7	2.3	-

-bd-: below detection, -: not measured, H^+ and HCO^-_3 are derived from pH.

Table: 2
Comparison of sea water ratios with rain water components

	Cl^-/Na^+	SO^{2-}_4/Na^+	K^+/Na^+	Ca^{2+}/Na^+	Mg^{2+}/Na^+
Sea Water rations.	1.16	0.125	0.227	0.0218	0.0439
Ratios in rain water	2.32	1.44	0.63	2.86	0.51
SSF%	50	8.7	3.4	1.5	44.2
NSSF%	50	91.3	96.6	98.5	55.8
EF	2.0	11.5	29.1	65.1	2.3

SSF – sea salt fraction.
NSSF – non-sea salt fraction.
EF – enrichment factor.

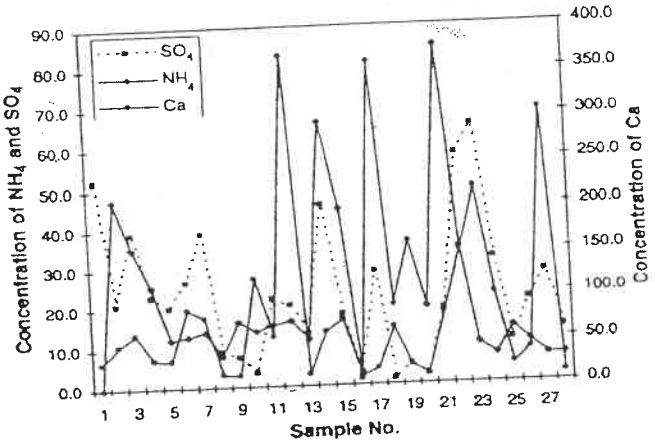
$$EF = \frac{X/Na^+_{rain}}{X/Na^+_{sea\ water}}$$

where X is the ion of interest.

The EF values are given in table 2. It is to be noticed that all the components are enriched showing significant influence of local sources other than marine influence at the site.

3.4 variation of Ca^{2+}, NH_4^+ and SO^{2-}_4

Fig .4 shows the variation of Ca^{2+}, NH_4^+ and SO^{2-}_4. Since the nature of rainwater is greatly influenced by these ionic species, it is important to discuss their variation .it is very interested to see that SO^{2-}_4 has been observed to be well correlated with Ca^{2+} as well as NH^+_4 Ca^{2+} is a major earth crust component while NH^+_4 mainly comes from anthropogenic activities . Association of $So2^-_4$ with $Ca2^+$ and NH^-_4 suggests its origin from crustal as well as anthropogenic sources. Significant SO^{2-}_4 fraction has been observed to be contributed by soil at Delhi (Jain et al., 2000). The possibility of SO^{2-}_4 association with Ca^{2+} is in the form of $CaSO_4$ due to gypsiferous nature of the crust. In addition, dry deposition of SO_2/H_2SO_4 on dust particles during dry weather conditions can also contribute significant $CaSO_4$ (Kulshrestha et. 2002). Dust particles have been observed as great scavengers for atmospheric SO_2 in India during dry weather conditions, which prevail around 80% of the year. In India, dry deposition is a very important phenomenon except during the 3 months of monsoon. The existence of $(NH_4)_2SO_4$ in rainwater has been well reported by various workers (Munger, 1982; Handa et al., 1982; Seinfeld, 1986; Possanzini et al., 1988; Mahadevan et al., 1989; Saxena et al., 1996).



3.5 Comparison during 3 years of study:

Table 3 gives the average concentrations of rainwater components during 1999, 2000, and 2001. The average pH of rainwater is decreased during 1999 – 2001, by 0.6 unit, from 6.7 in 1999 to 6.1 in 2001. The lowest average pH during 2001 may be due to the occurrence of two acid rain events. Decreased trend of average pH may be due to increased anthropogenic activities in the city. However, the average pH remains in the alkaline range due to the interference of soil dust particles.

During the period 1999 – 2001, large positive difference have been observed for Ca^{2+}, K^{+}, Na^{+}, $SO^{2-}{}_4$, Mg^{2+}. However, Cl^{-}, $NO^{-}{}_3$ and $NH^{+}{}_4$ showed mixed trends. The increased concentrations of $SO4^{2-}$ suggest the enhance emissions of SO_2 in the city. In addition, soil dust also contributes to primary sulphate in the form of $CaSO_4$ as characterized by the scanning electron microscope (SEM). SEM results show that gypsum particles are present in soil dust suspended in the air. Increased concentrations of Ca^{2+} K^{+}, Na^{+} and Mg^{2+} may be due to the local influence of increased traffic which enhances the suspension of soil derived particles into the air. In addition, construction of buildings which was at its peak during 2000 – 2001 in this area may be a factor of contribution of such particles.

Table: 3
Variation of components of rain water during 3 years.

	199		2000		2001	
	Mean	SD	Mean	SD	Mean	SD
Vol (ml)	128.0	89.8	618.1	509.6	49.1	332.1

Ph		6.7		0.1		6.4		0.5		6.1
0.6										
Cl^-		36.2		17.6		75.9		129.8		46.8
30.8	SO^{24}		31.1		14.0		16.4		13.6	
32.4			20.9	NO_3		20.6		15.9		27.9
82.1			10.3		9.7					
HCO_3		36.6		15.1		25.4		26.6		21.7
35.2										
NH4		24.0		18.6		29.0		26.1		12.8
9.9										
K^+		13.6		10.3		9.5		8.3		35.9
36.8										
Ca^{2+}		40.1		13.9		67.8		87.2		1119.2
110.3										
Na^+		18.2		12.1		23.1		23.6		40.2
24.8										
Mg^{2+}		8.7		5.9		12.2		14.7		20.4
3.7										
H^+		0.2		0.1		0.7		0.6		1.4
1.3										

which enhances the suspension of soil derived particles into the air. In addition, construction of buildings which was at its peak during 2000 – 2001 in this area may be a factor of contribution of such particles.

3.6 Occurrence of acid rain events

Two acid rain events were noticed on 4 August 2001. These events occurred after continuous rain on 1 August 2001 followed by continuous drizzling till the shower occurred on 4 August 2001. The first acid rain event occurred on 4 August at 1400h and the second at 1830h. The variation of pH, Ca2+, SO2-4, NO-3 and the sum of ions has been shown in Fig. 5. In this figure, rain occurring on 1 and 8 August have also been shown. The pH of rainwater before the acid rain event was 7.2. As the rain continued, the pH of rainwater became, 5.55 and 5.50, respectively. In the first acid rain event, Ca^{2+} concentrations were 99 µeq/l (2,3 times less than in the preceding event) while the second event had 20.5 µeq/l Ca^{2+} concentration (5 times less than in its preceding event). The sum of ions also varied almost in the same manner. Fig. 5 shows that when the next rain occurred on 8 August after 4 days, the concentrations of soil dust particles accumulated in the atmosphere when Ca^{2+} concentrations were found to be 37 µeq/l (almost 2 times that of the preceding event) which ionic concentrations. These observations clearly indicate that if the calcium concentrations are higher, pH of rain will be alkaline in this region which is true for most of India. Acid rain occurrence after continuous rains has been reported earlier at Delhi by Kulshrestha et al. (1996). The occurrence of acid rain at Hyderabad suggests that the city is under significant influence of anthropogenically derived atmospheric depositions.

3.7 Variation with rainfall:

Table 4 gives the correlation of ions with rainfall. The rainfall has negative correlations with the species except H^+ NO^-_3 suggesting that the greater the rainfall the lower the concentrations of species but higher the acidity. This analysis supports the occurrence of acid rain events after continuous rains for longer period. These higher concentrations of NO-3 with increased rainfall suggest that precursors of NO^-_3 like NO_x are oxidized to NO^-_3 by lengthy rains. The sources of NO_x may be vehicular traffic or biomass burning. In Table 1, the concentrations of NO^-_3 and K^+ are increased significantly in the first acid rain on 4 August 2001 suggesting the possible major source could be biomass burning as potassium is trace for biogenic emissions (Kulshrestha et al., 2001).

3.8 Annual wet deposition fluxes:

Annual wet deposition fluxes at Hyderabad are given in Table 5. These fluxes have been calculated by considering an average annual rainfall of 90 cm for the city. The annual wet deposition fluxes are the highest for Ca, which is very similar to that in other parts of India (Parashar et al., 1996; Jain et al., 2000). Next to Ca^{2+} chloride has the highest fluxes, which are unusually high at the present location compared to other sites. At this site, the higher fluxes of Cl^- may be due to the influence of unknown sources which may contribute excess chloride.

Table: 4
Correlations of components with rainfall

	r value
Rainfall	1
PH	-0.43
Cl^-	-0.30
SO^{2-}_4	-0.47
NO^-_3	0.43
HCO^-_3	-0.36
NH^+_4	-0.21
K^+	-0.30
Ca^{2+}	-0.17
Na^+	-0.28
Mg^{2+}	-0.18
H^+	0.24

Fig 5 Variation of pH, SO^{2-}_4, Ca^{2+} and sum of ions in two acid rain events. Rain events occurred before and after are also shown for comparison.

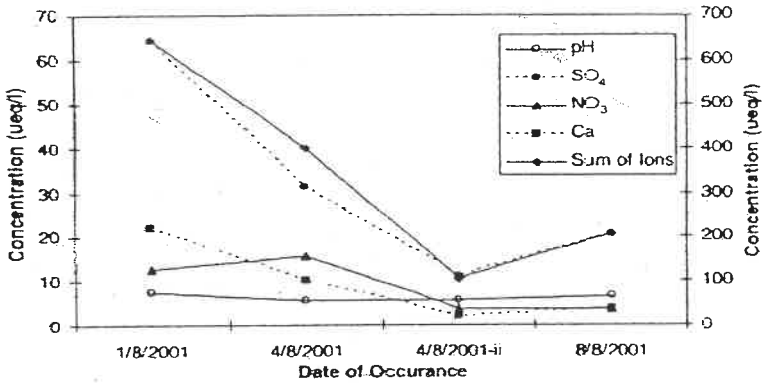


Table: 5
Annual wet deposition fluxes.

	Meq/m^2/a
Cl^-	12
SO^{2-}_4	7
NO^-_3	4
NH^+_4	5
K^+	3
Ca^{2+}	14
Na^+	5
Mg^{2+}	3

Table: 6
Average ion balance

	Sum
$\sum C^+ (Ca^{2+} + Na^+ + K^+ + Mg^{2+} + NH^+_4)$	156.7
$\sum A- (Cl^- + SO^{2-}_4 + NO_3)$	106.8
$\sum C+ - \sum A$	49.9

3.9. Ion balance and HCO^-_3 concentrations.

Table 6 gives the sum of anions (Cl^-, SO^{2-}_4 and NO^-_3) and cations (Ca^{2-}, K^+, Na^+, Mg^{2+}, and NH^+_4) in rainwater at this site. The difference of the sum of cations (156.7) and anions (106.8) in 49.9. This difference may be due to HCO^-_3 ions which are not measured. The equivalent HCO^-_3 concentrations will give rise to a pH 6.9 for rainwater. As mentioned in Section 3.1, the observed average pH of rainwater is 6.4. The calculated pH 6.9 is very close to the observed pH suggesting that at higher pH values of rainwater (common in India), average HCO^-_3 concentrations can be calculated by anion and cation difference. However, for individual samples it may have large variations due to some unanalyzed ions but the average values are somewhat realistic.

4. Conclusion.

The pH of rainwater at this site varied from 5.5 to 7.2 with an average of 6.4 which is in the alkaline range. However, the occurrence of two rain events at this site indicated that Hyderabad city is under significant influence of anthropogenic emissions. The levels of concentration of components were very similar to those at other Indian sites. The ratios of different components with respect to sea water ratios were higher indicating the influence of non-marine sources also. SO^{2-}_4 has been observed to be well correlated with Ca^{2+} as well as NH^{+}_4. Association of SO^{2-}_4 with $Ca2^{+}$ and NH^{+}_4 suggests its origin from crustal as well as anthropogenic sources. This study indicated that the chemistry of dry deposition of SO_2 is a very important phenomenon which needs to be investigated in Indian weather conditions to understand the net acidity caused by SO^{2-}_4 in rainwater.

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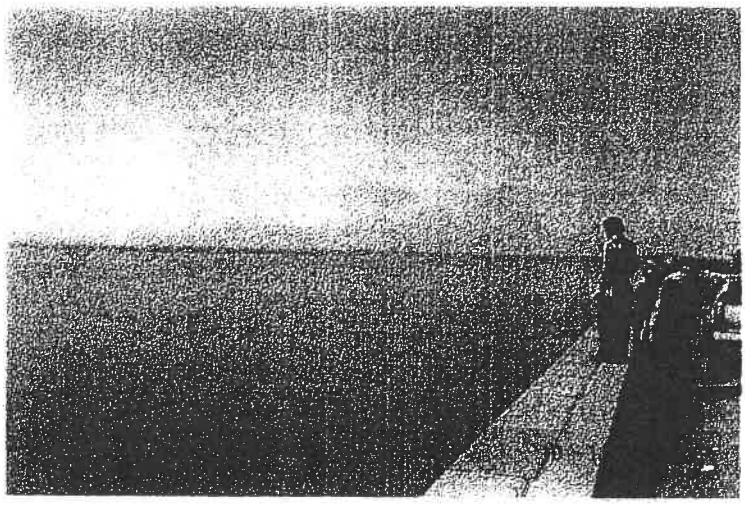

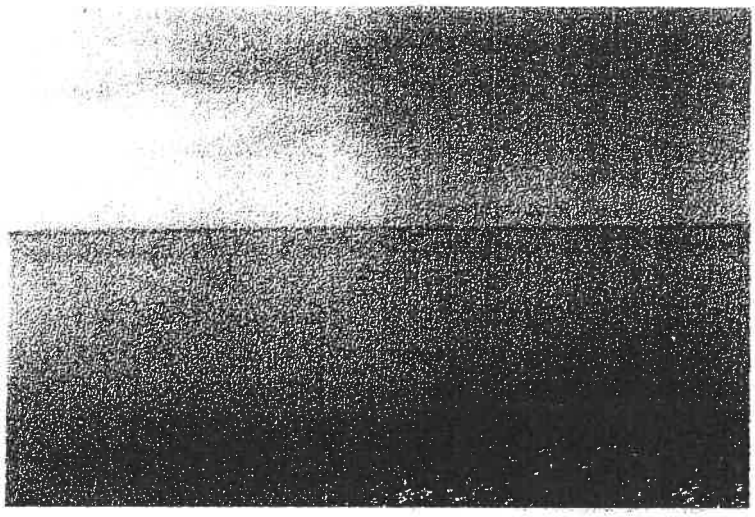

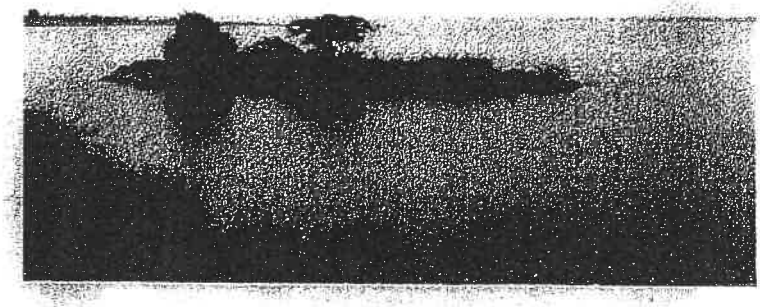

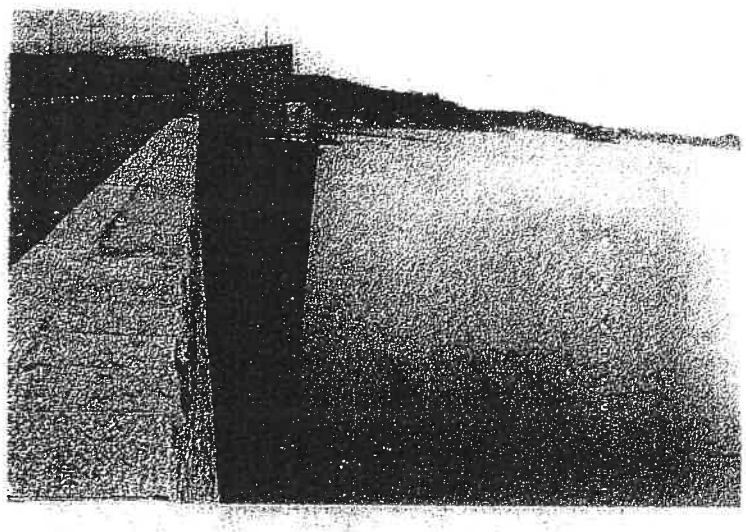

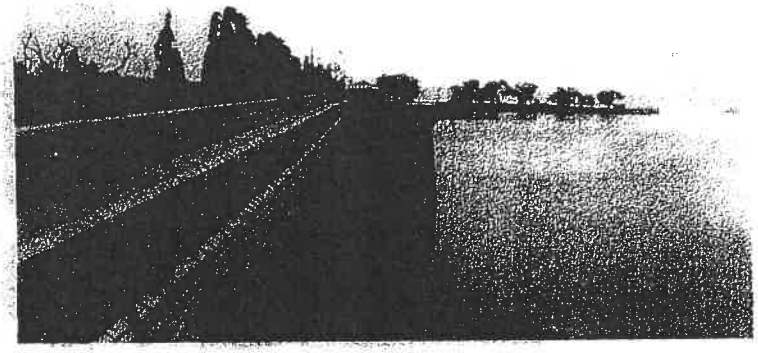

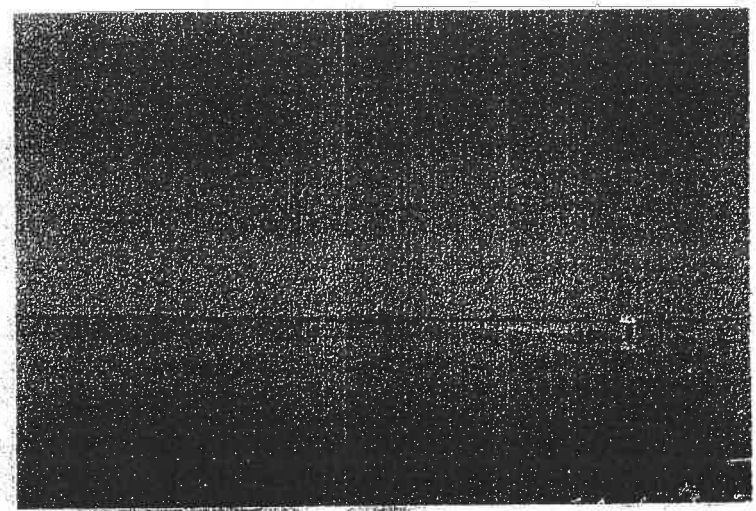

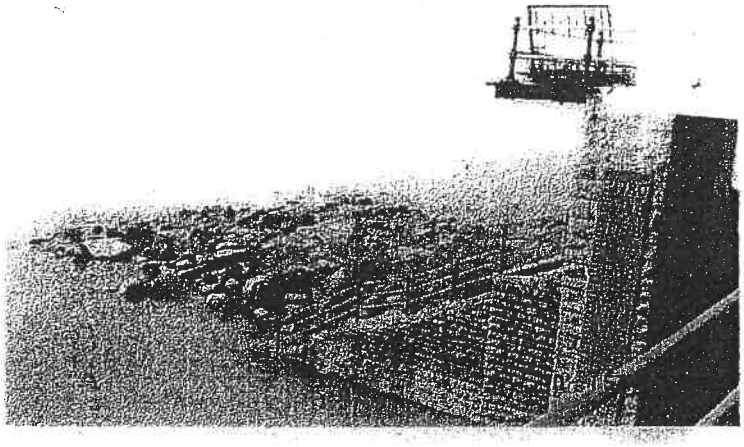

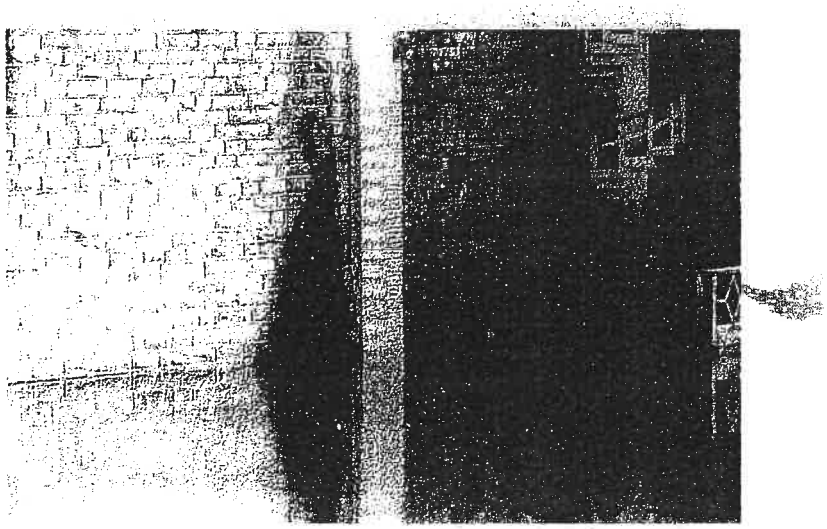

EPTRI
ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

Lr. No. EPTRI/RTI/2012/ 548

June 26, 2012

M/s Bhagyanagar Properties Pvt. Limited
5th Floor, Surya Towers
Sardar Patel Road,
Secunderabad – 500 003.

Subject: **RTI Act – Application from Bhagyanagar Properties Private Limited, Hyderabad for furnishing copy of report titled 'Ecology of Himayatsagar and Osmansagar lakes for evaluation of permissible developmental activities in the catchment areas' – Regarding**

Ref: 1. Your application to APIO, MA & UD Department dated 31.03.2012
2. Government letter No. 8368/11/2012 Municipal Administration & Urban Development Department dated 27.04.2012
3. EPTRI letter No. EPTRI/RTI/2012/336 dated 24.05.2012
4. Government letter No. 8368/11/2012 Municipal Administration & Urban Development Department dated 13.06.2012

Sir,

Please refer to the correspondence cited requesting EPTRI to furnish a copy of the above captioned report.

In the reference 4th cited Government has requested EPTRI to furnish the required information to the RTI applicant.

You are requested to deposit an amount of Rs. 800/- in our Accounts Department towards the cost of copying of the report, and collect the report titled 'Ecology of Himayatsagar and Osmansagar lakes for evaluation of permissible developmental activities in the catchment areas.'

Yours faithfully,

P.I.O.

cc: Principal Secretary to Government, MA & UD Department, Room No. 105, Ground Floor, L – Block, A.P. Secretariat, Hyderabad – 500 022

Ecology of Himayath Sagar and Osman Sagar Lakes - Evaluation of Permissible Developmental activities in the Catchment Areas

Executive Summary

Osmansagar Lake, formed on Musi River on a 6th order stream whereas Himayath Sagar, formed on Musa River a tributary of Musi a 5th order stream are located in Rangareddy district on western side to Hyderabad city. Osmansagar Catchment area covers about 736 sq km and whereas Himayath Sagar catchment area is spread over 1340 sq. km. The pattern of drainage in Musi catchment is typically of Trellis type where tributaries meet the main streams more or less at right angles grading between these two extreme patterns are the sub-dendritic pattern. The drainage pattern around Himayath Sagar is identified as radial where streams are diverging from a central elevation. The individual catchments are parallel to each other and extend from East to West.

The land slope of both Himayath Sagar and Osman Sagar catchment area predominantly falls under three classes i.e. Nearly level (0 – 1%), Very gentle slope (1-3%) and Gentle slope (3-5%) occurring in more than 90% of the area. This indicates that the area has uniform land slope over wide areas resulting in tendency for low surface runoff. Medium black soils cover western part. The alluvial black cotton soils are found along the stream courses and flood plains. The sedimentary black soils are present in the upland area of basaltic terrain and the thickness of the soils varies from 45 – 90 cm. The soils are moderately alkaline with pH value ranging from 7.0 – 8.5 and are non saline but the salt content is more than in the red soils. Clay content being high, their moisture retaining capacity too is high. Laterite soils with a thickness ranging 90 –180 cm occur in Vikarabad mandal. The soils are highly permeable and are well drained.

In the two catchment areas, predominant land capability class is designated as IIIse (Moderately good cultivable lands, with moderately deep clays, severely eroded). The land capability of the study area plays an important role to identify the suitable location of various water harvesting structures to be constructed to utilize water in sustainable manner.

The Catchment areas comprises predominantly two hydrogeologic environments (i) Granitic terrain and (ii) Lateritic – Basaltic terrain. In granitic terrain, groundwater occurs in inter-granular pore spaces of unconsolidated weathered material and in the porous secondary structures (mostly sheet fractures) under semi-confined conditions. The average depth to water level ranges from 10-20 m in recharge areas (uplands) and from ground level to about 3 m in valley bottoms. The recharge areas constitute about 70 per cent of the drainage basin in granitic terrain. The productive aquifers in granitic terrain are met at depth of 15 to 50 m below land surface, depending on topography.

Average rainfall recorded at Gundipet for 1901 – 1950 is 798 mm and the average annual rainfall during 1932-89 is 800.52 mm. Average rainfall at Chevella, Janwada and Gundipet is 751.71 mm. Most severe droughts have occurred during 1918, 1972, 1977 and 1987 and 2003, 2004. Minimum daily rainfall recorded at Gundipet is 218 mm (1977). Maximum annual rainfall recorded at Gundipet is 1412 mm(1978). Average annual rainfall during 1901-1950 monitored by Indian Meteorological Department at Hyderabad has been 758.9 ± 49.2 mm and around the lakes in Gundipet 798.0 ± 52.6 mm, Janwada 753 ± 50.6 mm and Chevella 601.1 mm.

Surface runoff based on geological formations varied from 35-52 mm/year under normal annual rainfall. Lowest runoff occurs in granites in the

immediate zone of the lakes. Highest runoff occurs in Laterites. Osmansagar Lake receives about 1 TMC of surface runoff under present development whereas Himayath Sagar Lake can receive about 1.8 TMC. Centre for Water Resources, JNTU has reported reduction of surface runoff rates from 12.1 to 6.9 % of annual rainfall during 1961 to 1996 in Osmansagar Lake Catchment and in the Himayath Sagar it has further reduced from 8 to 4 % of annual rainfall. Even this amount of surface runoff could not be realized due to construction of large number of water harvesting structures on first and second order steams of the flow path leading to the Musi & Musa river courses. Thus the combined storages in the lakes during last 5 years has not exceeded 2 TMC at any time. During 1996 full flows Osmansagar lake could realize 3.726 TMC on October 2nd 1996 and Himayath Sagar Lake has realized 2.245 TMC on November 28th 1995 for annual rainfall exceeding 1000 mm during two successive years of 1995 & 1996.

The catchment area of Himayath Sagar Lake has generated a surface runoff of 39-mm i.e. 51.4 mcm during 2004-2005. Out of the surface runoff the Musa river has contributed about 14.6 mcm of base flow for replenishing the declining water levels along its course during the same period. Thus the net storage realized in the Himayath Sagar Lake was only 36.8 mcm (1.3 TMC). Thus the lake has become completely dry during first week of November 2004.

The catchment area of Osmansagar lake has generated a surface runoff of 29.7 mcm. The base flow contribution from Musi river is 1.5 mcm. The inflows received in the Osmansagar lake was 1.1 TMC only. Through appropriate controlled withdrawals from the lake, the lake has sustained water up to May end and has gone completely dry during first week of June 2005.

The virgin catchment condition of 1970s has transformed into a treated catchment with intensive agricultural deve opment during last three decades. Progressive farmers are adopting innovative agricultural practices like horticulture, vegetable cultivation and floriculture following drip irrigation methods and other farmers are cultivating mainly paddy, groundnut, cotton, vegetables etc. using traditional irrigation practice.

In view of the need of important natural resource - water, there are conflicts among stakeholders to use this resource. The surface run off pooled in large water bodies may serve as drinking water source for a large urban sprawl or need for the agricultural use by the farmers in the catchment. **Considering this, change analysis exercise was carried out using 1989 and 2004 satellite data by preparing land use and land cover in the respective periods.** From the analysis, it is evident that agricultural plantations were increased by 10% whereas barren rocky area was reduced by 3%. Regarding crop areas, the single crop area is increased by 10% whereas there is minor change in case of double cropped area. Significantly the area covered by the waste lands and shrubs, which facilitates higher surface runoff, is reduced by 15% which has caused depletion of tanks by 8%.

Various departments have constructed water harvesting structures in spite of the Government regulation not to construct them. The data collected from various departments on the water harvesting structures during 2000 -2004 is compiled and presented in the Table I. Further, Farmers have constructed boulder bunds in between the existing check dams to conserve further water runoff. The anthropogenic interventions have resulted in arresting realizable potential surface runoff in the Osmansagar and Himayath Sagar lakes from the catchment area.

Table I - Water Harvesting Structures Constructed during 2000 – 2003

(District Water Management Authority, Ranga Reddy District, APIDC)

	Mandals falling in Osmansagar Catchment		Mandals falling in Himayath Sagar Catchment		Total
Check Dams	Shankerpally Vikarabad Navabpet **Total**	134 106 138 **280**	Shamshabad Chevella Shabad Mionabad **Total**	248 136 98 37 **500**	780
Rock Fill Dams	Shankerpally Vikarabad Navabpet **Total**	2260 1702 410 **4377**	Shamshabad Chevella Shabad Mionabad **Total**	931 2028 281 1451 **4691**	9071
Percolation Tanks	Shankerpally Vikarabad Navabpet **Total**	5 23 12 **40**	Shamshabad Chevella Shabad Mionabad **Total**	5 24 **29**	69
Mini Percolation Tank	Shankerpally Vikarabad Navabpet **Total**	74 46 4 **124**	Shamshabad Chevella Shabad Mionabad **Total**	12 24 **36**	160
Contour Bunding	Shankerpally Vikarabad Navabpet **Total**	2015 1123 745 **3883**	Shamshabad Chevella Shabad Mionabad **Total**	722 3927 709 175 **5533**	9416
Farm Pond	Shankerpally Vikarabad Navabpet **Total**	3 111 **114**	Shamshabad Chevella Shabad Mionabad **Total**	11 2 1 **14**	128
Sunken Pond	Shankerpally Vikarabad Navabpet **Total**	2498 392 513 **3403**	Shamshabad Chevella Shabad Mionabad **Total**	2498 1015 115 376 **4004**	7407
Continuous Contour Trench	Shankerpally Vikarabad Navabpet **Total**	142 749 283 **1174**	Shamshabad Chevella Shabad Mionabad **Total**	57 179 10 **246**	1420

The groundwater use has been increased in the catchment by 300% over last three decades. Studies made by CGWB during 1973-75 have given estimates of base flows in the rivers under virgin conditions. The lakes used to receive about 1 TMC of base flow regenerations in the Musi and Musa rivers. Due to overexploitation of groundwater, the groundwater levels have declined and there has been reduction of base flows in these rivers < 0.5 TMC. Farmers have resorted to lift irrigation from the river by making bunds in the Musi and Musa river beds to pond the meager base flows in the river for irrigation and domestic purposes during post-monsoon period. Quarries around Himayath Sagar have helped formation of artificial pools with water and are hindering the movement of surface runoff entering the lakes.

The transmissivity of the aquifers (fractured granites) ranges 19 to 290 m^2/day; the specific yield of phreatic aquifers ranges from 0.01 to 0.04. The vertical permeability of the confining material ranges from 1.35×10^{-4} to 3.3×10^{-2} m/day. The annual water level fluctuation in granitic recharge areas exceeds 9 m whereas in low lands the water level fluctuation is less than 3 m. Generally, water table has a configuration similar to that of land surface; however, depths to water levels are greater in upland areas than in valley bottoms. Depth to the lowest annual water level varies from 4 m in granitic low lands to 30 m in basaltic up lands in the catchment areas. In granitic terrain piezometric level divides coincide with phreatic level and topographic divides.

In laterite- Basaltic terrain groundwater occurs in laterite – basalt contact zones; weathered and fractured basalts; vesicular basalt lenses associated with intertrappean beds; sub-trappean alluvium and fractured granitic zones underlying shallow basalts. The average depth to water level in basaltic terrain range from 20 to 40 m below land surface in recharge areas (uplands) and from 6 to 40 m in valley bottoms. In basaltic terrain recharge (uplands) area comprises about 90 per cent of the catchment.

The productive zones are identified at various depths from 5 to 120 m below land surface. The perched aquifer conditions are not uncommon in the terrains. The transmissivity of vesicular basalts ranges from less than 1 to 198 m^2/day. The average specific yield of weathered basalt and vuggy laterite is 0.01 to 0.02 respectively. The vertical permeability of confining materials ranges from 6.9×10^{-4} to 1.1×10^{-2} m/day.

The behaviour of water level is closely dependent on precipitation, recharge and groundwater draft in the area. As per the water budget estimates only 50 per cent of the available dynamic reserve is utilized during 1970s. The ground water draft ranges from 0.01 to 0.05 m in the catchment areas. The average rate of seasonal water level decline approximates to 3.28 m/year (0.01m/d) in the granitic terrain whereas in the Basaltic terrain about 5.00 m/yr (0.04 m/day) which has been observed under natural groundwater flow conditions. Groundwater department has categorized the Shamshabad mandal as semi-critical (75% exploitation), Chevella mandal as Critical (97% exploitation), northern area of Chevella mandal as over developed areas (127% exploitation) duly accounting the ground water development. Shankarpally and Vikarabad mandals are safe for groundwater development (with 50% exploitation) and classified entire Rangareddy district as semi critical condition.

Considering the streams being dry during post monsoon period of 2004, surface water samples were collected from Osman Sagar and Himayth Sagar Lakes. The samples were anlysed for water quality parameters namely pH, total hardness, alkalinity, Chlorides, Fluorides, Nitrates, Sulfates, Biological Oxygen Demand and were found to be well within the drinking water quality standards of IS 10500. The Groundwater quality was monitored by collecting 100 samples covering all watersheds and in general it is calcium-magnesium, carbonate-bicarbonate type of water and is fit for irrigation. Iron content in groundwater is generally more than the

permissible limit of 0.3 mg/l for drinking purposes. At some places fluoride content is higher than permissible limits (i.e. greater than 1.5 mg/l). Nitrate content in groundwater seems to be high in grantic low lands, valley bottoms and near irrigated lands.

Groundwater investigations carried out in both catchment areas indicate that the virgin catchment areas were now transformed as well developed agriculture area and with lot of modifications in the drainage through landscaping works taking place in already existing farm houses/resorts etc. Catchment runoff has been minimized by human interventions like construction of water harvesting structures namely check dams, rock fill dams, percolation tanks, mini percolation tanks, contour bunding, farm ponds, sunken pond, continuous contour trenching and as well micro irrigation schemes. Earlier grape gardens have already exploited huge groundwater during early 1990 has not yet recouped as a result of overexploitation. Generally the groundwater levels are below 10-15 m in 90% of the cases indicating only active zone for groundwater flow is fracture zone below 20-50 m. The geophysical investigations carried out in the area and correlation with available lithologs also substantiate the above conditions. As a result the designed discharges are unable to enter the drinking water sources and the storages in both the lakes are depleting very fast.

Groundwater balance has been worked through construction of a groundwater flow model for each catchment area. The stream-aquifer interaction under the present overstressed conditions has been computed. The groundwater budget computed from the flow model under virgin conditions of 1970s indicates the base contribution would be about 1 TMC for each lake. Thus the lakes used to receive about one fourth of the storage capacity through the stream regeneration. Significantly over last decade the situation has changed due to construction of number of water harvesting structures. These structures are arresting the surface runoff

flowing in to the stream courses and the impoundings are replenishing the local aquifer in a micro-scale resulting in drying lakes after November / December. At present, the lakes are not even receiving about ¼ of the base flows due to existing agricultural practices and various activities in farm houses/resorts, which are mainly dependent on groundwater.

In a prediction scenario even if groundwater withdrawals increase by 1 mcm it would result in reduction of base flow in the Musi and Musa rivers of about 0.3 mcm in the respective catchment areas. This would further reduce the storage in the drinking water sources. Added to this problem the water quality deterioration would occur due to in situ sewerage disposal wherein the ground water already having high background nitrate concentrations. **Thus the relaxation of measures imposed by G.O.Ms.111 should be deferred for protecting the existing groundwater as well as surface water resources in the lake catchment areas.**

Apart from examining the feasibility of locating new water harvesting structures', other important terms and reference of Municipal Administration & Urban Development Department, Government of Andhra Pradesh is to examine

> 'If farmhouses are permitted in conservation zone in the Master Plan, the current maximum built-up area of 200 sq.m. could be raised to 400 sq.m. with the minimum plot size limit of 4000 sq.m. presently stipulated as per HUDA regulations'.

To meet the objective, the study was undertaken by taking into considering the various issues including review with reference to the norms in other metropolitan areas and as well as in Developed Countries and implications of the present activities itself, which has bearing on the

ecology of the two lakes. A comparison of Farmhouses norms in Hyderabad region with other cities is presented in Table II.

Table II Comparison of Farmhouses norms in various cities

PLACE/ CITY/REF	LAND USE	MIN. SIZE OF FARM HOUSE PLOT (sq.m.)	MAX. BUILT UP AREA PERMITTED (sq.m.)	HEIGHT LIMIT	EFFECTIVE FAR/FSI/BUILT UP AREA %
National Stds.- UDPFI norms	Agriculture	10000	100-150	Single storey-6m	0.0075 to0.010 i.e. 0.075% to 1.0%
Delhi	Agriculture/ Conservation	10000	100-150	Single storey-6m	0.0075 to0.010 i.e. 0.075% to 1.0%
Mumbai	No Development Zone	10000	500 with FSI 0.05 at 10000 plot size	Two storey-9.75m	0.025 to 0.05 i.e. 2.5% to 5.0%
Bangalore	Agriculture	12000	200	NA	0.0166 i.e. 1.66%
Hyderabad	Agriculture/ Conservation	4000	200	Single storey-6m	0.05 i.e. 5%

Source: Communication received from HUDA

From this, it is evident that Hyderabad allows Farmhouses with the smallest plot size of 4000 sq.m as compared to other cities in India. The existing standard is well below national norm. Thus, there is a strong case for raising the minimum plot size for a Farmhouse from the present 4000 sq.m to the minimum 10,000 sq.m as in UDPFI guidelines.

As per master plan preparation norms, there are certain areas which are called Green Belts or Conservation Zones in Master Plans. These are residual areas, which are not meant for buildings for future population as per density norms. These are reserved as agriculture zones, which are named as Conservation Zones, Agriculture Zones or No Development Zones. In such zones the land use regulations allow agriculture and other

primary activities. Buildings such as godowns and farmhouses are allowed only to the extent they are incidental to agriculture uses and are of small proportion in relation to the size of the individual land holding. These zones are the 'balance areas' as indicated by the UDPFI guidelines.

In this connection, literature survey was conducted to assess the present practices in developed countries in regard to these conservation areas. The conservation areas as discussed under "Law and Practice of Urban Development in the Federal Republic of Germany" a handbook by federal Ministry for Regional Planning, Building and Urban Development, Germany was reviewed. These conservation zones are termed as "White Land". These white land or the undeveloped outskirt areas are those areas on which as a general rule construction/building work should not be taken up. Some types of individual development can however be implemented - for e.g. a farm. These farm or farmhouses, which are allowed, are only incidental to the agricultural activity and serve the purpose of residence for the farmhouse workers. **In these areas weekend houses, static caravans are strictly not allowed.** Some public infrastructure project like water, sewerage, electricity etc. may be taken up in cases where alternative routes have huge economic implications.

In the total catchment area of the two lakes, about 200 farmhouses are found and among them about 136 farmhouses are enumerated during the field studies. Some of the farmhouses are used / developed as recreational / resort areas. The landscape changes in the form of construction activities, construction of tank etc. are taking place in these recreational areas apart from micro irrigation for raising and maintaining greenery. Various facilities are available/proposed in these resorts including accommodation, restaurants and entertainment activities like swimming pools, water sports etc. The major implications of these activities are on water consumption pattern and resultant sewage load.

The landscape change has further exacerbated by construction of check dams inside the farmhouses by obstructing the natural flow of water towards the lakes. These check dams have been built by obstructing the higher order stream flows of water into the lake. These higher order flows are made up of several lower order steam flows i.e. number of micro watersheds and any obstruction with water harvesting structures deprives flow of water into the recipient body i.e. the two lakes.

Thus, it is suggested that the farmhouse restrictions should be imposed not only to the conservation area but to the entire catchment area.

Further, the Municipal Administration & Urban Development Department in its letter dated 10500/II/2004 dated 4-3-2005 asked EPTRI

> 'to examine the draft master plans of both Hyderabad Urban Development Authority (HUDA) and Hyderabad Airport Development Authority (HADA) and the proposed Zoning Regulations therein and suggest which activities could be permitted in normal course, which could be permitted with restriction and which activities should be prohibited keeping in view the environmental flows and safeguards'

The study area comprises of area covered under master plans of Hyderabad Airport Development Authority (HADA) and Hyderabad Urban Development Authority (HUDA) but falling with in the watersheds of the catchment area of the two lakes of Osman Sagar and Himayath Sagar. The activities that may come up in the identified zone which may have likely impact on the lake water quality, is the consideration for selection of this study area.

A watershed wise review shows that out of total number of 29 watersheds of the two lake catchment areas, 6 watersheds fall in the HADA area and 8 watersheds fall in the HUDA area either wholly or partially. These watersheds are nearer to the lakes and any surface waters discharges in these areas invariably flow into the two lakes. The likely ground water withdrawals and consumptive use pattern of water in this area also may result in a significant impact on the ground water budget and as well as base flows in the streams draining the watersheds.

After review of the master plan of HUDA, it is found that the regulations of the GO Ms 111 has been duly incorporated in the master plan with zones around the lakes earmarked predominantly as conservation zone. However, in the master plan, there are some zones, which are earmarked as residential use zone, small multiple use zone, public and semi public use zone and roads.

In case of HADA Master Plan, the major activities that covered in the areas falling in the catchment area of the two lakes are the upcoming Hyderabad International Airport and some small residential use zones.

Under the Cyberabad Development Authority master plan not much area falls with in the catchment area. However a small portion pertaining to the CDA is falling in the catchment area. The activities proposed/existing in those areas belong to the residential use zone and commercial cum offices.

Considering the likely impacts from the activities identified as in the respective zones, the following precautions have to be considered under the respective zones:

1. Residential use zone is permissible but it is recommended that it should follow the regulations stipulated by the GO Ms 111 since

they fall within the catchment area. The regulations should be extended in the total watershed areas covered under respective master plans.

2. The residential use zone should only be meant for dwelling purposes and no commercial activity should be undertaken.

3. The regulation in the GO Ms. 111 which says, "to restrict the FSI to 1:0.5 in the catchment area ... to ensure that 90% of the area remains under agriculture as is the practice now and ensure protection of the lakes" should be strictly followed and should be extended to the total area falling within the watersheds in the respective master plans. This will prevent large and high complexes being developed in the area and prevent huge pollution load generated by both domestic sewage and solid waste.

4. Airports come under Transportation and communication use zone as per UDPFI guidelines. The location of Airport in this area needs further carefully examination with regard to:
   - Altering of the topography which affects the surface runoff into the catchment and tapping of the subsurface water resources which should not interfere with the catchment area
   - Location of the operation area of the Airport with regard to the total paved surface falling within the catchment area of Himayath Sagar Lake.
   - The discharges of both point and area sources, if any which should be properly organized and examined keeping in view the airport planning layout and operations which fall under the micro watershed of Himayath Sagar catchment area.

   An in depth analysis of these aspects will help to evaluate the effect on the catchment of the two lakes from the up coming air port operations.

5. Mixed and semi public use zone should be located elsewhere. The type of activity that can be taken up in this zone as per UDPFI guidelines are institutional in nature and may have commercial value in terms of service sector that generally exists as a support to this zone thereby increasing the pollutant load.

Efforts were made by the authorities in preparing the master plans of HUDA & HAD to incorporate the regulations of the G.O. Ms. 111 and associated regulations as well. The common area i.e. the catchment area falling in the master plan is largely marked as the conservation zone. However, some other zones like residential, public, mixed and airport zones do exist. The important aspect in all these zones is the implementation of regulations envisaged in the G.O.Ms 111, while undertaking any kind of developmental activity which is permissible by the same order. The zonal regulations duly considering the restrictions identified and as well adhering to the G.O.Ms 111 regulations will safeguard the drinking water sources of these two lakes.

Though the engineered systems can modify the capacity of a system, but usually result in continued operating costs with negative ecological impacts. It may be concluded by saying that projected growth should be sustainable otherwise over-development will destroy the ecological conditions around the lakes with existing communities.

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Executive Summary

Osmansagar Lake, formed on Musi River on a 6th order stream whereas Himayath Sagar, formed on Musa River a tributary of Musi a 5th order stream are located in Rangareddy district on western side to Hyderabad city. Osmansagar Catchment area covers about 736 sq km and whereas Himayath Sagar catchment area is spread over 1340 sq. km. The pattern of drainage in Musi catchment is typically of Trellis type where tributaries meet the main streams more or less at right angles grading between these two extreme patterns are the sub-dendritic pattern. The drainage pattern around Himayath Sagar is identified as radial where streams are diverging from a central elevation. The individual catchments are parallel to each other and extend from East to West.

The land slope of both Himayath Sagar and Osman Sagar catchment area predominantly falls under three classes i.e. Nearly level (0 – 1%), Very gentle slope (1-3%) and Gentle slope (3-5%) occurring in more than 90% of the area. This indicates that the area has uniform land slope over wide areas resulting in tendency for low surface runoff. Medium black soils cover western part. The alluvial black cotton soils are found along the stream courses and flood plains. The sedimentary black soils are present in the upland area of basaltic terrain and the thickness of the soils varies from 45 – 90 cm. The soils are moderately alkaline with pH value ranging from 7.0 – 8.5 and are non saline but the salt content is more than in the red soils. Clay content being high, their moisture retaining capacity too is high. Laterite soils with a thickness ranging 90 –180 cm occur in Vikarabad mandal. The soils are highly permeable and are well drained.

In the two catchment areas, predominant land capability class is designated as IIIse (Moderately good cultivable lands, with moderately deep clays, severely eroded). The land capability of the study area plays an important role to identify the suitable location of various water harvesting structures to be constructed to utilize water in sustainable manner.

The Catchment areas comprises predominantly two hydrogeologic environments (i) Granitic terrain and (ii) Lateritic – Basaltic terrain. In granitic terrain, groundwater occurs in inter-granular pore spaces of unconsolidated weathered material and in the porous secondary structures (mostly sheet fractures) under semi-confined conditions. The average depth to water level ranges from 10-20 m in recharge areas (uplands) and from ground level to about 3 m in valley bottoms. The recharge areas constitute about 70 per cent of the drainage basin in granitic terrain. The productive aquifers in granitic terrain are met at depth of 15 to 50 m below land surface, depending on topography.

Average rainfall recorded at Gundipet for 1901 – 1950 is 798 mm and the average annual rainfall during 1932-89 is 800.52 mm. Average rainfall at Chevella, Janwada and Gundipet is 751.71 mm. Most severe droughts have occurred during 1918, 1972, 1977 and 1987 and 2003, 2004. Minimum daily rainfall recorded at Gundipet is 218 mm (1977). Maximum annual rainfall recorded at Gundipet is 1412 mm(1978). Average annual rainfall during 1901-1950 monitored by Indian Meteorological Department at Hyderabad has been 758.9 ± 49.2 mm and around the lakes in Gundipet 798.0 ± 52.6 mm, Janwada 753 ± 50.6 mm and Chevella 601.1 mm.

Surface runoff based on geological formations varied from 35-52 mm/year under normal annual rainfall. Lowest runoff occurs in granites in the

immediate zone of the lakes. Highest runoff occurs in Laterites. Osmansagar Lake receives about 1 TMC of surface runoff under present development whereas Himayath Sagar Lake can receive about 1.8 TMC. Centre for Water Resources, JNTU has reported reduction of surface runoff rates from 12.1 to 6.9 % of annual rainfall during 1961 to 1996 in Osmansagar Lake Catchment and in the Himayath Sagar it has further reduced from 8 to 4 % of annual rainfall. Even this amount of surface runoff could not be realized due to construction of large number of water harvesting structures on first and second order steams of the flow path leading to the Musi & Musa river courses. Thus the combined storages in the lakes during last 5 years has not exceeded 2 TMC at any time. During 1996 full flows Osmansagar lake could realize 3.726 TMC on October 2nd 1996 and Himayath Sagar Lake has realized 2.245 TMC on November 28th 1995 for annual rainfall exceeding 1000 mm during two successive years of 1995 & 1996.

The catchment area of Himayath Sagar Lake has generated a surface runoff of 39-mm i.e. 51.4 mcm during 2004-2005. Out of the surface runoff the Musa river has contributed about 14.6 mcm of base flow for replenishing the declining water levels along its course during the same period. Thus the net storage realized in the Himayath Sagar Lake was only 36.8 mcm (1.3 TMC). Thus the lake has become completely dry during first week of November 2004.

The catchment area of Osmansagar lake has generated a surface runoff of 29.7 mcm. The base flow contribution from Musi river is 1.5 mcm. The inflows received in the Osmansagar lake was 1.1 TMC only. Through appropriate controlled withdrawals from the lake, the lake has sustained water up to May end and has gone completely dry during first week of June 2005.

The virgin catchment condition of 1970s has transformed into a treated catchment with intensive agricultural development during last three decades. Progressive farmers are adopting innovative agricultural practices like horticulture, vegetable cultivation and floriculture following drip irrigation methods and other farmers are cultivating mainly paddy, groundnut, cotton, vegetables etc. using traditional irrigation practice.

In view of the need of important natural resource - water, there are conflicts among stakeholders to use this resource. The surface run off pooled in large water bodies may serve as drinking water source for a large urban sprawl or need for the agricultural use by the farmers in the catchment. **Considering this, change analysis exercise was carried out using 1989 and 2004 satellite data by preparing land use and land cover in the respective periods.** From the analysis, it is evident that agricultural plantations were increased by 10% whereas barren rocky area was reduced by 3%. Regarding crop areas, the single crop area is increased by 10% whereas there is minor change in case of double cropped area. Significantly the area covered by the waste lands and shrubs, which facilitates higher surface runoff, is reduced by 15% which has caused depletion of tanks by 8%.

Various departments have constructed water harvesting structures in spite of the Government regulation not to construct them. The data collected from various departments on the water harvesting structures during 2000 -2004 is compiled and presented in the Table I. Further, Farmers have constructed boulder bunds in between the existing check dams to conserve further water runoff. The anthropogenic interventions have resulted in arresting realizable potential surface runoff in the Osmansagar and Himayath Sagar lakes from the catchment area.

Table I - Water Harvesting Structures Constructed during 2000 – 2003

(District Water Management Authority, Ranga Reddy District, APIDC)

	Mandals falling in Osmansagar Catchment		Mandals falling in Himayath Sagar Catchment		Total
Check Dams	Shankerpally Vikarabad Navabpet **Total**	134 106 138 **280**	Shamshabad Chevella Shabad Mionabad **Total**	248 136 98 37 **500**	780
Rock Fill Dams	Shankerpally Vikarabad Navabpet **Total**	2260 1702 410 **4377**	Shamshabad Chevella Shabad Mionabad **Total**	931 2028 281 1451 **4691**	9071
Percolation Tanks	Shankerpally Vikarabad Navabpet **Total**	5 23 12 **40**	Shamshabad Chevella Shabad Mionabad **Total**	5 24 **29**	69
Mini Percolation Tank	Shankerpally Vikarabad Navabpet **Total**	74 46 4 **124**	Shamshabad Chevella Shabad Mionabad **Total**	12 24 **36**	160
Contour Bunding	Shankerpally Vikarabad Navabpet **Total**	2015 1123 745 **3883**	Shamshabad Chevella Shabad Mionabad **Total**	722 3927 709 175 **5533**	9416
Farm Pond	Shankerpally Vikarabad Navabpet **Total**	3 111 **114**	Shamshabad Chevella Shabad Mionabad **Total**	11 2 1 **14**	128
Sunken Pond	Shankerpally Vikarabad Navabpet **Total**	2498 392 513 **3403**	Shamshabad Chevella Shabad Mionabad **Total**	2498 1015 115 376 **4004**	7407
Continuous Contour Trench	Shankerpally Vikarabad Navabpet **Total**	142 749 283 **1174**	Shamshabad Chevella Shabad Mionabad **Total**	57 179 10 **246**	1420

The groundwater use has been increased in the catchment by 300% over last three decades. Studies made by CGWB during 1973-75 have given estimates of base flows in the rivers under virgin conditions. The lakes used to receive about 1 TMC of base flow regenerations in the Musi and Musa rivers. Due to overexploitation of groundwater, the groundwater levels have declined and there has been reduction of base flows in these rivers < 0.5 TMC. Farmers have resorted to lift irrigation from the river by making bunds in the Musi and Musa river beds to pond the meager base flows in the river for irrigation and domestic purposes during post-monsoor period. Quarries around Himayath Sagar have helped formation of artificial pools with water and are hindering the movement of surface runoff entering the lakes.

The transmissivity of the aquifers (fractured granites) ranges 19 to 290 m^2/day; the specific yield of phreatic aquifers ranges from 0.01 to 0.04. The vertical permeability of the confining material ranges from 1.35×10^{-4} to 3.3×10^{-2} m/day. The annual water level fluctuation in granitic recharge areas exceeds 9 m whereas in low lands the water level fluctuation is less than 3 m. Generally, water table has a configuration similar to that of land surface; however, depths to water levels are greater in upland areas than in valley bottoms. Depth to the lowest annual water level varies from 4 m in granitic low lands to 30 m in basaltic up lands in the catchment areas. In granitic terrain piezometric level divides coincide with phreatic level and topographic divides.

In laterite- Basaltic terrain groundwater occurs in laterite – basalt contact zones; weathered and fractured basalts; vesicular basalt lenses associated with inter-trappean beds; sub-trappean alluvium and fractured granitic zones underlying shallow basalts. The average depth to water level in basaltic terrain range from 20 to 40 m below land surface in recharge areas (uplands) and from 6 to 40 m in valley bottoms. In basaltic terrain recharge (uplands) area comprises about 90 per cent of the catchment.

The productive zones are identified at various depths from 5 to 120 m below land surface. The perched aquifer conditions are not uncommon in the terrains. The transmissivity of vesicular basalts ranges from less than 1 to 198 m^2/day. The average specific yield of weathered basalt and vuggy laterite is 0.01 to 0.02 respectively. The vertical permeability of confining materials ranges from 6.9×10^{-4} to 1.1×10^{-2} m/day.

The behaviour of water level is closely dependent on precipitation, recharge and groundwater draft in the area. As per the water budget estimates only 50 per cent of the available dynamic reserve is utilized during 1970s. The ground water draft ranges from 0.01 to 0.05 m in the catchment areas. The average rate of seasonal water level decline approximates to 3.28 m/year (0.01m/d) in the granitic terrain whereas in the Basaltic terrain about 5.00 m/yr (0.04 m/day) which has been observed under natural groundwater flow conditions. Groundwater department has categorized the Shamshabad mandal as semi-critical (75% exploitation), Chevella mandal as Critical (97% exploitation), northern area of Chevella mandal as over developed areas (127% exploitation) duly accounting the ground water development. Shankarpally and Vikarabad mandals are safe for groundwater development (with 50% exploitation) and classified entire Rangareddy district as semi critical condition.

Considering the streams being dry during post monsoon period of 2004, surface water samples were collected from Osman Sagar and Himayth Sagar Lakes. The samples were anlysed for water quality parameters namely pH, total hardness, alkalinity, Chlorides, Fluorides, Nitrates, Sulfates, Biological Oxygen Demand and were found to be well within the drinking water quality standards of IS 10500. The Groundwater quality was monitored by collecting 100 samples covering all watersheds and in general it is calcium-magnesium, carbonate-bicarbonate type of water and is fit for irrigation. Iron content in groundwater is generally more than the

permissible limit of 0.3 mg/l for drinking purposes. At some places fluoride content is higher than permissible limits (i.e. greater than 1.5 mg/l). Nitrate content in groundwater seems to be high in granitic low lands, valley bottoms and near irrigated lands.

Groundwater investigations carried out in both catchment areas indicate that the virgin catchment areas were now transformed as well developed agriculture area and with lot of modifications in the drainage through landscaping works taking place in already existing farm houses/resorts etc. Catchment runoff has been minimized by human interventions like construction of water harvesting structures namely check dams, rock fill dams, percolation tanks, mini percolation tanks, contour bunding, farm ponds, sunken pond, continuous contour trenching and as well micro irrigation schemes. Earlier grape gardens have already exploited huge groundwater during early 1990 has not yet recouped as a result of overexploitation. Generally the groundwater levels are below 10-15 m in 90% of the cases indicating only active zone for groundwater flow is fracture zone below 20-50 m. The geophysical investigations carried out in the area and correlation with available lithologs also substantiate the above conditions. As a result the designed discharges are unable to enter the drinking water sources and the storages in both the lakes are depleting very fast.

Groundwater balance has been worked through construction of a groundwater flow model for each catchment area. The stream-aquifer interaction under the present overstressed conditions has been computed. The groundwater budget computed from the flow model under virgin conditions of 1970s indicates the base contribution would be about 1 TMC for each lake. Thus the lakes used to receive about one fourth of the storage capacity through the stream regeneration. Significantly over last decade the situation has changed due to construction of number of water harvesting structures. These structures are arresting the surface runoff

flowing in to the stream courses and the impoundings are replenishing the local aquifer in a micro-scale resulting in drying lakes after November / December. At present, the lakes are not even receiving about ¼ of the base flows due to existing agricultural practices and various activities in farm houses/resorts, which are mainly dependent on groundwater.

In a prediction scenario even if groundwater withdrawals increase by 1 mcm it would result in reduction of base flow in the Musi and Musa rivers of about 0.3 mcm in the respective catchment areas. This would further reduce the storage in the drinking water sources. Added to this problem the water quality deterioration would occur due to in situ sewerage disposal wherein the ground water already having high background nitrate concentrations. **Thus the relaxation of measures imposed by G.O.Ms.111 should be deferred for protecting the existing groundwater as well as surface water resources in the lake catchment areas.**

Apart from examining the feasibility of locating new water harvesting structures, other important terms and reference of Municipal Administration & Urban Development Department, Government of Andhra Pradesh is to examine

> 'If farmhouses are permitted in conservation zone in the Master Plan, the current maximum built-up area of 200 sq.m. could be raised to 400 sq.m. with the minimum plot size limit of 4000 sq.m. presently stipulated as per HUDA regulations'.

To meet the objective, the study was undertaken by taking into considering the various issues including review with reference to the norms in other metropolitan areas and as well as in Developed Countries and implications of the present activities itself, which has bearing on the

ecology of the two lakes. A comparison of Farmhouses norms in Hyderabad region with other cities is presented in Table II.

Table II Comparison of Farmhouses norms in various cities

PLACE/ CITY/REF	LAND USE	MIN. SIZE OF FARM HOUSE PLOT (sq.m.)	MAX. BUILT UP AREA PERMITTED (sq.m.)	HEIGHT LIMIT	EFFECTIVE FAR/FSI/BUILT UP AREA %
National Stds.- UDPFI norms	Agriculture	10000	100-150	Single storey-6m	0.0075 to0.010 i.e. 0.075% to 1.0%
Delhi	Agriculture/ Conservation	10000	100-150	Single storey-6m	0.0075 to0.010 i.e. 0.075% to 1.0%
Mumbai	No Development Zone	10000	500 with FSI 0.05 at 10000 plot size	Two storey-9.75m	0.025 to 0.05 i.e. 2.5% to 5.0%
Bangalore	Agriculture	12000	200	NA	0.0166 i.e. 1.66%
Hyderabad	Agriculture/ Conservation	4000	200	Single storey-6m	0.05 i.e. 5%

Source: Communication received from HUDA

From this, it is evident that Hyderabad allows Farmhouses with the smallest plot size of 4000 sq.m as compared to other cities in India. The existing standard is well below national norm. Thus, there is a strong case for raising the minimum plot size for a Farmhouse from the present 4000 sq.m to the minimum 10,000 sq.m as in UDPFI guidelines.

As per master plan preparation norms, there are certain areas which are called Green Belts or Conservation Zones in Master Plans. These are residual areas, which are not meant for buildings for future population as per density norms. These are reserved as agriculture zones, which are named as Conservation Zones, Agriculture Zones or No Development Zones. In such zones the land use regulations allow agriculture and other

primary activities. Buildings such as godowns and farmhouses are allowed only to the extent they are incidental to agriculture uses and are of small proportion in relation to the size of the individual land holding. These zones are the 'balance areas' as indicated by the UDPFI guidelines.

In this connection, literature survey was conducted to assess the present practices in developed countries in regard to these conservation areas. The conservation areas as discussed under "Law and Practice of Urban Development in the Federal Republic of Germany" a handbook by federal Ministry for Regional Planning, Building and Urban Development, Germany was reviewed. These conservation zones are termed as "White Land". These white land or the undeveloped outskirt areas are those areas on which as a general rule construction/building work should not be taken up. Some types of individual development can however be implemented - for e.g. a farm. These farm or farmhouses, which are allowed, are only incidental to the agricultural activity and serve the purpose of residence for the farmhouse workers. **In these areas weekend houses, static caravans are strictly not allowed.** Some public infrastructure project like water, sewerage, electricity etc. may be taken up in cases where alternative routes have huge economic implications.

In the total catchment area of the two lakes, about 200 farmhouses are found and among them about 136 farmhouses are enumerated during the field studies. Some of the farmhouses are used / developed as recreational / resort areas. The landscape changes in the form of construction activities, construction of tank etc. are taking place in these recreational areas apart from micro irrigation for raising and maintaining greenery. Various facilities are available/proposed in these resorts including accommodation, restaurants and entertainment activities like swimming pools, water sports etc. The major implications of these activities are on water consumption pattern and resultant sewage load.

The landscape change has further exacerbated by construction of check dams inside the farmhouses by obstructing the natural flow of water towards the lakes. These check dams have been built by obstructing the higher order stream flows of water into the lake. These higher order flows are made up of several lower order steam flows i.e. number of micro watersheds and any obstruction with water harvesting structures deprives flow of water into the recipient body i.e. the two lakes.

Thus, it is suggested that the farmhouse restrictions should be imposed not only to the conservation area but to the entire catchment area.

Further, the Municipal Administration & Urban Development Department in its letter dated 10500/II/2004 dated 4-3-2005 asked EPTRI

> 'to examine the draft master plans of both Hyderabad Urban Development Authority (HUDA) and Hyderabad Airport Development Authority (HADA) and the proposed Zoning Regulations therein and suggest which activities could be permitted in normal course, which could be permitted with restriction and which activities should be prohibited keeping in view the environmental flows and safeguards'

The study area comprises of area covered under master plans of Hyderabad Airport Development Authority (HADA) and Hyderabad Urban Development Authority (HUDA) but falling with in the watersheds of the catchment area of the two lakes of Osman Sagar and Himayath Sagar. The activities that may come up in the identified zone which may have likely impact on the lake water quality, is the consideration for selection of this study area.

A watershed wise review shows that out of total number of 29 watersheds of the two lake catchment areas, 6 watersheds fall in the HADA area and 8 watersheds fall in the HUDA area either wholly or partially. These watersheds are nearer to the lakes and any surface waters discharges in these areas invariably flow into the two lakes. The likely ground water withdrawals and consumptive use pattern of water in this area also may result in a significant impact on the ground water budget and as well as base flows in the streams draining the watersheds.

After review of the master plan of HUDA, it is found that the regulations of the GO Ms 111 has been duly incorporated in the master plan with zones around the lakes earmarked predominantly as conservation zone. However, in the master plan, there are some zones, which are earmarked as residential use zone, small multiple use zone, public and semi public use zone and roads.

In case of HADA Master Plan, the major activities that covered in the areas falling in the catchment area of the two lakes are the upcoming Hyderabad International Airport and some small residential use zones.

Under the Cyberabad Development Authority master plan not much area falls with in the catchment area. However a small portion pertaining to the CDA is falling in the catchment area. The activities proposed/existing in those areas belong to the residential use zone and commercial cum offices.

Considering the likely impacts from the activities identified as in the respective zones, the following precautions have to be considered under the respective zones:

1. Residential use zone is permissible but it is recommended that it should follow the regulations stipulated by the GO Ms 111 since

they fall within the catchment area. The regulations should be extended in the total watershed areas covered under respective master plans.

2. The residential use zone should only be meant for dwelling purposes and no commercial activity should be undertaken.

3. The regulation in the GO Ms. 111 which says, "to restrict the FSI to 1:0.5 in the catchment area ... to ensure that 90% of the area remains under agriculture as is the practice now and ensure protection of the lakes" should be strictly followed and should be extended to the total area falling within the watersheds in the respective master plans. This will prevent large and high complexes being developed in the area and prevent huge pollution load generated by both domestic sewage and solid waste.
4. Airports come under Transportation and communication use zone as per UDPFI guidelines. The location of Airport in this area needs further carefully examination with regard to:
   - Altering of the topography which affects the surface runoff into the catchment and tapping of the subsurface water resources which should not interfere with the catchment area
   - Location of the operation area of the Airport with regard to the total paved surface falling within the catchment area of Himayath Sagar Lake.
   - The discharges of both point and area sources, if any which should be properly organized and examined keeping in view the airport planning layout and operations which fall under the micro watershed of Himayath Sagar catchment area.

   An in depth analysis of these aspects will help to evaluate the effect on the catchment of the two lakes from the up coming air port operations.

5. Mixed and semi public use zone should be located elsewhere. The type of activity that can be taken up in this zone as per UDPFI guidelines are institutional in nature and may have commercial value in terms of service sector that generally exists as a support to this zone thereby increasing the pollutant load.

Efforts were made by the authorities in preparing the master plans of HUDA & HAD to incorporate the regulations of the G.O. Ms. 111 and associated regulations as well. The common area i.e. the catchment area falling in the master plan is largely marked as the conservation zone. However, some other zones like residential, public, mixed and airport zones do exist. The important aspect in all these zones is the implementation of regulations envisaged in the G.O.Ms 111, while undertaking any kind of developmental activity which is permissible by the same order. The zonal regulations duly considering the restrictions identified and as well adhering to the G.O.Ms 111 regulations will safeguard the drinking water sources of these two lakes.

Though the engineered systems can modify the capacity of a system, but usually result in continued operating costs with negative ecological impacts. It may be concluded by saying that projected growth should be sustainable otherwise over-development will destroy the ecological conditions around the lakes with existing communities.

Preface

Providing clean and safe drinking water for both rural and urban populations is indeed a serious challenge. Water is considered to be the elixir for all living beings and its quality is vital for the health of communities. Failure to provide safe drinking water may seriously impair progress and well being of the people. Thus understanding water quantity and quality has become prime concerns in any water management activity. EPTRI and NGRI have jointly investigated ecology of Himayath Sagar and Osman Sagar lakes which are drinking water sources for Hyderabad city for evaluation of permissible developmental activities in the catchment areas referred by Municipal Administration and Urban Development Department, A.P.

Osman Sagar Lake, formed on Musi River and Himayath Sagar, formed on Musa River a tributary of Musi are located on western side to Hyderabad city. Osman Sagar Catchment area covers about 736 sq.km. whereas Himayath Sagar catchment area is spread over 1340 sq.km. The Catchment areas comprises predominantly two hydrogeologic environments: Granitic terrain and Lateritic – Basaltic terrain. Surface runoff based on geological formations have been found varying from 35-52 mm/year under normal annual rainfall of about 800 mm. Osman Sagar lake receives about 1 TMC of surface runoff whereas Himayath Sagar lake can receive about 1.8 TMC under present developments. Even the amount of surface runoff could not be realized due to construction of large number of water harvesting structures in the catchment areas of the lakes during last 5 years and the combined storage has not exceeded 2 TMC at any time.

Remote sensing based change analysis of land use/land cover has estimated increase in agricultural plantations and single crop area. Significantly the area covered by the wastelands and shrubs, which facilitates surface runoff was reduced causing depletion of inflows into the lakes. Various departments have constructed water harvesting structures in spite of the Government regulation not to construct them. The

anthropogenic interventions have resulted in arresting realizable potential surface runoff into the lakes from the catchment area. The stream-aquifer interaction under the present overexploited groundwater condition in the catchment areas has been estimated further reduction of base flows to the lakes through groundwater flow modeling studies. The water harvesting structures are found arresting the surface runoff into the stream courses and the impoundings are able to replenish the local aquifer to a limited extent resulting in drying of lakes after November. The lakes are unable to receive 0.5 TMC of the base flows. Various activities in farm houses/resorts are adding further stress on the already strained water resources in the area.

In view of the above evaluation, the relaxation of measures imposed through regulation as in G.O.Ms.111 should be deferred for protecting the existing groundwater as well as surface water resources in the Osman Sagar and Himayath Sagar lakes and its catchment areas. Farmhouse holdings around Hyderabad are of 4000 sq.m plots as against the national norm of 10000 sq.m plots. Instead of permitting more built up area, it may be considered for raising the minimum plot size of a Farmhouse from the present 4000 sq.m to 10,000 sq.m, which supports the amelioration of the surrounding environment largely and the two lakes particularly.

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Contents

Executive Summary		
List of Figures		
List of Tables		
Bibliography		
1	Introduction	1
1.1	Prelude	1
1.2	Terms of Reference	2
1.3	Analysis of the Problem	3
1.4	Basic Scientific Issues	5
1.5	Approach	7
1.6	Methodology	8
1.6.1	Input Data Requirements	11
2.	Study Area and it's Characteristics	13
2.1	Study Area	13
2.2	Catchment Characteristics	15
2.2.1	Topography of the Study Area	15
2.2.2	Drainage Pattern in the Catchment Area	18
2.2.3	Watershed Delineation in the Catchment Area	20
2.2.4	Soils in the Catchment Area	23
2.2.5	Land Capability in the Catchment Area	30
2.2.6	Geology and Hydro-geomorphology in the Catchment Area	33
3.	Land Use / Land Cover and Change Analysis of the Study Area between 1989 and 2004	39
3.1	Objective of Land Use / Land Cover and Change Analysis	39
3.2	Methodology	39
3.3	Land use and Land Cover Classification	41
4.	Assessment for Feasibility for New Water Harvesting Structures	53
4.1	Objective of this study component	53

4.2	Hydrological aspects of Osman Sagar & Himayath Sagar Lakes	54
4.2.1	Ground water Conditions	56
4.3	Field Studies	58
4.3.1	Surface Waters	58
4.3.2	Existing Water Harvesting Structures in the Catchments	76
4.4	Ground Water Condition	83
4.4.1	Depth to Ground Water Table	83
4.4.2	Ground Water Withdrawal	99
4.4.3	Ground Water Conditions	101
4.4.4	Ground Water Potential in Ranga Reddy district	101
4.4.5	Aquifer System in the Study Regior	103
4.4.6	Ground Water Quality in the Study region	120
4.4.7	Ground Water Balance and Lake Water Interaction	155
4.5	Conclusions	182
5.	Assessment for Increase in Floor Area Index & Examining of the Master Plan of HUDA and HADA as per the Proposed Zoning Regulations	180
5.1	Objective of the Study Component	180
5.2	Methodology adopted for the Study Component	188
5.3	Norms for Farmhouses as per UDPFI Guidelines	189
5.4	Major Aspects of increase in Built Up area in the Farm Land	190
5.5	Examining the master plan of HUDA and HADA as per the proposed Zoning Regulations	209
5.5.1	Objective of the Study Component	209
5.5.2	Study Area	209
5.5.3	Review of the Master Plans	213
5.5.4	Conclusion	217
6.	Conclusions & Recommendations	218

List of Figures

Fig. 1.1	Water Partitioning at the soil surface	5
Fig. 1.2	Osman Sagar and Himayath Sagar Catchment Areas	8
Fig. 1.3	Assessment of Hydrologic Regime	10
Fig. 2.1	Catchment Area of Osman Sagar and Himayath Sagar	14
Fig. 2.2	Slope map of the Study Area	17
Fig. 2.3	Drainage Pattern in the Study Area	19
Fig. 2.4	Stream orders in the Catchment Area	21
Fig. 2.5	Water Shed Boundaries and Codes of the Study Area	22
Fig. 2.6	Soils in the Catchment Area	25
Fig. 2.7	Land Capability in the Study Area	31
Fig. 2.8	Hydrogeomorphology of Osman Sagar & Himayath Sagar Catchment Area	38
Fig. 3.1	Satellite Image of Osman Sagar and Himayath Sagar Catchment Areas during November,1989	46
Fig. 3.2	Satellite Image of Osman Sagar and Himayath Sagar Catchment Areas during November,2004	47
Fig 3.3	Land/Land Cover in the Study Area during November,1989	48
Fig 3.4	Land/Land Cover in the Study Area during November,2004	49
Fig 3.5	Distribution of Land Use / Land Cover in the Study Area during November, 1989	50
Fig 3.6	Distribution of Land Use / Land Cover in the Study Area during November, 2004	51
Fig 3.7	Change in the Land Use & Land Cover from 1989 to 2004	52
Fig 4.1	Himayath Sagar Lake during Pre-monsoon	58
Fig 4.2	Himayath Sagar Lake during Post –monsoon period November,2004	59
Fig 4.3	Osman Sagar Lake during Post –monsoon period September,2004	59
Fig 4.4	Water Sample Collection from Lake	60

Fig 4.5	Sampling Locations in Osman Sagar Lake	61
Fig 4.6	Rock fill Dam 50 M above the check Dam at Pamena Village	78
Fig 4.7	Check Dams at number of locations	78
Fig 4.7a	Check Dams at number of locations	79
Fig 4.7b	Pumping into open well from Check Dam	79
Fig 4.8	Tapping Stream flow by tankers near Attapur	80
Fig 4.9	Tapping Stream flow by tankers & above 10 pumps	80
Fig 4.10	Musi River flow tapped by blocking near Chittigadda railway bridge	81
Fig 4.11	Quarrying area very near to Lakes obstructing the flow	81
Fig 4.12	Observation Wells in the Catchment area of Himayath Sagar Lake	85
Fig 4.13	Depth to groundwater Level in the Catchment area of Himayath Sagar Lake – November 2004	86
Fig 4.14	Groundwater Level contours m (amsl) in the Catchment area of Himayath Sagar Lake – November 2004	87
Fig 4.15	Depth to groundwater Level in the Catchment area of Himayath Sagar Lake – May 2005	88
Fig 4.16	Groundwater Level contours m (amsl) in the Catchment area of Himayath Sagar Lake – May 2005	89
Fig 4.17	Observation Wells in the Catchment area of Osmansagar Lake	90
Fig 4.18	Depth to groundwater Level in the Catchment area of Osman Sagar Lake – November 2004	91
Fig 4.19	Groundwater Level contours m (amsl) in the Catchment area of Osman Sagar Lake – November 2004	92
Fig 4.20	Depth to groundwater Level in the Catchment area of Osman Sagar Lake – May 2005	93
Fig 4.21	Groundwater Level contours m (amsl) in the Catchment area of Osman Sagar Lake – May 2005	94
Fig 4.22	Geological Formations & VES profiles in the Catchment	107

	area of Himayath Sagar Lake	
Fig 4.23	Variation of Apparent Resistivity along Profile - Catchment area of Himayath Sagar Lake	108
Fig 4.24	Location of Wells for pumping tests in the Catchment area of Himayath Sagar Lake	109
Fig 4.25	Geological Formations & VES profiles in the Catchment area of Osman Sagar Lake	110
Fig 4.26	Variation of Apparent Resistivity along Profile - Catchment area of Osman Sagar Lake	111
Fig 4.27	Location of Wells for pumping tests in the Catchment area of Osman Sagar Lake	112
Fig 4.28	Spatial Variation of TDS (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	125
Fig 4.29	Spatial Variation of Chloride (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	126
Fig 4.30	Spatial Variation of Sulfate (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	127
Fig 4.31	Spatial Variation of Nitrate No3 (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	128
Fig 4.32	Spatial Variation of Fluoride (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	129
Fig 4.33	Spatial Variation of Sodium (mg/l) in Groundwater - Catchment area of Himayath Sagar Lake – November 2004	130
Fig 4.34	Spatial Variation of TDS (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	131

Fig 4.35	Spatial Variation of Chloride (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	132
Fig 4.36	Spatial Variation of Sulfate (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	133
Fig 4.37	Spatial Variation of Nitrate No3 (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	134
Fig 4.38	Spatial Variation of Fluoride (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	135
Fig 4.39	Spatial Variation of Sodium (mg/l) in Groundwater - Catchment area of Osman Sagar Lake – November 2004	136
Fig 4.40	Wilcox Diagram & Piper Plots - Catchment area of Himayath Sagar Lake – November 2004	137
Fig 4.41	Wilcox Diagram & Piper Plots - Catchment area of Osman Sagar Lake – November 2004	138
Fig 4.42	Simulation Model Domain in the Catchment area of Himayath Sagar Lake	159
Fig 4.43	Grid map of Simulation model domain in the Catchment area of Himayath Sagar Lake	160
Fig 4.44	Simulation vertical cross section in the Catchment area of Himayath Sagar Lake	161
Fig 4.45	Permeability distribution in m/day in the Catchment area of Himayath Sagar Lake	162
Fig 4.46	Pumping Centers in the Catchment area of Himayath Sagar Lake	163
Fig 4.47	Boundary Conditions of Ground Water flow model in the Catchment area of Himayath Sagar Lake	164
Fig 4.48	Simulation Model Domain in the Catchment area of Osman Sagar Lake	165
Fig 4.49	Grid map of Simulation model domain in the Catchment area of Osman Sagar Lake	166
Fig 4.50	Simulation vertical cross section in the Catchment area of	167

	Osmar Sagar Lake	
Fig 4.51	Permeability distribution in m/day in the Catchment area of Osman Sagar Lake	168
Fig 4.52	Pumping Centers in the Catchment area of Osman Sagar Lake	169
Fig 4.53	Boundary Conditions of Ground Water flow model in the Catchment area of Osman Sagar Lake	170
Fig 4.54	Calibration Water Levels in the GWF Model in the Catchment area of Himayath Sagar Lake	172
Fig 4.55	Computed Water levels in m (amsl) in GW Flow Model in the Catchment area of Himayath Sagar Lake	173
Fig 4.56	Predicted Water levels in m (amsl) in GW Flow Model in the Catchment area of Himayath Sagar Lake –May 2010	174
Fig 4.57	Zone budget in GW Flow Model in the Catchment area of Himayath Sagar Lake	175
Fig 4.58	Calibration Water Levels in the GWF Model in the Catchment area of Osman Sagar Lake	176
Fig 4.59	Computed Water levels in m (amsl) in GW Flow Model in the Catchment area of Osman Sagar Lake	177
Fig 4.60	Computed Water levels in m (amsl) in GW Flow Model in the Catchment area of Osman Sagar Lake – May 2010	178
Fig 4.61	Zone budget in GW Flow Model in the Catchment area of Osman Sagar Lake	179
Fig 5.1	The Ratio of Farmhouses size and allowed Built up area in various cities	192
Fig 5.2	Cases of Farmhouses with built up area localized and with built up area distributed and wastes assimilation into the environment	196
Fig 5.3	Watersheds Representing Population and Agricultural Growth Rate	197
Fig 5.4	Up coming Resort in the Himayath Sagar Catchment	203

Fig 5.5	Landscape changes in one of the Resort in Osman Sagar Catchment	203
Fig 5.6	Landscape change in one of the resort in Osman Sagar Catchment	204
Fig 5.7	Cottages in the Resort depicting Landscape changes	204
Fig 5.8	View of extenstive Greenery developed in one of the Resort in Osman Sagar Catchment	205
Fig 5.9	Ground Water Use in one of the Resort in Osman Sagar Catchment	205
Fig 5.10	Landscape changes – Construction of tank inside one of the Resort in Osman Sagar Catchment	206
Fig 5.11	Landscape changes – in one of the Resort in Osman Sagar Catchment – Micro Irrigation	206
Fig 5.12	Landscape changes in one of the Resort in Osman Sagar Catchment – Check Dam	207
Fig 5.13	Landscape changes in one of the Resort in Osman Sagar Catchment – Check Dam	207
Fig 5.14	Landscape changes – in one of the Resort in Osman Sagar Catchment – Micro Irrigation	208
Fig 5.15	Landscape changes – in one of the Resort in Osman Sagar Catchment – Tank under construction	208
Fig 5.16	Boundaries of various Zones	211
Fig 5.17	Watersheds in the Catchment area along with Master Plan Boundary	212
Fig 6.1	Agriculture being practiced in the dryed up lake bed of Himayath Sagar Lake during November, 2004	221
Fig 6.2	Activities in the foreshores of Osman Sagar Lake	221
Fig 6.3	Agricultural practices in the dryed up lake bed of Himayath Sagar Lake during November, 2004	222
Fig 6.4	Green Belt Developed by HMWS&SB to protect the shore area on Janwada side	222

List of Tables

Table 2.1	Slope Classes	15
Table 2.2	Area under respective Slope category in Osman Sagar Lake Catchment	16
Table 2.3	Area under respective Slope category in Himayath Sagar Lake Catchment	16
Table 2.4	Water Sheds in Himayath Sagar Catchment and their extent of areas	20
Table 2.5	Water Sheds in Osman Sagar Catchment and their extent of areas	23
Table 2.6	Description of Soil type in the Study Area	26
Table 2.7	Description of land Capability Classes	32
Table 3.1	Satellite Data used for the Change Analysis	40
Table 3.2	Lanc / Use Land Cover Classes in respective levels	42
Table 3.3	Areas of Land Use/ Land Cover classes in the Study Area during November, 1989	43
Table 3.4	Areas of Land Use/ Land Cover classes in the Study Area during November, 2004	44
Table 3.5	Change Analysis in the Study Area	45
Table 4.1	Annual rain fall pattern in Ranga Reddy District	55
Table 4.2	Ground Water recharge percentage in Granites from annual rainfall	57
Table 4.3	Water Quality in Osman Sagar Lake	65
Table 4.4	Water Quality in Himayath Sagar Lake	74
Table 4.5	Water harvesting structures constructed in year 2000-2003	77
Table 4.6	Well inventory in the Catchment area of Himayath Sagar Lake November,2004	96
Table 4.7	Well inventory in the Catchment area of Osman Sagar	97

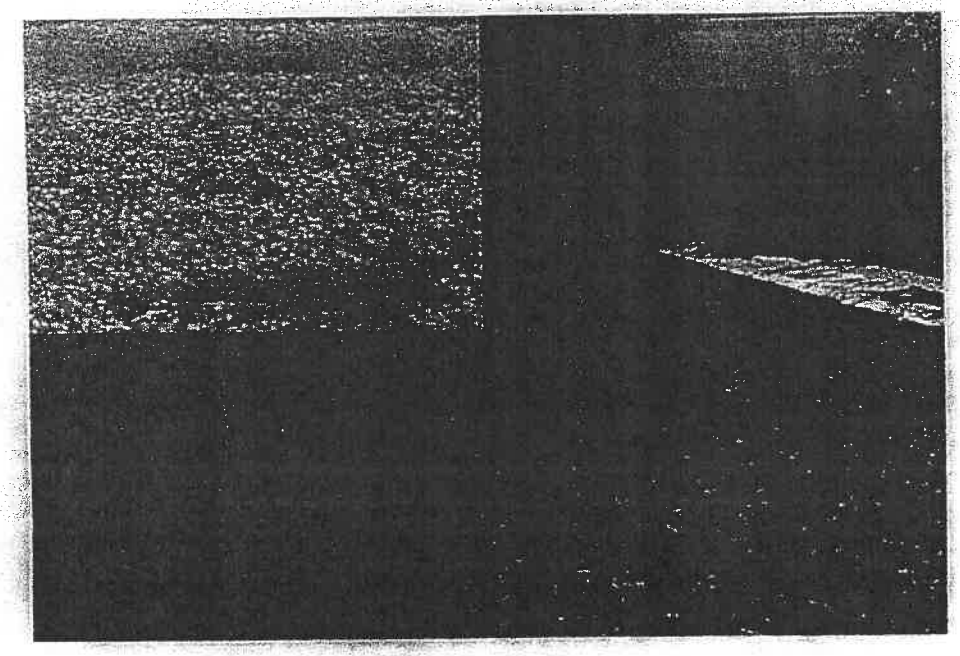
	Lake November,2004	
Table 4.8	General crop requirements	100
Table 4.9	Ground Water Consumptive use	101
Table 4.10	Interpreted layer parameters from Geo electrical Resistivity Sounding in Himayath Sagar Catchment	113
Table 4.11	Interpreted layer parameters from Geo electrical Resistivity Sounding in Osman Sagar Catchment	115
Table 4.12	Aquifer Parameters	106
Table 4.13	CGWB Studies – Aquifer details & Parameters	118
Table 4.14	Ground Water Quality Analysis November,2004 in Himayath Sagar Catchment	140
Table 4.15	Statistical Analysis of G.W quality in the catchment area of Himayath Sagar Lake November, 2004	145
Table 4.16	Analysis of pumping tests and estimated permeability in Himayath Sagar Catchment	146
Table 4.17	Ground Water Analysis November 2004 in Osman Sagar lake	147
Table 4.18	Statistical Analysis of G.W quality in the catchment area of Osman Sagar Lake November, 2004	153
Table 4.19	Analysis of pumping tests and estimated permeability in Osman Sagar Catchment	154
Table 4. 20	Ground Water Budget in Himayath Sagar & Osman Sagar Catchment area	180
Table 4.21	Ground Water Budget for Virgin condition in Himayath Sagar and Osman Sagar Catchment Area	181
Table 5.1	Farmhouses Norms as in UDPFI guidelines	190
Table 5.2	Comparison of Farmhouses norms in various cities	191
Table 5.3	Various Farmhouses sizes in India	195
Table 5.4	List of Farmhouses in the Study Area	198
Table 5.5	Watersheds in the Catchment Area of the Osman Sagar and Himayath Sagar Lakes	210

ANNEXURE XIV

Ecology of Himayath Sagar and Osman Sagar Lakes - Evaluation of Permissible Developmental activities in the Catchment Areas

Report submitted to

Municipal Administration & Urban Development Department, Government of Andhra Pradesh



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Hyderabad

September, 2005

Chapter 1

Introduction

1.1 Prelude

Lakes serve variety of purposes. However, because of their socio-economic significance they have been quite often over exploited leading to qualitative and quantitative deterioration. Growing human interference in the catchment further aggravates the situation increasing the number of problems of the lake. This has posed a serious threat to their survival and lakes have been reported to have undergone quantitative and qualitative deterioration and even untimely extinction.

Since the introduction of protected water supply schemes, protection of the catchment area of the lakes, which serve as drinking water sources, has become a well-established practice world over. This practice has been evolved based on the fact that most of the pollutants, which are generated due to developmental activities in the catchment area, are not removed during the conventional treatment for drinking water supply. Even after evolving advanced water treatment processes now, this practice is being continued mainly on three grounds.

1. Analytical techniques to find out the presence of some of the pollutants involves use of very sophisticated equipment, highly qualified and experienced technical manpower and huge expenditure and time
2. Treatment of water for removal of these pollutants is so costly that it is beyond the reach of most of the local bodies.
3. Treatment cost raises the cost of water supplied to the citizens

From the available records that came across till 1989 any regulatory order preventing developmental activities with pollution potential in Himayath Sagar and Osman Sagar catchment areas, such as industries, agriculture, farmhouses, recreation centres are taking place, since designating Hyderabad as the state capital of Andhra Pradesh. From 1989 till 1996, three G.Os were issued restricting some of the activities totally, and some partially in these two catchment areas.

Based on the representation received by the Government to relax the restrictions imposed in G.O. Ms. No. 111 of M.A 1996 with regard to small hydrological structures like check dams, bore wells and also for allowing some construction activities in this area, the Government desired EPTRI to examine "whether if any relaxation may be considered without damaging the lakes and their ecology". Since EPTRI has expertise in some areas of the study, it is proposed to take up the study under ...o supplement the remaining expertise required for this ...dy, it may be pointed out that EPTRI and NGRI are members of the committee among others, who had carried out the studies.

1.2 Terms of Reference

The Municipal Administration & Urban Development Department, Government of Andhra Pradesh has asked EPTRI to conduct study vide their letter no: 10500/I1/2004-1 M.A. DATED 22-06-2004 with the following terms of reference:

(a) Consideration of the restrictions imposed by G.O. Ms. No 111 M.A. dated 08.03.1996 read along with the judgment delivered by Hon'ble Supreme Court of India in Civil Appeal Nos. 368 to 371/99 in the case of A.P. Pollution Control Board vs. Prof. M.V. Naidu (Retd) and others and operation thereof with regard to sub-clause 3 of G.O. Ms. No 111 M.A. dated 08.03.1996, with regard to the direction *"not to*

take up any building work / check dams / lift irrigation works / storage reservoirs across vagus flowing in the catchment areas".

(b) To consider the relevant hydrological data and ground water data in the catchment areas with a view to finding out whether any relaxation can be made without affecting the ecological balance in the reservoirs of Himayath Sagar and Osman Sagar, with regard to permitting check dams / bore wells etc.,

(c) To examine if for farmhouses permitted in Conservation Zone in the Master Plan, the current maximum built up area of 200 sq.m. could be raised to 400 sq.m. with the minimum plot size limits of 4000 sq.m. presently stipulated as per HUDA regulations.

(d) To suggest ways and means of limiting the adverse impact that is likely to arise because of the proposed interventions and finally to come out with detailed designs of by structures, which could be, permitted keeping in view of the judgment of the Hon'ble Supreme Court of India.

1.3 Analysis of the Problem

A summary of the regulations imposed by Government of Andhra Pradesh through Government Orders from time to time is presented below.

a) G.O. Ms. No 50 M.A. dated 28.01.1989 – deals with only protection of hydrological regime of the catchment areas. For this purpose, the G.O.
- Prohibits the interception of any inflows of water into the rivers in the catchment areas of the two lakes, including the removal of unauthorized check dams.
- Prohibits tapping of ground water in these catchment areas.
- Prevents unauthorized occupation of land.

b) G.O. Ms. No 192 M.A. dated 31.03.1994 – deals with all sources of pollution

- Prohibits within 10 km. from full tank level contour in the catchment areas of the two lakes, activities such as industries, major hotels, residential colonies, or other establishments.
- Permits beyond 10 km. and within the catchment areas with approval (NOC) from HMWSSB, APPCB, Directorate T&CP, HUDA and Industry Department.

c) G.O. Ms. No 111 M.A. dated 08.03.1996 – deals with both hydrological regime and prevention of pollution

- All the restrictions imposed in G.Os under item a) and b) have been reiterated.
- In addition, the following restrictions have been imposed within 10 km radius from full tank level of the lake.

  - 60 % of the total area shall be kept as open space and roads in all layouts in the villages of the catchment area.
  - The land use of about 90 % is to be classified as recreational and conservational use.
  - To restrict the FSI to 1: 0.5.
  - To prohibit polluting industries within 10 km radius both upstream and downstream.
  - No industry in the prohibited 10 km. radius.
  - Not to take up any building works like check dams, lift irrigation works, storage reservoirs, across vagus flowing in the catchment area.

A critical study of the recommendations based on which the above Government Orders have been issued clearly indicates that demarcating line of 10 km. radius all round the lakes from FTL in the catchment areas is not based on any well planned scientific study. It appears that it is

based on the expert opinion. In view of this, there is need for scientific evaluation for development activities in the entire catchment area and to develop various scenarios.

1.4 Basic Scientific Issues

Human activities within the lake or their surrounding landscapes in the catchment area have adverse impact on the lake ecology. The degree of impact depends on the nature and extent of these activities. The landscape is a composite system where ecohydrological phenomena form an important component. It can be thought of as a geological matrix, represented by its topography, its mineral composition as well as the permeability characteristics of its various layers or components.

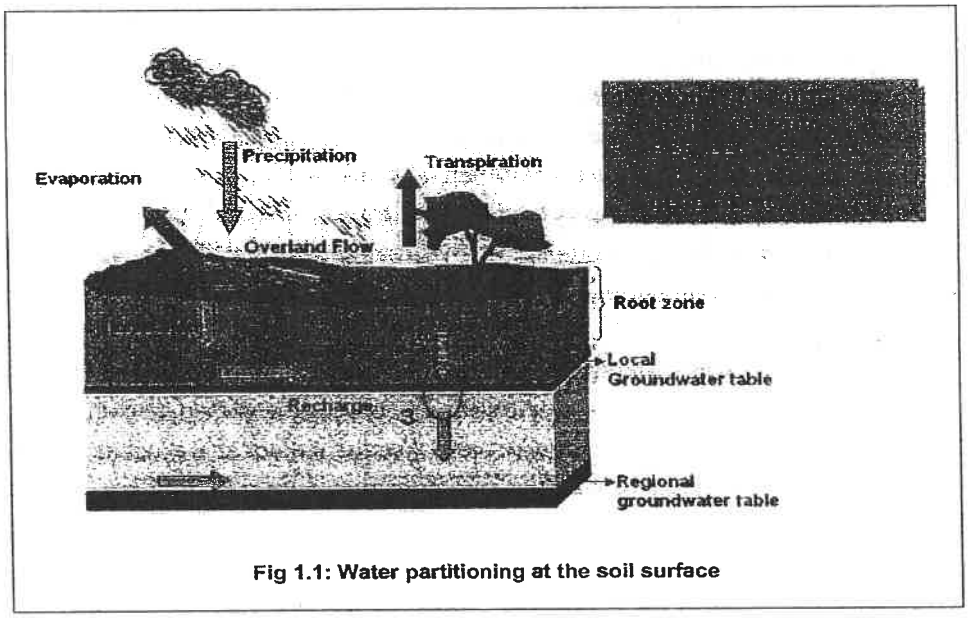


Fig 1.1: Water partitioning at the soil surface

When climatic forces such as wind, rain and evaporation act on this matrix, the water flows get divided along pathways on the surface or within the ground or both. Figure 1.1 shows the water partitioning on the soil/ground surface. This has a systematic impact on hydrochemical and ecosystem characteristics.

The landscape, which has been shaped over thousands of years by the interaction between geological processes and climate, is being changed within a short period by human interventions, which are made for the benefit of mankind without knowing or considering the long-term consequences. As a result, water quality and quantity, which are naturally determined by interrelated forces such as climatological, geological and biological dynamics, are drastically disturbed by human activities.

If human interventions result in change of the natural vegetation, these changes will control the state of the ground, the size of the interception storage in the vegetation canopy, and the amount of water that is evapotranspired back to the atmosphere. In addition to changing the natural vegetation, there are other land-use activities by man that result in significant effects/impact on the infiltration and storage of water such as built up land, soil compaction by grazing animals, drainage, ploughing, logging and building of water harvesting structures.

The accelerated growth of science and applied technology, which gave power to man to interfere with natural processes stated above, has also given him the ability to predict the consequences of the proposed actions. For this purpose predictive mathematical models taking into the consideration of the interdependency of various processes involved have been developed. Using these models, it is possible to develop scenarios for various developments and their consequences. Based on this, a scenario, which permits the contemplated development with acceptable adverse impacts on the environment, can be selected.

1.5 Approach

To meet the objectives of the study, which can be defined as the terms of reference, the comprehensive hydrological studies were conducted by utilizing the available data after screening and validating and supplementing with the required primary data. The following assumptions are made for conducting the studies:

- Historical data available with the various government departments, agencies will be made available within reasonable time.
- No other sectorial development activity other than agriculture will take place in the catchment area beyond 10 KM. radius from the FTL contour of the two lakes.
- Selection of suitable locations for the water harvesting structures will be carried out based on the Central Ground Water Board (CGWB) criteria and hydrogoelogical investigations.
- Down stream developmental activities are not considered in the present study due to formation of Lake Bund on low permeability formations.
- Data pertaining to the industrial operations and their discharges in the catchment area provided by APPCB will be considered as quality data and will be utilized in the study.
- Based on the water availability and land capability provided by the study team the Agriculture Department will provide the data pertaining to probable cropping patterns could be implemented.

Limitations

- Economic merits/benefits of the scenarios created in the study are not covered.
- Design of the water harvesting structures is not included

1.6 Methodology

Problems of the individual lakes in the semi-arid terrain vary. Each lake will have its own set of problems depending upon its morphology, climate, land use in the catchment, degree of human interference in the catchment and use of the lake water along with other environmental factors.

One of the important objectives is to identify the possibility for constructing water-harvesting structures. This needs the assessment of the hydrological regime in the study region. Fig. 1.2 presents the Osman Sagar and Himayath Sagar catchment areas.

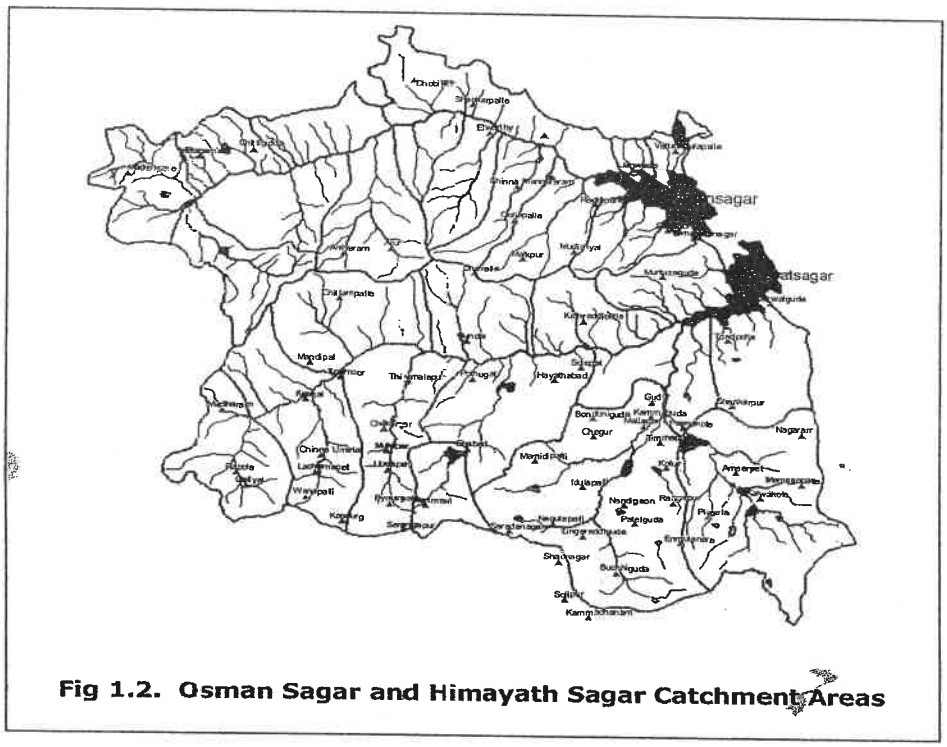


Fig 1.2. Osman Sagar and Himayath Sagar Catchment Areas

Assessment of Hydrological Regime

In the present context there are two major interventions, which have effect on the lakes ecology viz.

1. Flow characteristics
2. Water Quality of inflows into the lakes

Flow Characteristics

To understand the flow of the two rivers i.e. Musa and Musi, which are contributing inflows into the two lakes - Himayath Sagar and Osman Sagar lakes respectively, the following data was collected

- Precipitation records
- Landscape relief
- Existing Water Harvesting Structures
- Residential Colonies
- Industries
- Farm Houses
- Agriculture and Extent of Vegetation
- Soils
- Aquifer Geometry
- Base flows
- Ground Withdrawal

This is schematically illustrated in Figure 1.3.

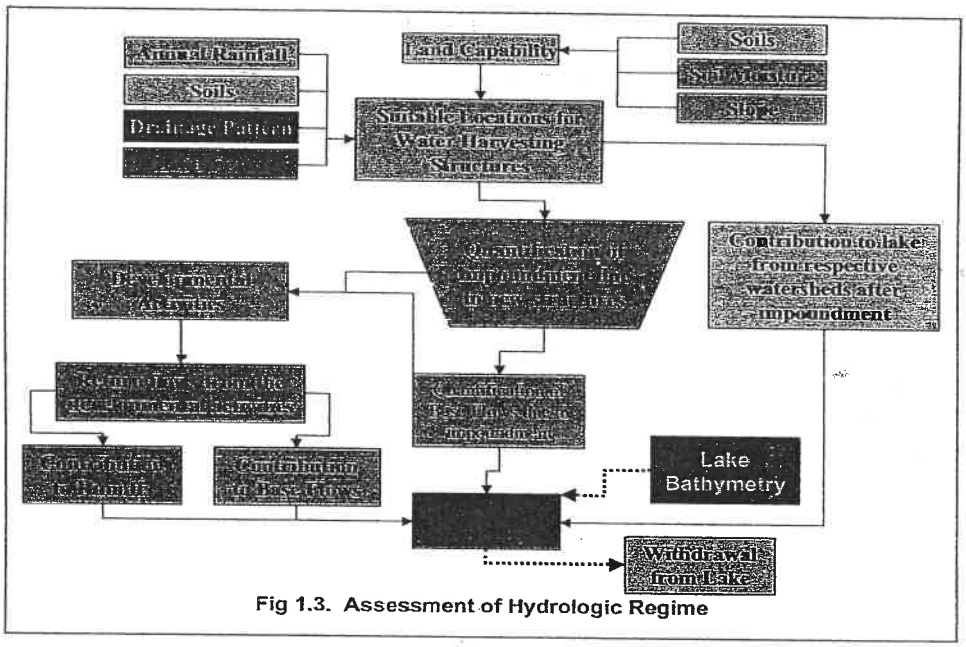


Fig 1.3. Assessment of Hydrologic Regime

■ Water Quality

Any activity involved in use of water results in discharge of liquid wastes, which differ in quality and quantity. Both point sources and non-point sources are considered in this study.

The study on various uses of water in the existing farmhouses will be reviewed. The implications of the change in the floor area from 200 sq.m to 400 sq.m with in the minimum plot area of 4000 sq.m will be assessed based on the purpose of utilization.

1.6.1 Input Data Requirements

To conduct the above studies the following datasets are identified that are to be collected from various sources and in the field:

I. Spatial Datasets

1. Physical Features of the catchment areas (in 1:25,000 scale)
    a. Administrative boundaries
        i. District boundary
        ii. Mandal boundary
    b. Major Transport Networks
        i. National Highways
        ii. State Highways
        iii. District Roads
        iv. Railway line
    c. Drainage Pattern
        i. With orders
        ii. Flow directions
    d. Contours
    e. Spot heights
    f. Water bodies
2. Land use Land Cover
    a. IRS P6 satellite data of two seasons (Pre & Post monsoon)
    b. GPS survey for obtaining Ground Control Points
3. Hydro-geomorphology
    a. Landsat TM data of summer
    b. Geology map of GSI (1:250,000 scale)
4. Soil Map (1:50,000 scale)

II. Field data:

1. Geophysical survey
2. Inventory of wells
3. Ground water Levels
4. Aquifer parameters through Pumping tests of wells
5. Water samples
    a. Surface water samples
        i. Water samples in the lake, along the river courses, water bodies and from inlet channels
    b. Groundwater samples
6. Inventory of existing Farm houses
7. Location of Check dams

III Secondary Data:

1. Daily rainfall data
2. Existing Water Harvesting Structures information

Using the data collected i.e. both primary and secondary, the studies were carried out as per the methodology presented / discussed above.

Chapter 2

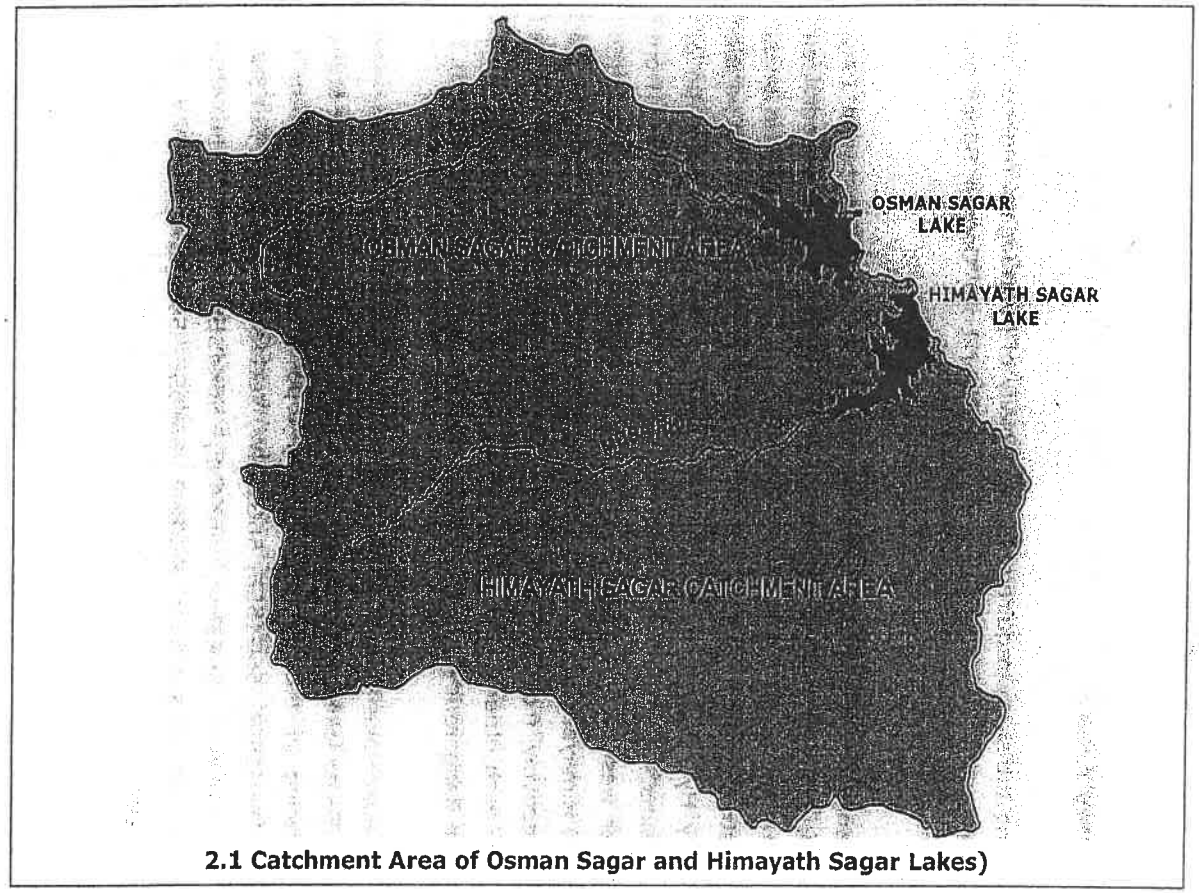
Study area and it's Characteristics

2.0 Study Area

Considering the study requirements especially of hydrological regime, the study area is identified as catchment area of both Osman Sagar and Himayath Sagar lakes.

The Osman Sagar lake was constructed on the River Musi between 1912 and 1920. Subsequently Himayath Sagar lake was constructed between 1920 and 1927 on the stream Musa a tributary of Musi. The two lakes were constructed to meet a part of the drinking water needs of the people in the city Hyderabad. In 1920s they were catering for a population of about 5 lakhs. Two lakes are situated at a distance of about 10 km. from each other west of Hyderabad and relatively Osman Sagar lies towards North and Himayath Sagar to the South at a distance of 19.31 and 9.66 km. respectively from Hyderabad city. The individual catchments are parallel to each other and extend from East to West. The catchment area is falling in Rangareddy and Mahaboobnagar Districts of Andhra Pradesh.

Osman Sagar lake has a total catchment area of 736 sq.km. and Himayath Sagar lake has a total catchment area of 1340 sq.km. The study area is falling in the Survey of India topo sheet index numbers of 56G15NE, 56G15SE, 56G15SE, 56G15NW, 56G16NE, 56G16SE, 56K3NE, 56K3SE, 56K3SW, 56K3NW, 56K4NE, 56K4SE, 56K4SW, 56K4NW, 56K7SE, 56K7SW, 56K7NW, 56K8NE, 56K8SE, 56K8SW, 56K8NW (1in 25,000 Scale.)



2.1 Catchment Area of Osman Sagar and Himayath Sagar Lakes)

363

2.1 Catchment Characteristics

2.1.1 Topography of the study area

The catchment area represents undulating topography with elevations ranging from 530 to 730 m above mean sea level. The general land slope is towards east i.e. towards Osman Sagar and Himayath Sagar lakes. Western Vikarabad areas, underlain by Deccan Traps and laterite have typical flat-topped terrain and Granites having isolated hills underlie the eastern parts.

The slope map has been prepared for the catchment area using available 10 m interval contours. The different classes of slopes have been categorised as per the guidelines suggested by the All India Soil and Land Use Survey (AIS&LUS). The classification adopted is presented below in Table2.1. The sloping pattern in the catchment area is presented in Figure 2.1

Table 2.1 Slope Class

Slope Class (%)	Slope Category
0 – 1	Nearly Level
1 – 3	Very Gentle Slope
3 – 5	Gentle Sloping
5 – 10	Moderately Sloping
10 – 15	Strong Sloping
15 – 35	Moderately Steep to Steep Slope
> 35	Very Steep Slope

The land slope of both Himayath Sagar and Osman Sagar catchment area predominantly falls under three classes i.e. Nearly level, Very gentle slope and Gentle slope occurring in more than 90% of the area. This indicates

that the area has uniform land slope over wide areas resulting in tendency for low surface runoff. The catchment has Class VII category with land slope of >35% along the mainstream course owing to deep cut and also in small extents along the tributary stream courses. In both the catchments the Class II category having land slope of 1-3% is larger than the Class I category. The categories of higher land slopes of more than 3% in small extents along the basin margins and along surface water divide between the two individual basins.

Table 2.2 Area under respective Slope Category in Osman Sagar Lake Catchment

Slope Class (%)	Area in sq.km.	% area
0 – 1	270.44	36.69
1 – 3	319.03	43.28
3 – 5	80.65	10.94
5 – 10	43.42	5.89
10 – 15	9.23	1.25
15 – 35	9.92	1.35
> 35	4.43	0.6

Table 2.3 Area under respective Slope Category in Himayath Sagar Lake Catchment

Slope Class (%)	Area in sq.km.	% area
0 – 1	542.86	40.51
1 – 3	559.18	41.73
3 – 5	136.06	10.15
5 – 10	66.66	4.98
10 – 15	12.17	C.91
15 – 35	14.41	1.08
> 35	8.61	C.64

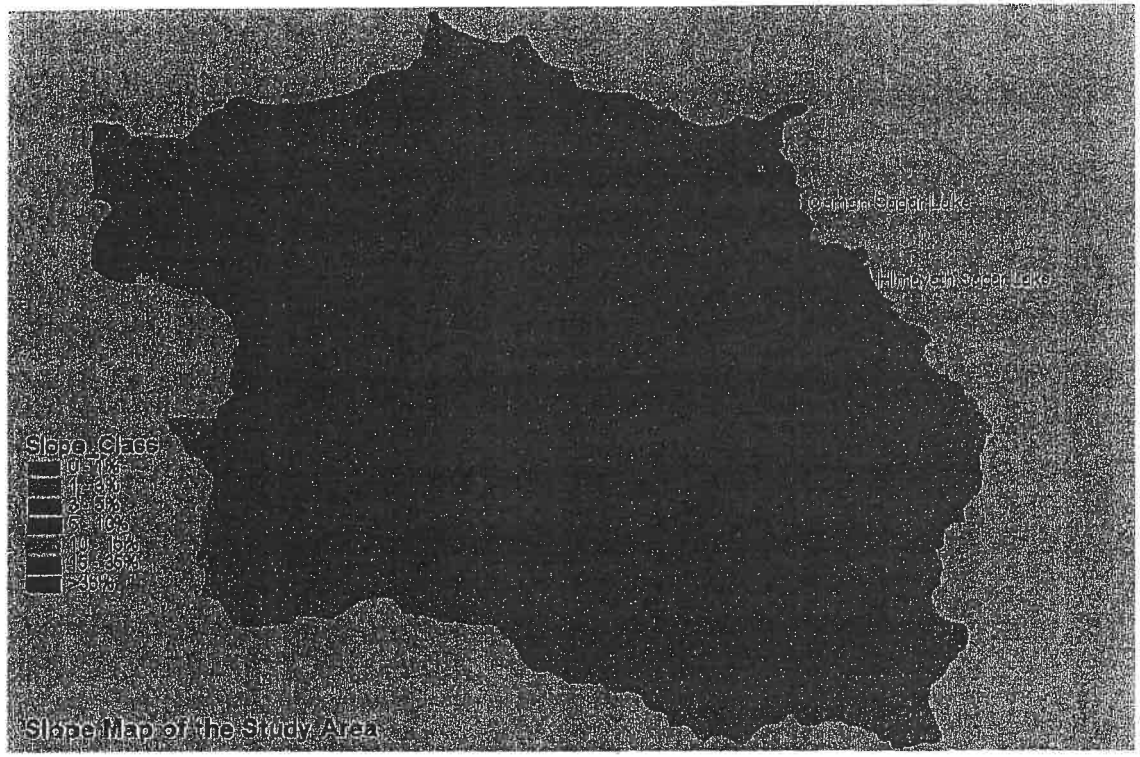


Fig 2.2 Slope map of the Study Area

366

2.1.2 Drainage Pattern in the Catchment area

The catchment of the reservoirs is part of the Musi River sub basin, a part of the major river Krishna basin. Osman Sagar is on the mainstream course of Musi river, whereas, Himayath Sagar is on the Musa a tributary to the Musi river. The River Musi rises in Ananthagiri hills near Naskel village. The stream Musa originates on the hills at Eravalli village. Figure 2.3 presents the drainage pattern in the catchment area of Himayath Sagar and Osman Sagar lakes.

Drainage pattern is dendritic i.e., irregular branching of tributary streams in many directions and at almost any angle usually at less than 90^0. Some streams take a straight line course, which are showing structural control in the area.

The drainage pattern around Himayatsagar is identified as radial where streams are diverging from a central elevation and surrounding this finds number of 1^{st} order streams i.e. drainage density is more in this area than the entire area.

The pattern of drainage in Musi catchment is typically of Trellis type where tributaries meet the main streams more or less at right angles and grading between these two extreme patterns are the sub-dendritic pattern. Drainage density is of about 0.4 km/sq.km. is observed in Shabad and Moinabad mandals and near Vikarabad it is about 0.6 – 0.8 km/sq.km.

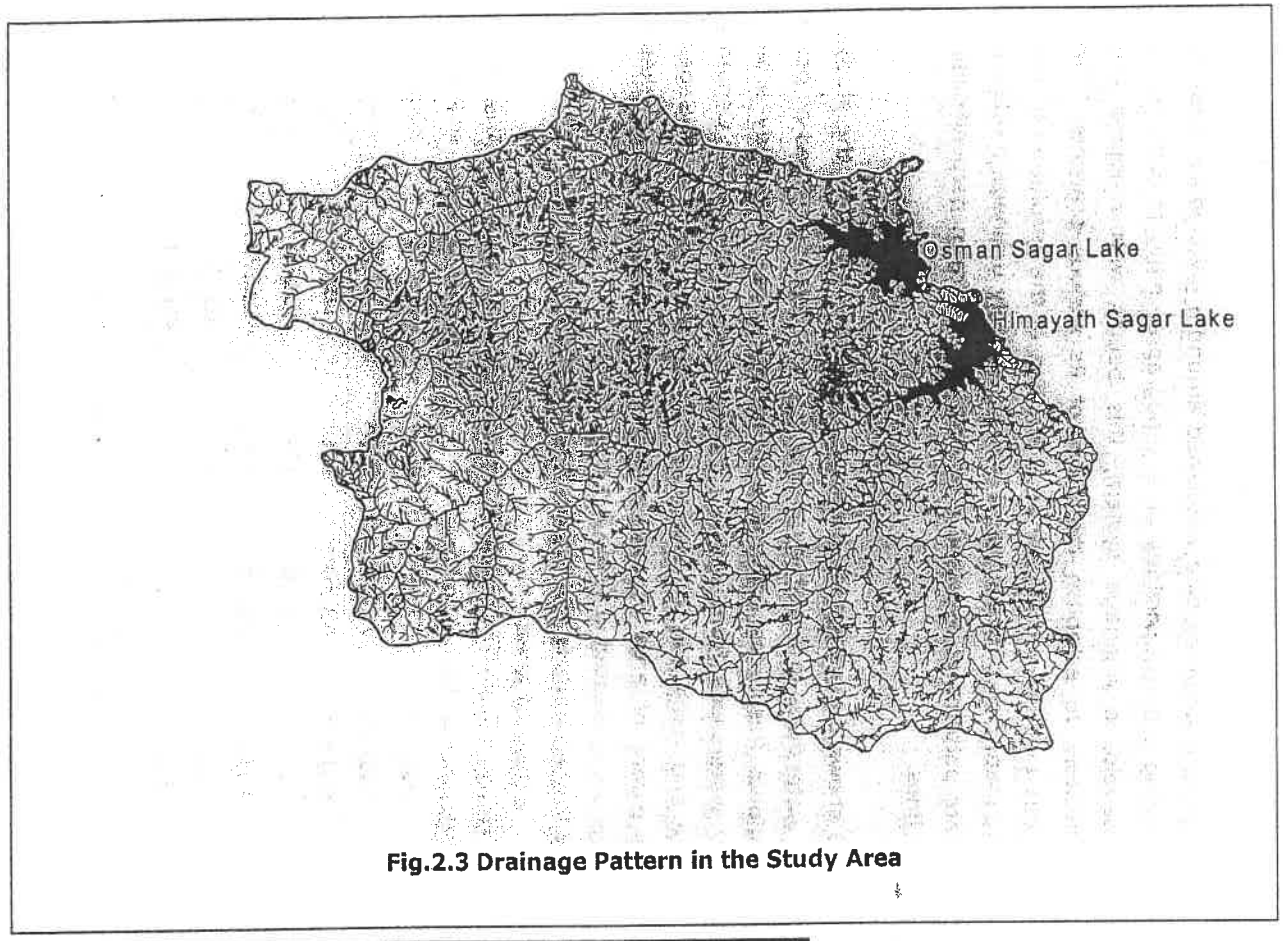


Fig.2.3 Drainage Pattern in the Study Area

2.1.3 Watershed Delineation in the Catchment area

Establishing the boundaries of a watershed around a given water body is done by finding drainage divides on a topographic map. In landscapes with well-developed drainage system, this begins with mapping the drainage network to establish the order of its various branches. The results of this exercise will largely be a function of the resolution of the topographic map. One of the simplest ways to identify drainage divides is to demarcate patterns of overland flow with arrows drawn perpendicular to contour lines.

Figure 2.5 shows the watershed boundaries and their codes of the study area. The watersheds in the study area are delineated and named as per NRIS (National Resources Information System) code. The study area having 29 watersheds from which 15 watersheds come under Osman Sagar lake and remaining 14 watersheds come under Himayath Sagar lake. The extent of area in each sub- watersheds in both the lakes catchments are presented in Table 2.4 and Table 2.5.

Table 2.4 Watersheds in Himayath Sagar Catchment and their extent of area

S.No	Osman Sagar Watershed Codes	Area in sq.km.	S.No	Osman Sagar Watershed Codes	Area in sq.km.
1	4D1E7a	57.29	9	4D1E7I	60.63
2	4D1E7b	70.87	10	4D1E7j	41.23
3	4D1E7c	43.70	11	4D1E7k	39.42
4	4D1E7d	55.50	12	4D1E7l	15.01
5	4D1E7e	25.75	13	4D1E7m	40.52
6	4D1E7f	86.28	14	4D1E7n	34.30
7	4D1E7g	68.8	15	4D1E7o	28.11
8	4D1E7h	69.09			

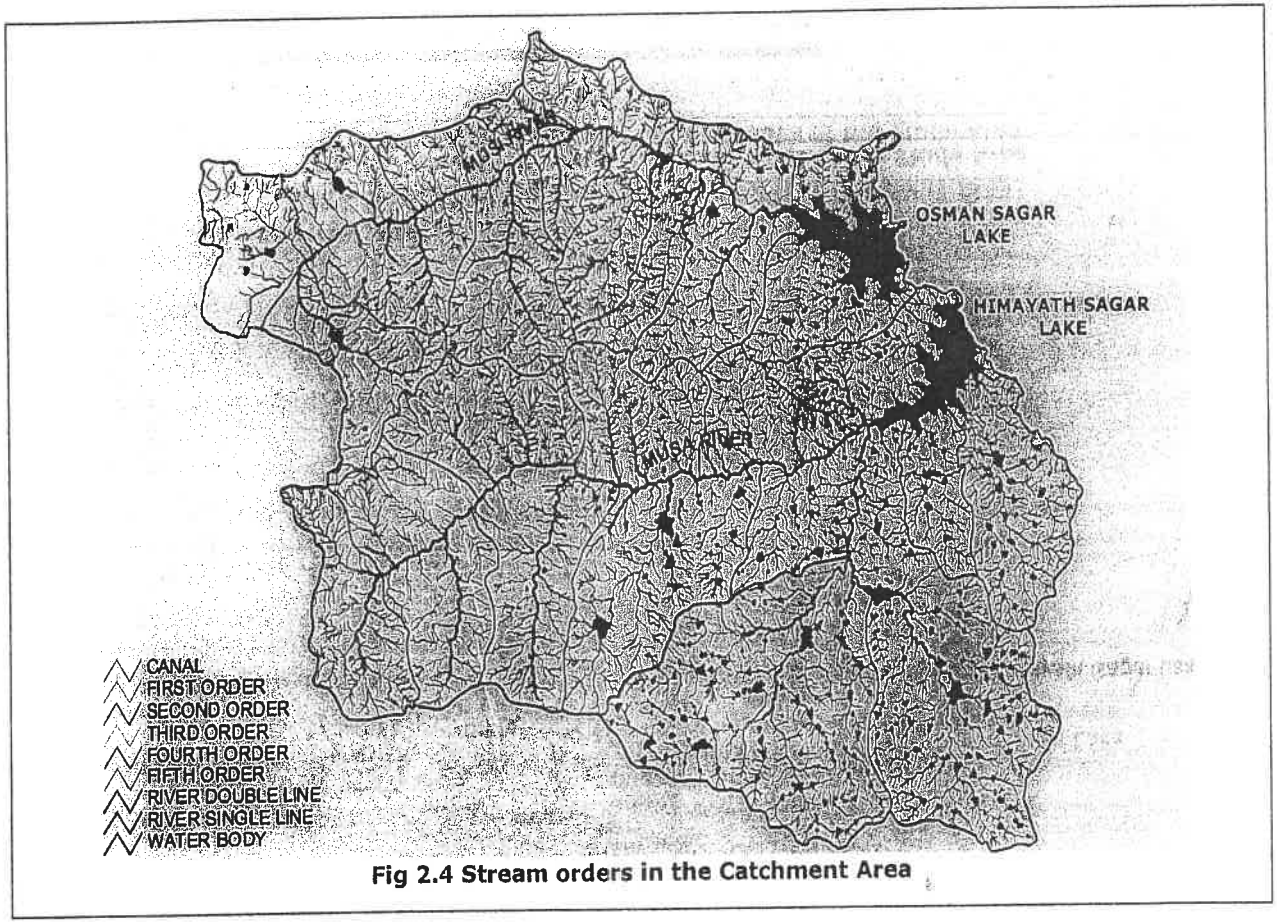


Fig 2.4 Stream orders in the Catchment Area

370

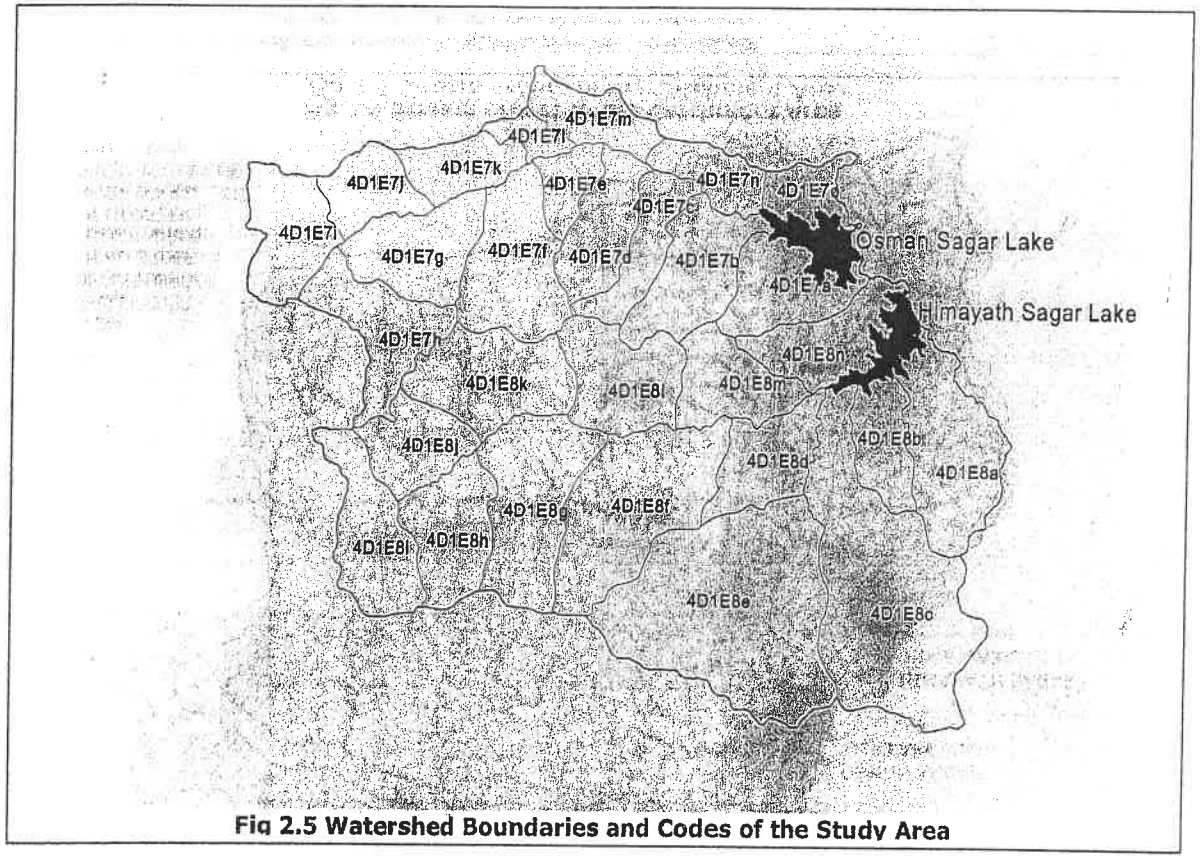


Fig 2.5 Watershed Boundaries and Codes of the Study Area

Table 2.5 Watersheds in Himayath Sagar Catchment and their extent of area

S.No	Himayath Sagar Watershed Codes	Area in sq.km	S.No	Himayath Sagar Watershed Codes	Area in sq.km.
1	4D1E8a	98.10	8	4D1E8h	66.56
2	4D1E8b	41.77	9	4D1E8i	74.01
3	4D1E8c	213.87	10	4D1E8j	50.84
4	4D1E8d	56.11	11	4D1E8k	83.78
5	4D1E8e	237.51	12	4D1E8l	72.28
6	4D1E8f	131.83	13	4D1E8m	54.48
7	4D1E8g	101.70	14	4D1E8n	56.25

2.1.4 Soils in the Catchment area

Soils contain different types of minerals and nutrients. As water flows over, it picks up some of these and carries to long distances. Thus the soils affect surface water quality and especially top 10 mm of soil layer interacts with surface runoff. Surface runoff rate varies widely with different types of soils.

Soil map showing different soil types which was prepared under National Mission for Sustainable Development Project by taking extensive soil samples and using remote sensing data was obtained from Andhra Pradesh Remote Sensing Agency, Hyderabad. The map information was brought into digital format considering the study area boundary. The different soil classes information is given as attribute information. The soil map of the study area and different soil types are presented in Figure 2.6 and in the Table 2.6.

Medium black soils cover western part. The alluvial black cotton soils are found along the stream courses and flood plains. The sedimentary balck soils are present in the upland area of basaltic terrain and the thickness of the soils varies from 45 – 90 cm. The soils are moderately alkaline with pH value ranging from 7.0 – 8.5 and are nor saline but the salt content is more than in the red soils. Clay content being high, their moisture retaining capacity too is high. Laterite soils with a thickness ranging 90 – 180 cm occur in Vikarabad mandal. The soils are highly permeable and are well drained. The soils are acidic with pH value ranging between 4.0 – 6.0.

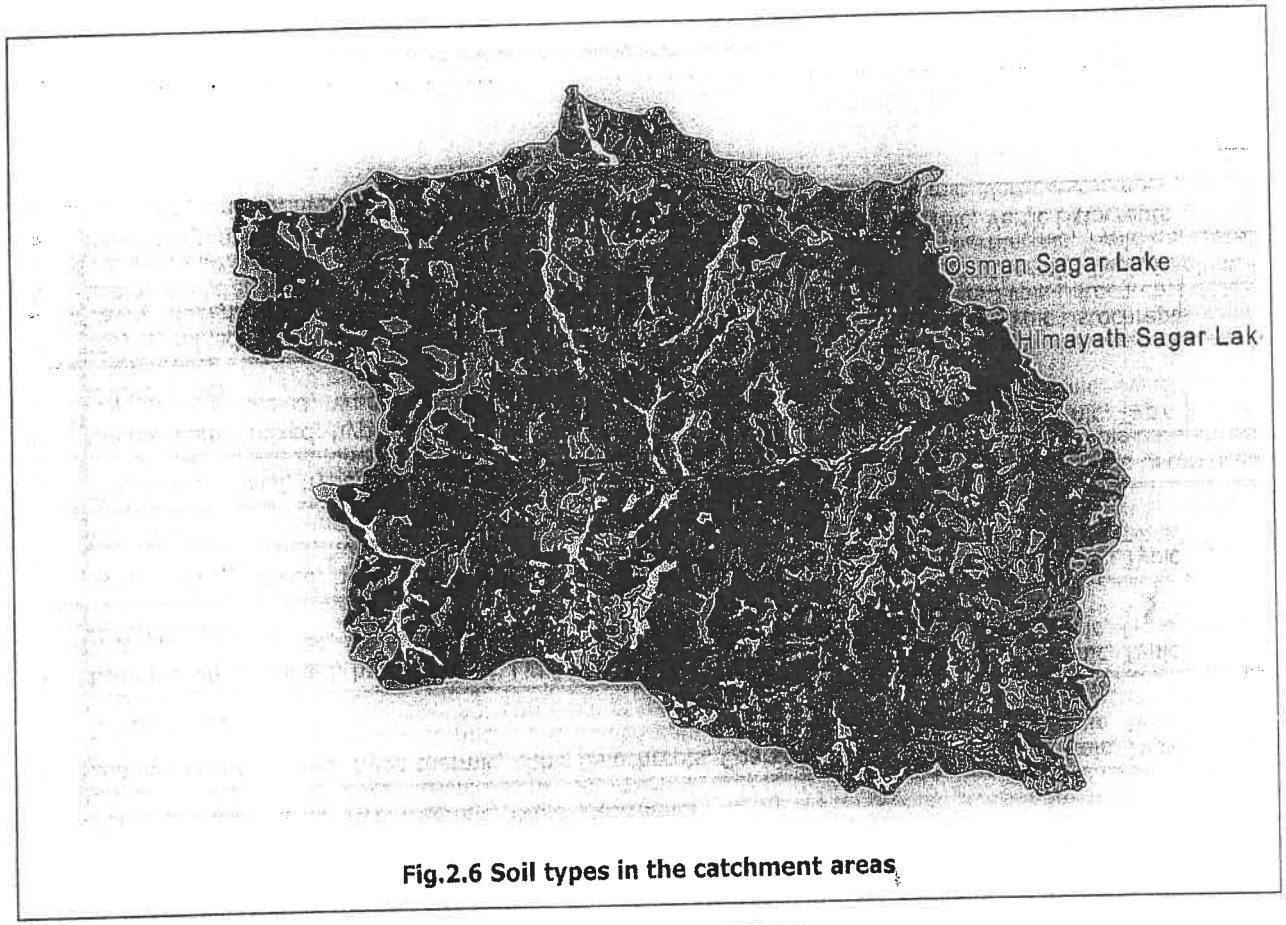


Fig.2.6 Soil types in the catchment areas

Table 2.6 Soil Types in the Study Region

Unit	Description
1	Sandy skeletal, mixed, hyperthermic, Typic Ustorthents
2	Loamy-skeletal, mixed, hyperthermic, Lithic Ustochrepts, Coarse loamy, mixed, hyperthermic, Typic Ustorchrepts
3	Loamy-skeletal, mixed, hyperthermic, Lithic Ustorthents, Coarse loamy, mixed, hyperthermic, Typic Ustorchrepts
4	Coarse loamy, mixed, hyperthermic, Lithic Ustochrepts, Loamy-skeletal, mixed, hyperthermic, Typic Ustorthents
5	Fine loamy, mixed, hyperthermic, Typic Ustochrepts, Coarse loamy, mixed, hyperthermic, Typic Ustorchrepts
6	Coarse loamy, mixed, hyperthermic, Typic Ustorthents, Loamy-skeletal, mixed, hyperthermic, Typic Ustorchrepts
7	Clayey, mixed, hyperthermic, Typic Ustochrepts, Fine loamy, mixed, hyperthermic, Typic Ustochrepts
8	Loamy-skeletal, mixed, hyperthermic, Typic Ustochrepts, Fine loamy, mixed, hyperthermic, Typic Haplustalfs
9	Fine loamy, mixed, hyperthermic, Aeric Halaquepts, Clayey, mixed, hyperthermic, Vertic Ustocrepts

375

Unit	Description
10	Clayey, mixed, hyperthermic, Typic Rhodustalts, Fine loamy, mixed, hyperthermic, Typic Haplustalfs
11	Clayey, mixed, hyperthermic, Typic Ustochrepts, Fine, mixed, hyperthrmic, Typic Haplustalfs
12	Fine, mixed, hyperthermic, Fluventic Ustrochrepts, Clayey, mixed, hyperthermic, Typic Haplustalfs
13	Clayey, mixed, hyperthermic, Typic Ustochrepts, Clayey, mixed, hyperthermic, Typic Ustochrepts
14	Clayey, mixed, hyperthermic, Typic Haplustalfs, Clayey, mixed, hyperthermic, Typic Ustochrepts
15	Fine, mixed, hyperthermic, Typic Fluvaquents, Coarse loamy, mixed, hyperthermic, Typic Ustorchrepts
16	Fine, Montmorillonitic, hyperthermic, Leptic Haplusterts
17	Fine loamy, mixed, hyperthermic, Lithic Ustorthents
18	Very fine, Montmorillonitic, hyperthermic, Typic Haplusterts, Very fine, Montmorillonitic, hyperthermic, Leptic Haplusterts
19	Very fine, Montmorillonitic, hyperthermic, Leptic Udic Haplusterts
20	Loamy-skeletal, hyperthermic, Lithic Ustorthents
21	Clayey, mixed, hyperthermic, Lithic Ustorthents
22	Clayey, mixed, hyperthermic, Lithic Ustochrepts, Clayey-skeletal, mixed, hyperthermic, Lithic Ustorthents
23	Clayey, mixed, hyperthermic, Lithic Ustorthents, Clayey-skeletal, mixed, hyperthermic, Lithic Ustochrepts

Unit	Description
24	Fine, mixed, hyperthermic, Vrtic Ustochrepts, Clayey-skeletal, mixed, hyperthermic, Lithic Ustochrepts, Fine, mixed, hyperthermic, Typic Ustochrepts
25	Fine, Montmorillonitic, hyperthermic, Typic Haplusterts, Very fine, Montmorillonitic, hyperthermic, Leptic Haplusterts, Clayey, mixed, hyperthermic,Vertic, Ustochrepts
26	Fine, Montmorillonitic, hyperthermic, Typic Haplusterts
27	Clayey, Montmorillonitic, hyperthermic, Vertic Haplaquepts, Fine, Montmorillonitic, hyperthermic, Typic Haplusterts
28	Clayey, mixed, hyperthermic, Lithic Ustorthents
29	Fine, mixed, hyperthermic, Vertic Ustifluvents, Fine, mixed, hyperthermic, Fluventic Ustochrepts
30	Loamy-skeletal, Kaolinitic hyperthermic, Lithic Ustorthents
31	Clayey-skeletal, mixed, hyperthermic, Typic Dystrochrepts
32	Clayey-skeletal, mixed, hyperthermic, Durorthidic Ustorthents, Clayey , mixed, hyperthermic, Dystric Durochrepts
33	Clayey-skeletal, mixed, hyperthermic, Durorthidic Ustorthents, Loamy-skeletal, Kaolinitic hyperthermic, Lithic Ustorthents

Unit	Description
34	Clayey, mixed, hyperthermic, Dystric Durochrepts, Clayey-skeletal, mixed, hyperthermic, Typic Ustorthents
35	Very fine, Kaolinitic, hyperthermic, Typic Durochrepts, Clayey, mixed, hyperthermic, Plinthustalfs
36	Fine, mixed, hyperthermic, Typic Haplustalfs, Clayey, mixed, hyperthermic, Vertic Ustochrepts
37	Clayey, mixed, hyperthermic, Lithic Ustochrepts
38	Clayey, mixed, hyperthermic, Lithic Ustochrepts, Clayey, mixed, hyperthermic, Lithic Ustorthents
39	Very fine, Montmorillontic, hyperthermic, Typic Haplusterts
40	Fine, Montmorillontic, hyperthermic, Typic Haplusterts, Clayey, mixed, hyperthermic, Typic Ustochrepts
41	Fine, mixed, hyperthermic, Vertic Ustifluvents
100	River/stream
101	Water Body
102	Settlements

Source: AP State Remote Sensing Application Centre, Hyderabad

2.1.5 Land Capability in the Catchment Area

Land capability classification indicates the capability of soils to produce field crops, availability of pasturage, forestry, preservation of wildlife and other sustained uses. Thirteen variables are taken to decide the capability classes. These indicators are slope, degree of erosion, hazards, danger of water flow and water logging, soil depth, soil texture, soil fertility, drainage, water holding capacity of soils, land management practices, adverse effects of salinity and physical obstacles such as roads, sands, deep gullies, ravines etc.

Land capability classification is an interpretative grouping of soil map units to show the capability of soils to produce field crops or to be put to other uses on a sustained basis. It is based on inherent soil characteristics, external land features and environmental factors that limit the use of the land. Soil suitable for agriculture is grouped under classes I to IV according to their limitations for sustained agriculture production. Soils not suitable for agriculture are grouped under classes V to VIII for use for forestry, for recreation purposes and as habitat wildlife. The land capability classes have sub classes to indicate the dominant limitations for agricultural use. Four subclasses based on limitations are recognized and denoted by "e" for problems caused by wind and water erosion, "w" for problems of drainage, wetness or overflow, "s" for soil limitations affecting plant growth, and "c" for climate limitations

Land Capability map showing different land capability classes was obtained from Andhra Pradesh Remote Sensing Agency, Hyderabad. The map information was brought into digital format considering the study area boundary. The different land capability classes information is given as attribute information. The land capability map of the study area and different land capabilities are presented in Figure 2.7.

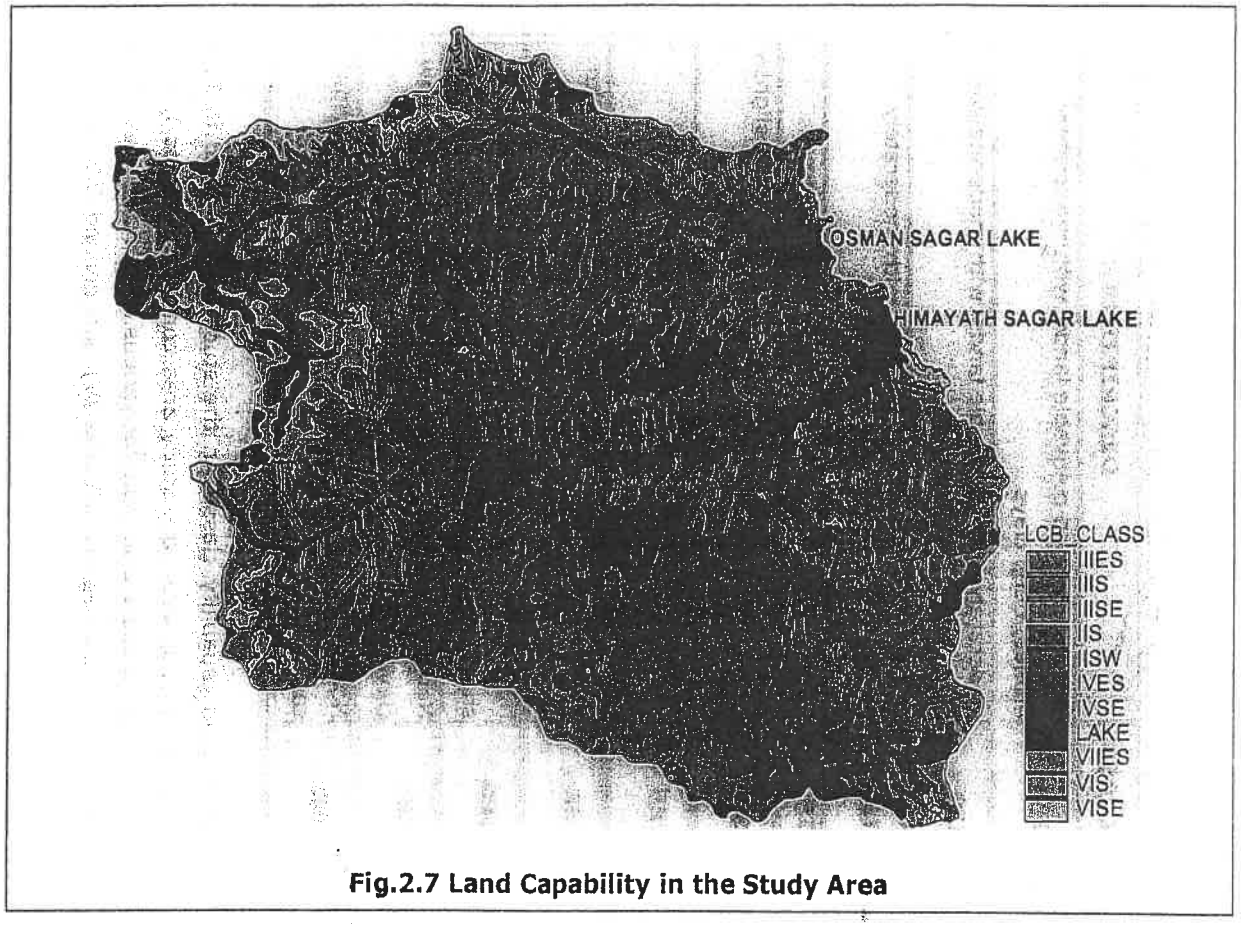


Fig.2.7 Land Capability in the Study Area

380

Table 2.7 Description of Land Capability Classes

LCB_CLASS	DESCRIPTION
IIIES	Moderately good cultivable lands, with moderately eroded, deep clays
IIIS	Moderately good cultivable lands, with moderate soil problems
IIISE	Moderately good cultivable lands, with moderately deep clays, severely eroded.
IIS	Good cultivable lands, with minor soil problems
IISW	Good cultivable lands, with clayey textures and slightly wet
IVES	Fairly good lands, suitable for limited cultivation, severely eroded, having only shallow clays
IVSE	Fairly good lands, suitable for limited cultivation, with shallow sandy loams, severely eroded
VIIES	Non-arable lands fairly well suited for grazing or shallow sandy loams
VIS	Non-arable lands, well suited for grazing, with shallow clayey soils
VISE	Non-arable lands, well suited for grazing with shallow sandy loams, severely eroded

Description of land capability classes in the study area is listed in Table 2.7. Land capability classes in the study area consist of classes II to IV indicating that these areas are suitable for various agricultural uses. These three land capability classes (II, III and IV) sub divided into four sub groups "s","es","se" and "sw") according to their limitations for sustained agricultural production. In the study area dominating land capability class

distributed giving rise to characteristic step like structure. Vesicular members are very few in occurrence. On weathering, the rocks are converted into black cotton soils, preserving the transitional spheroidal weathering phase at places. Well sections have exposed bluish coloured weathered zones at depths where the depth of weathering is as much as 15 m. Characteristic columnar jointing is also reported from the well sections. Basaltic flows attained a maximum thickness of 60 m near Chevella village. Alluvium consists of sand, silt and limited clay and it is distributed as elongated patches along stream courses. They are dark in colour, coarse grained, highly porous and permeable and mainly covered by three types of soils, i.e. coarse sandy loam, fine sandy loam and black cotton soil of which coarse sandy loam soil occupies major part of the area.

Black cotton soil is exposed towards the western part of the area. The pink granites as compared to grey granites are found to be more susceptible to weathering. Compared to granites, the gneisses are softer and found to occupy plains and valleys. The depth of weathering is seen more in the gneisses as compared to granites. A number of quartz reefs are observed criss-crossing the entire area. Pegmatite, aplite and epidote veins ranging in width from few cm to 50 cm are seen traversing the Peninsular gneissic complex throughout the area. However they were found to be concentrated around the intrusive granite and sheared zones. They do not show much control on groundwater movement.

Deccan traps are exposed on the surface are comparatively soft and break more easily and are further characterized by pores and vesicular. Non vesicular types are found at depths. They are hard, tough and compact, and are fine grained. Massive traps weather with characteristic spheroidal exfoliation giving rise to large rounded boulders on the outcrops as seen on road side of Knakamamidy village. Two basaltic flows are distinguished. Lower flow, which is hard and massive, is observed in some

is IIIse (Moderately good cultivable lands, with moderately deep clays, severely eroded). The land capability of the study area plays an important role to identify the suitable location of various water harvesting structures to be constructed to utilize water in sustainable manner.

2.1.6 Geology and Hydro-geomorphology in the Catchment Area

Over 85 % of the area is distributed with granite gneisses. The out-crops are few because of the continued denudational effect over the geological past. The gneissic granites are grey coloured, medium to coarse grained, massive to jointed and weathered extensively in aerial extent. At some places the degree of weathering is quite high thereby giving rise to saprolite through removal of felspar and generating very good secondary porosity. Saprolite extends down to 16 m at places. Joints are well developed in granites excepting in massive varieties. The sheet erosion along the horizontal joints developed through weathering produced gently sloping domes. Prolonged weathering along the joints resulted in saproletic zones, whereas along the fissure zone given rise to valleys. Spheroidal weathering is very common. The shear zones coincide with linear valleys within the massive granitic regions. In Basalts columnar joints are observed at some places. The easterly flowing Musi river and Musa river are guided by the more or less E-W trending major faults. Dolerite dykes appear to be very hard compact and poorly fractured whereas the quartiz and pegmatitic reefs are highly fractured.

Deccan traps occupy southwestern parts of the area which are dark coloured, fine grained, massive and weathered. These are resting on the Precambrian peninsular gneissic complex, the eastern fringes of the Deccan plateau. Contact between the basement granites and Deccan traps is characterized by a widespread occurrence of the red bole horizon. A flat topped mesa is observed near Chevella. The basaltic flows are horizontally

of the well sections situated south of Appareddy guda village where nearly 1 – 2 m thick hard trap occurs at 5 m below the ground level. Below this hard trap, a zone of weak weathered strata exits. Top vesicular flow is seen exposed throughout the area around Kanakamamidy village. Within this vesicular flow, the presence of secondary minerals like quartz, zeolite etc act as useful indicator for groundwater because altered type of morrum like materials indicate easy circulation of water whereas amorphous silica restricts flow of water movement. Traps on weathering are seen to give rise to black cotton soil. The weathered basalt acts as an aquifer with limited yields in shallow dug wells. Alluvium is observed to be a reasonably good aquifer.

Structural Features

Structural features mainly comprise of lithologic and structural continuities/discontinuities like lithologic contacts, bedding/layering, unconformities, faults, fractures/joints, etc. Development of permeability particularly in hard formations is mainly dependent on these structural features (Reddy, P.R, 1991 & 1987). Thus the aquifer characteristics of the rocks depend to a great extent on the orientation and density of these secondary structures.

Remote sensing helps getting a synoptic view of large areas are provided direct evidence of geological structures for understanding and mapping both on regional and local scale. Visual interpretation of Landsat imagery provides better scope for delineation of structurally weak zones which act as conduits for groundwater movement in hard rock areas. Lineaments are mapped using satellite data.

Trend of main structural features are NNE-SSW, ENE-WSW and NE-SW and alignment of bed rock exposures and also the alignment of valleys mainly follow this trend. Linear features picked up on the satellite imagery

as linear alignment of structural, lithologic, topographic, vegetational, drainage anomalies, etc are called lineaments. Remote sensing data provides significant information about structural and tectonic frame work. Particularly in hard rock areas, major faults and fractures expressed by imagery as lineaments are potentia zones for groundwater because the occurrence and movement of groundwater is mostly confined to such zones. Dominant trend of lineaments have been found to N60^{0}E. Drainage courses are controlled by these lineaments. Himayat Sagar also has major lineament trending in N30^{0}W and N60^{0}W directions. Prominent among them is Musa river near Venkatapur has taken its course along NE-SW lineament for a short distance.

The landforms identified are mesa/butte, linear ridge, residual hills, pediment – inselberg complex, shallow weathered pediplain, moderately weathered pediplain, deeply weathered pediplain, pediplain with black soil cover and flood plain. By combining the geologic and geomorphic units, hydrogeomorphological units are derived and groundwater prospects for each lithology landform unit have been defined. Narrow patch of Alluvium with 5-7 m thickness along flood plain constitute shallow aquifer suitable for ring wells / shallow tube wells. Deccan traps are classified into mesa/butte, shallow weathered pediplain and moderately weathered pediplain. Mesa/butte around Kanakamamidy village on drainage divide forms runoff zone and no scope for groundwater development in the unit. Shallow weathered pediplain occupies more area than the other landforms in Deccan trap region is not suitable for shallow aquifer development and deep bore wells may feasible in fracture zone. In Moderately weathered pediplain recharge conditions are favourable hence suitable for dug wells.

Peninsular gneiss and granite

Major part of the area is occupied by Peninsular gneiss and granite complex. The land forms identified in this region are linear ridge, residual

hill, pediment inselberg complex, shallow weathered pediplain, moderately weathered pediplain, deeply weathered pediplain and pediplain with black soil cover. A quartz reef is seen to occur as linear ridge in the northwestern part of the area Medipally. This acts as a barrier for groundwater movement and results in compartmentalization of the groundwater regime in the area. Residual hills occur along drainage divides act partly as runoff and partly as recharge areas. They are not suitable for groundwater development because of high relief and limited aerial extent. Pediment-inselberg complex comprises gently undulating plain with rock outcrops within this unit, shallow aquifers are rare due to limited thickness of weathered zone. Fracture zones are suitable for bore wells. Shallow weathered pediplain in peninsular gneissic complex where recharge conditions are moderate. Shallow aquifers and deep wells are suitable. Black soil cover is poor for recharge condition. Moderately weathered pediplain and deeply weathered pediplains occupy major part of the area (75%). In this unit, recharge conditions are good. Weathered zones form shallow aquifers suitable for dug wells and fractures passing through the area constitute deeper aquifers suitable for bore wells. In deeply weathered pediplain, the shallow bore wells of 25 – 30 m deep are feasible. Most of the existing wells in the area are located in this unit. Close spacing of wells is leading to sharp decline in water table indicating overexploitation of groundwater resource in the area.

Based on the geomorphic features associated in each lithological unit characterized by distinguishable ground water potential, different hydro-geomorphic units are identified. The map prepared on interpretation of Satellite Imagery is presented in Figure 2.8.

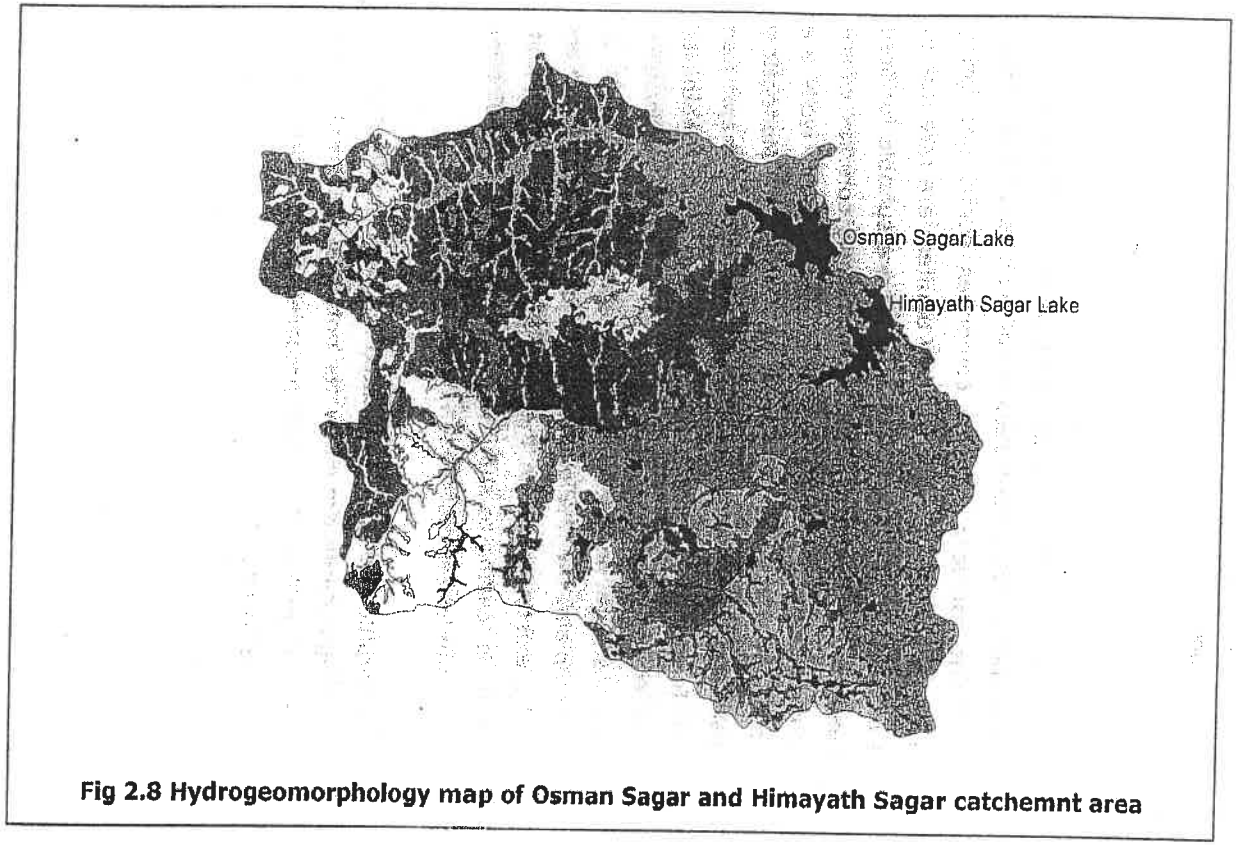


Fig 2.8 Hydrogeomorphology map of Osman Sagar and Himayath Sagar catchemnt area

387

Chapter 3

Land Use / Land Cover and Change Analysis of the Study Area during 1989 and 2004

3.1 Objective of Land Use / Land Cover and Change analysis

Water is one of the essential constituents of all animal and vegetation matter and forms about 75% of the matter of Earth's crust. Water accounts for about 70% of the mass of human body and is of utmost physiological importance. Water is essential for a multiplicity of purposes, which include drinking and other domestic uses, industrial, agricultural (Irrigation), transportation, recreation etc. Surface water is the much available and easily extractable form than ground water for these purposes.

In view of the need of this important natural resource, there are conflicts among stakeholders to use this resource. The surface run off pooled in large water bodies may serve as drinking water source for a large urban sprawl or need for the agricultural use by the farmers in the catchment. In this context, the land use and land cover in a region plays an important role to have a synoptic view of various land uses that use this natural resource.

3.2 Methodology

To carrying out the change analysis in the catchment areas, the satellite data is used. For identifying appropriate satellite data, spatial resolution

and spectral resolution plays an important role. Spatial resolution is the size of the smallest object that can be discriminated by the sensor of the satellite. In fact, area coverage and resolution are interdependent and these two factors determine the scale of imagery. In case of spectral resolution, the information is collected by satellite sensors in multi-band or multi spectral i.e. individual images have been separately recorded in discrete spectral bands. The position in the spectrum, width and number of spectral bands will determine the degree to which individual targets can be determined on the multi spectral image. The use of multispectral imagery can lead to a higher degree of discriminating power than any single band taken on its own and facilitates in identifying various surface features.

Keeping this view and the study objects, the land use & land cover map is prepared using the false colour composite (FCC) of Indian Remote Sensing Resourcesat I-P6, LISS III whose acquisition period is November' 2004 and as well as Landsat whose acquisition period is November, 1989. The later one was selected considering that the first regulation of Government of Andhra Pradesh came in year 1989. The details of the satellite and sensor and period of acquisition are tabulated in Table 3.1

Table 3.1 Satellite Data used for the Change Analysis

Satellite / sensor	Year	Path / Row
IRS P6 – LISS III	2004	99/60 and 100 / 60
Landsat Data	1989	143/47 and 143/48, 144/47 and 144/48, 145/47 and 145/48

Pre processing of data

The satellite data is geometrically corrected with respect to Survey of India toposheets. To carry out the same, ground control points (GCPs) were identified on the maps and raw satellite data. The coefficients for two co-ordinate transformation equations were computed based on polynomial regression between GCPs on map and satellite data. Alternate GCPs were generated till the r.m.s error was less than 0.5 pixel and then both the images were co-registered. The geo-rectified satellite data was presented in Figures 3.1. and 3.2 covering 1989 and 2004 periods respectively.

3.3 Land use and Land Cover Classification

Based on the scale and the satellite resolution the Land Use & Land Cover classification can be made in two levels, which are listed in Table 3.2. Since the satellite data is of IRS P6, which is having 24 m resolution, level II classification is adopted while carrying out the analysis.

The land use & Land Cover in the study area in **November 1989** is depicted in Figure 3.3. The area calculations of land use/land cover are Built up land of 4645.45 Hectares or 2.19 %, Agricultural land 134658.66 Hectares or 63.50 %, Forest area (including Dense forest / Scrub forest) 3777.98 Hectares or 1.78 % and Dry river/ Dry tank of 4875.21 or 2.30%. The areas of various land use & land cover classes pertaining to the study area are given in Table 3.3.

Table 3.2 Land Use/Land Cover classes in respective levels

	LEVEL I	LEVEL II
1.0	Built up land	1.1 Settlement
		1.2 Industry
		1.3 Vacant land
2.0	Agricultural land	2.1 Double crop
		2.2 Single crop
		2.3 Fallow land
		2.4 Agricultural plantations
		2.5 Aqua culture poncs
3.0	Forest	3.1 Deciduous forest
		3.2 Degraded forest
		3.3 Forest plantations
4.0	Waste land	4.1 Land with/without scrub
		4.2 Sands (Coastal / Riverine)
		4.3 Marshy / Swampy area
5.0	Water bodies	5.1 Sea
		5.2 River/Stream
		5.3 Tank/Reservoir/Lake/Canal
6.0	Others	6.1 Salt pans
		6.2 Quarry/Mining Areas

The land use/Land Cover in the study area in **November 2004** is depicted in Figure 3.3 The area calculations of land use/land cover are Built up land of 5288.77 Hectares (2.49%), Agricultural lard 145705.88 Hectares (68.71%), Forest area (including Dense forest / Scrub forest of 3782.76 Hectares (1.78%) and Dry river/ Dry tank of 7668.46 Hectares

(3.62%). The areas of various land use/land cover classes pertaining to the study area are given in Table 3.4.

Table 3.3 Areas of Landuse/Land cover classes in the study area during November1989

Land Use/Land Cover Category	Area in Ha.	% to Study area
Agricultural Plantations	9041	4.26
Barren rocky/Stony waste/Sheet rock area	5453	2.57
Dense forest	657	0.31
Double crop	25305	11.93
Dry River	2122	1.00
Dry Tank	2753	1.30
Fallow lands	463	0.22
Forest plantations	1018	0.48
Gullied lands	658	0.31
Land with/without scrubs	41353	19.50
Major settlements	803	0.38
Mining areas	36	0.02
Other settlements	3842	1.81
Scrub forest	3121	1.47
Single crop	109354	51.57
Tank with water	6081	2.87

Table 3.4 Areas of Landuse/Land cover classes in the study area during November 2004

Land Use/Land Cover Category	Area in Ha.	% to Study area
Agricultural Plantations	9895	4.67
Barren rocky/Stony waste/Sheet rock area	5327	2.51
Dense forest	659	0.31
Double crop	27122	12.79
Dry River	2108	1.00
Dry Tank	5561	2.62
Fallow lands	481	0.23
Forest plantations	1018	0.48
Gullied lands	658	0.31
Land with/without scrubs	30120	14.20
Major settlements	1322	0.62
Mining areas	36	0.02
Other settlements	3967	1.87
Scrub forest	3123	1.47
Single crop	118584	55.92
Tank with water	2079	0.98

Table 3.5 presents the change of land use and land cover from 1989 to 2004. From the table, it is evident that agricultural plantations were increased by 10% whereas barren rocky area was reduced by 3%. Regarding crop areas, the single crop area is increased by 10% whereas there is minor change in case of double-cropped area. Significantly the area covered by the waste lands and shrubs, which facilitates higher

surface runoff, is reduced by 15% which has caused depletion of tanks by 8%.

Table 3.5 Change analysis in the study area (1989 to 2004)

Land Use/Land Cover Category	Extent of area in 1989 (in Ha.)	Extent of area in 2004 (in Ha.)	Changes in the study area (in Ha)	% change over 1989
Agricultural - Plantations	9041	9895	854	9.45
Barren rocky/Stony-waste/Sheet rock - area	5453	5327	126	-2.31
Dense forest	657	659	-	-
Double crop	25305	27122	1817	7.18
Dry River	2122	2108	14	0.68
Dry Tank	2753	5561	2808	101.97
Fallow lands	463	481	18	3.78
Forest plantations	1018	1018	-	-
Gullied lands	658	658	-	-
Land with/without - scrubs	41353	30120	11233	-27.16
Major settlements	803	1322	518	64.54
Mining areas	36	36	-	-
Other settlements	3842	3967	125	3.25
Scrub forest	3121	3123	-	-
Single crop	109354	118584	9230	8.44
Tank with water	6081	2079	4002	-65.82

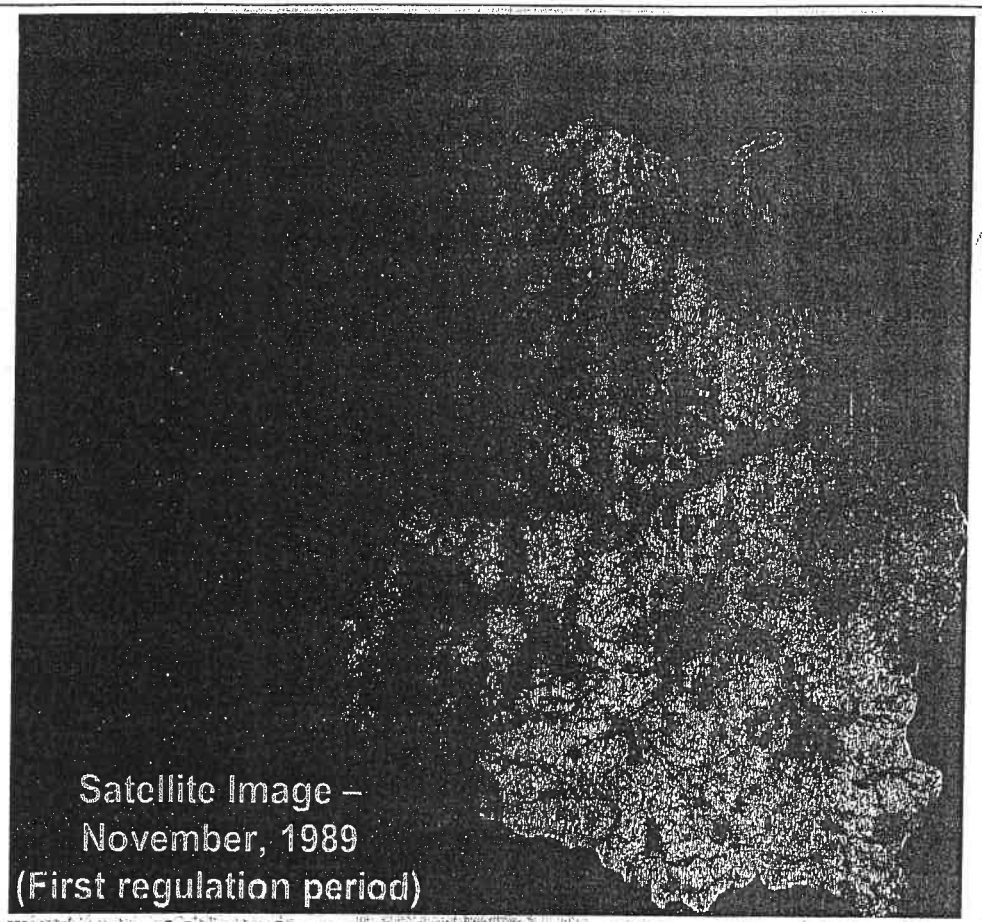


Fig.3.1 Satellite Image of Osman Sagar and Himayath Sagar Catchment areas during November, 1989

395

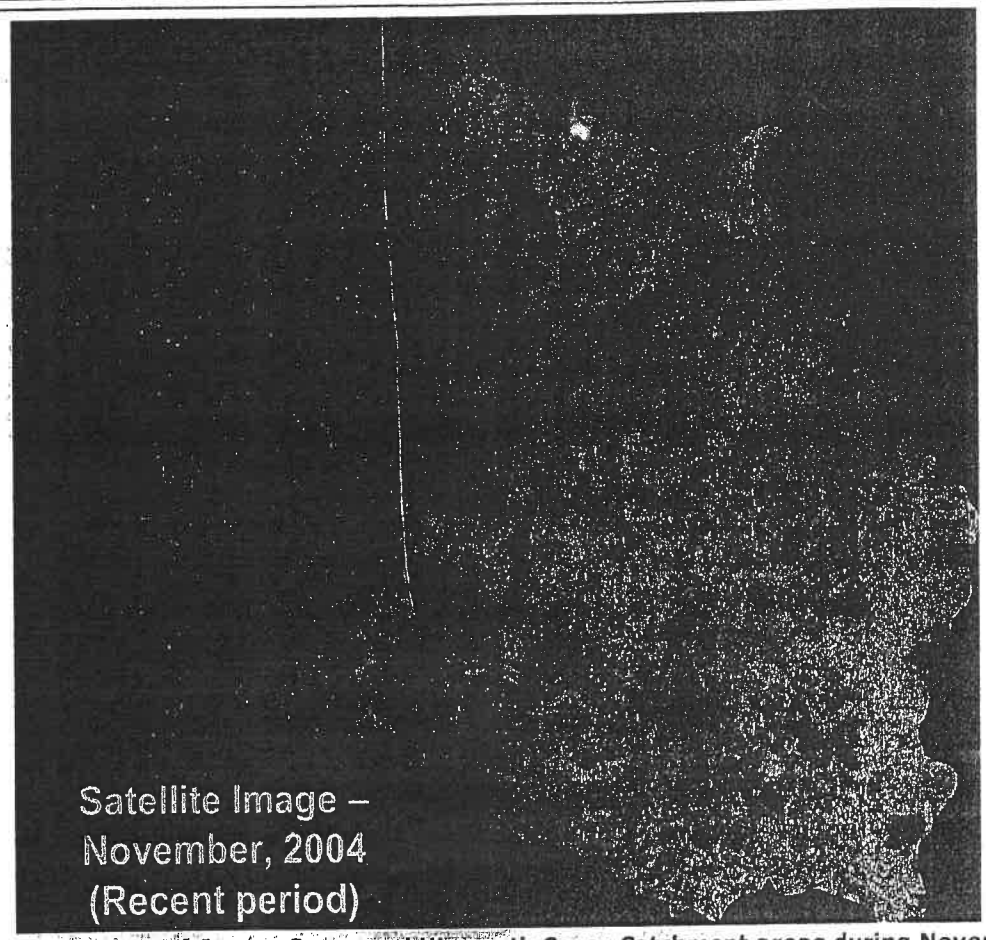


Fig.3.2 Satellite Image of Osman Sagar and Himayath Sagar Catchment areas during November, 2004

396

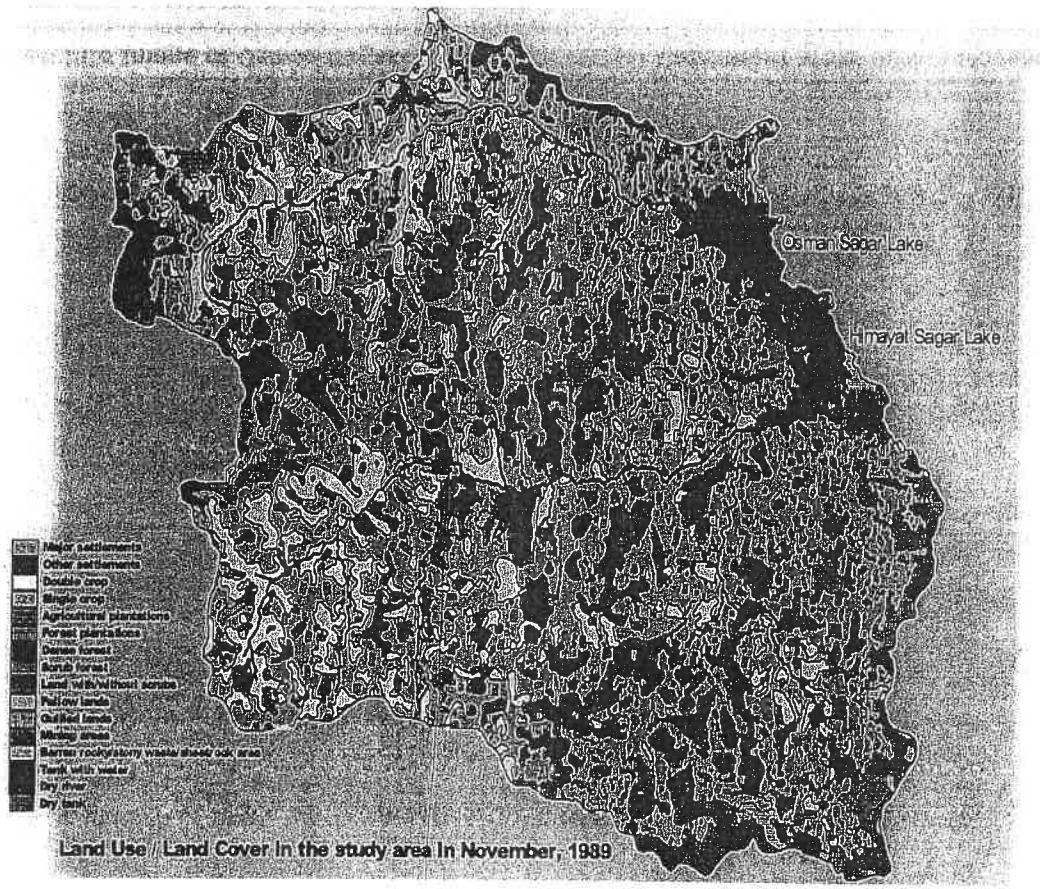


Fig 3.3 Land use/ Land cover in the study area during November, 1989

397

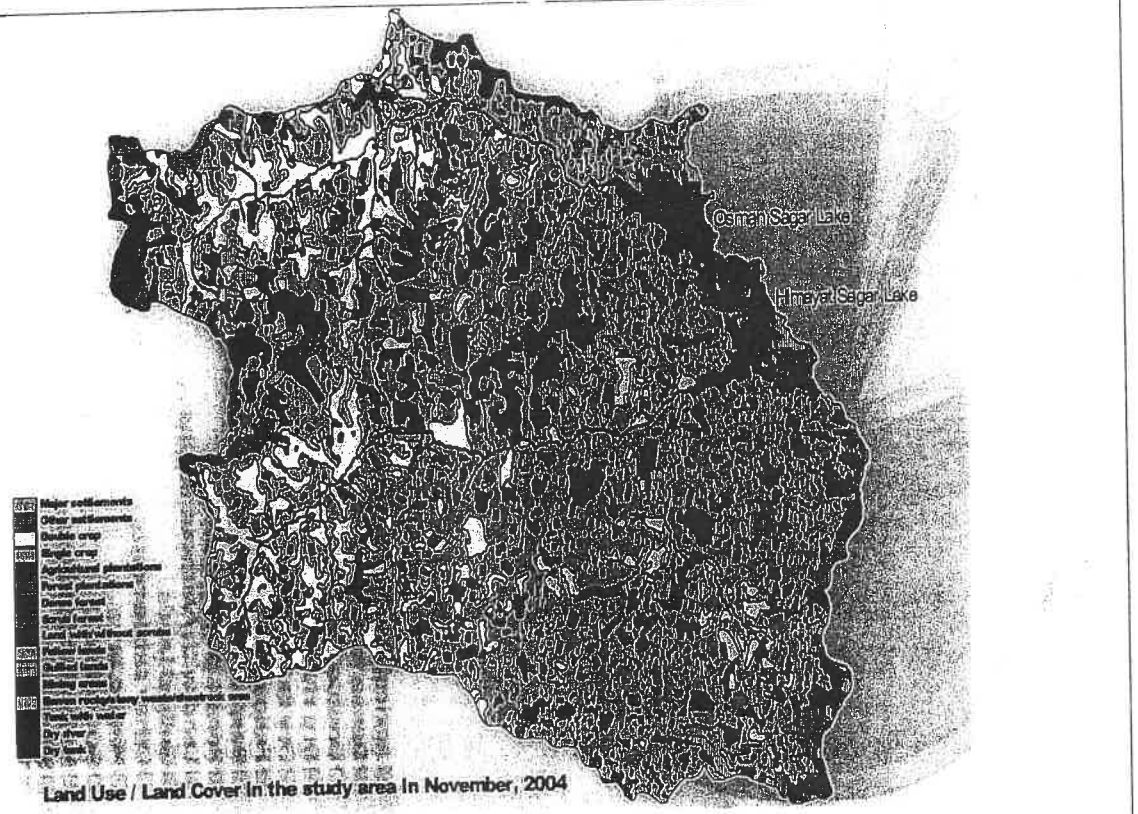


Fig 3.4 Land use / Land cover in the study area during November, 2004

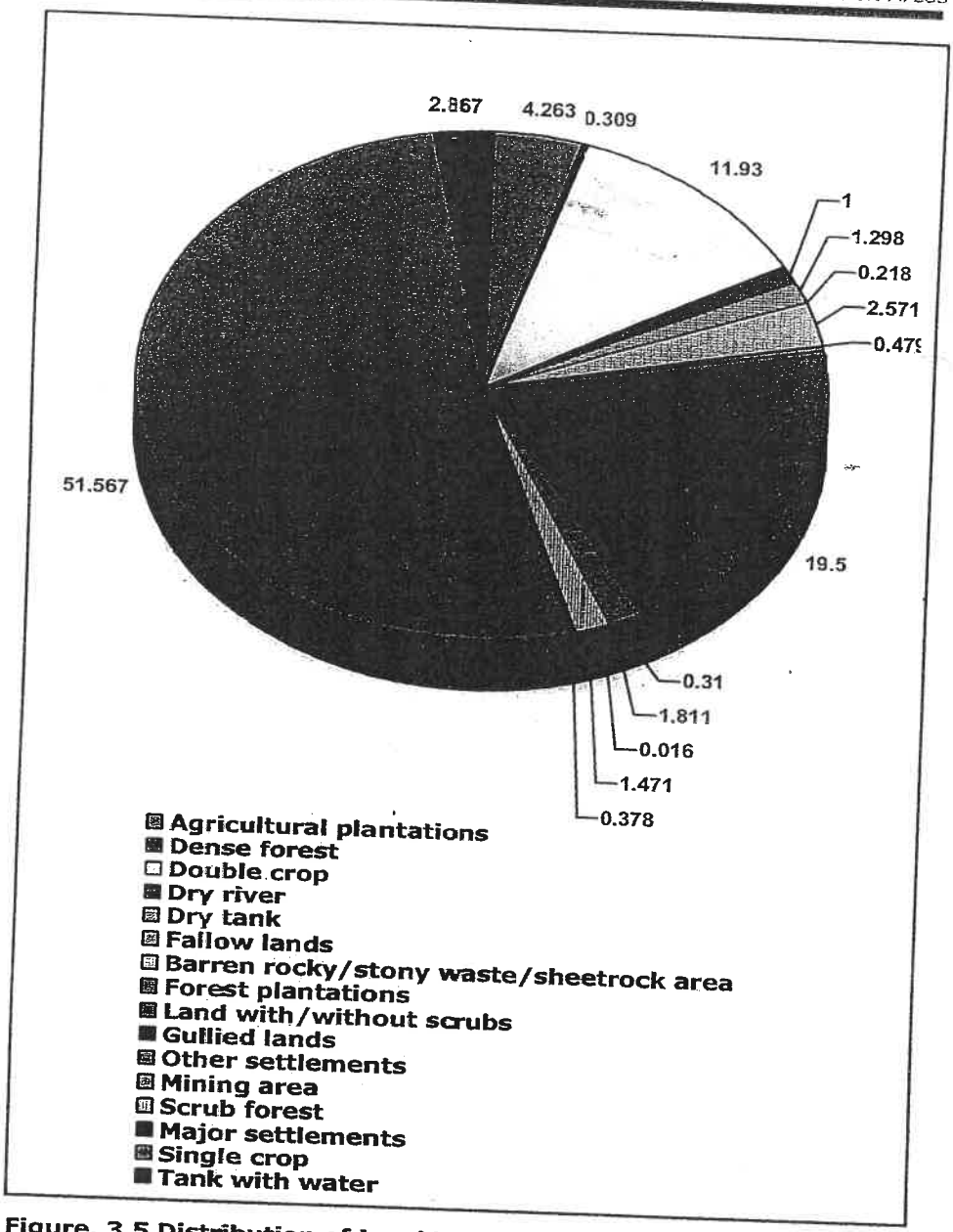


Figure. 3.5 Distribution of Land Use / Land Cover in the study area during November, 1989

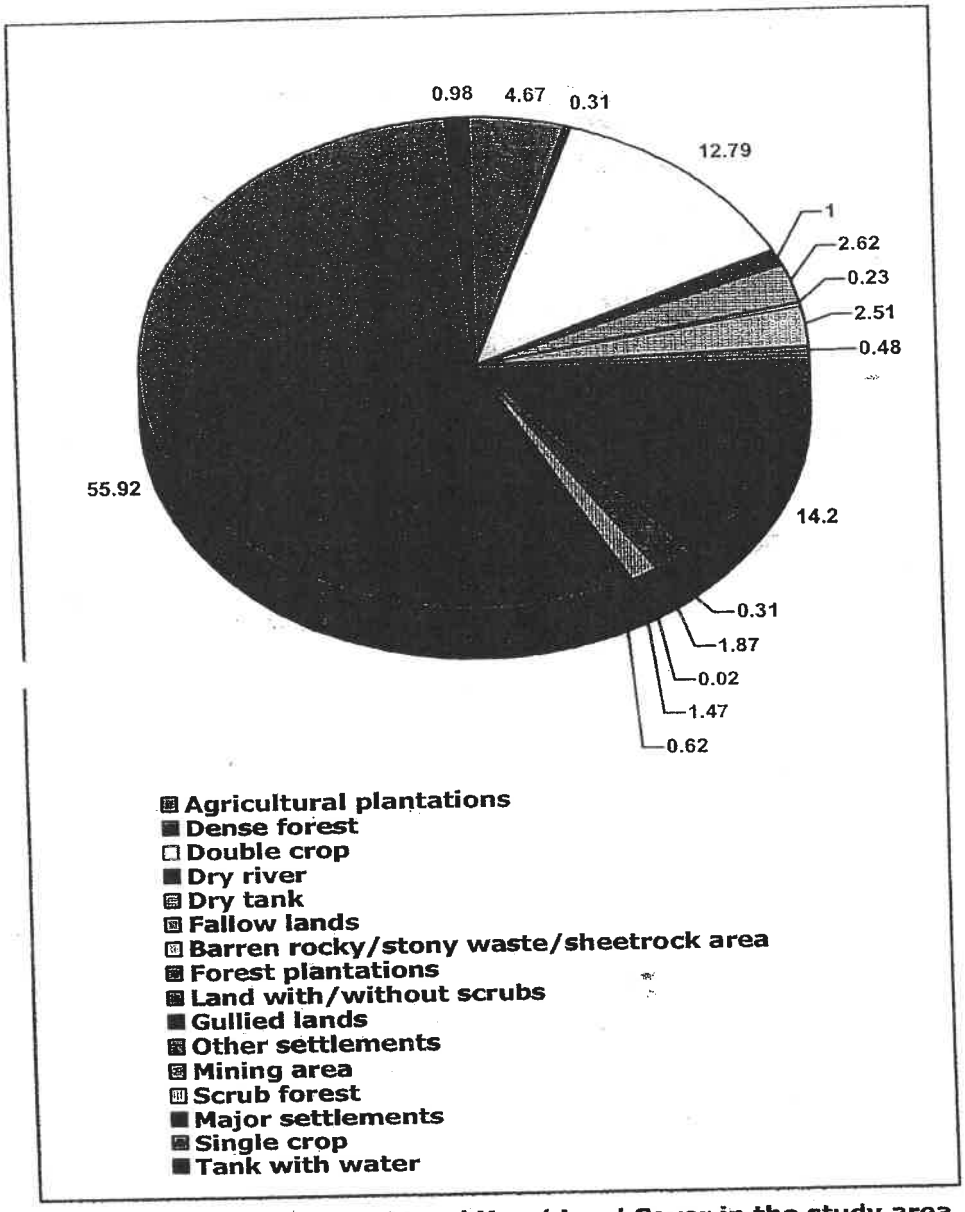


Figure. 3.6 Distribution of Land Use / Land Cover in the study area during November, 2004

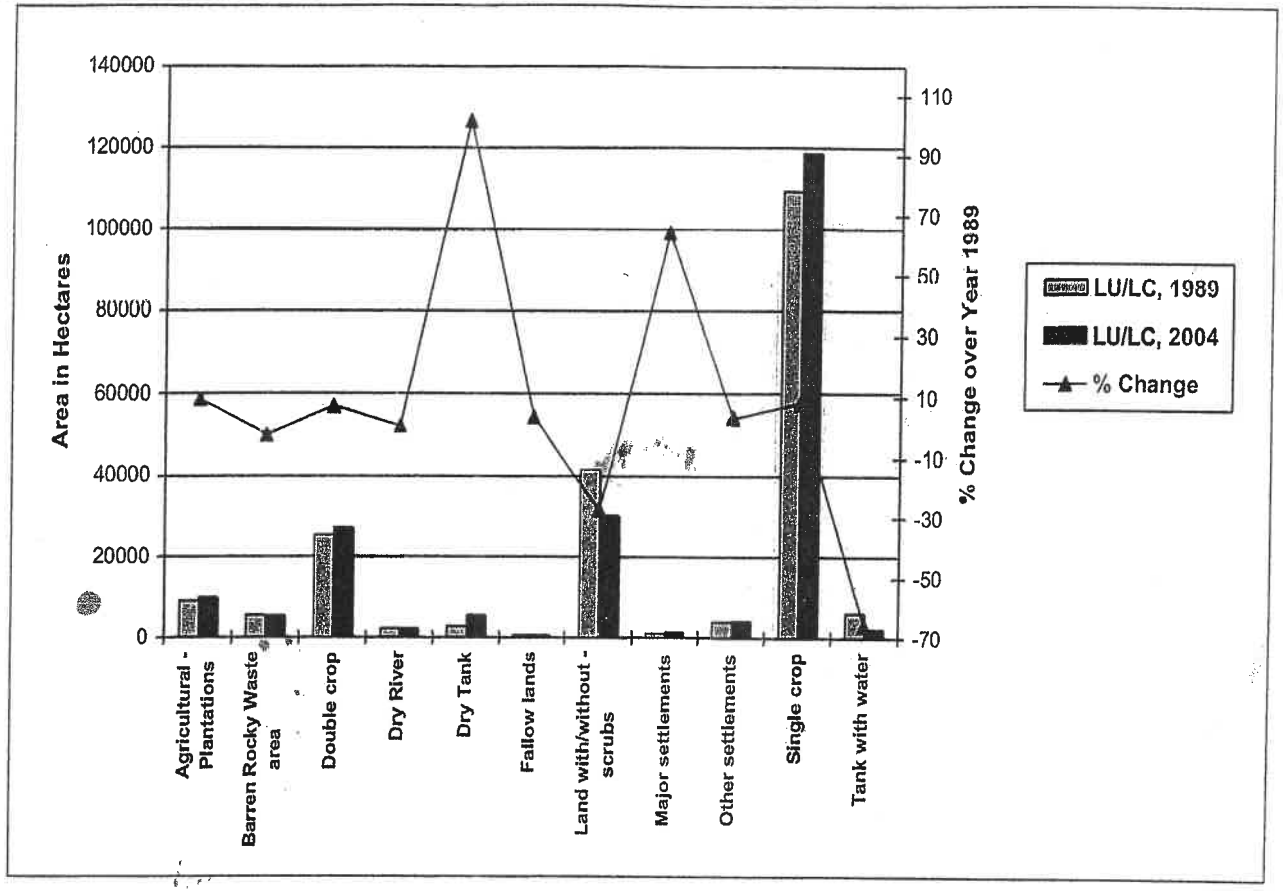


Figure. 3.7 Changes in the Land Use & Land Cover from 1989 to 2004

Chapter 4

Assessment of Feasibility for New Water Harvesting Structures

4.1 Objective of this study component

One of the important terms and reference of Municipal Administration & Urban Development Department, Government of Andhra Pradesh is examine the following components:

(a) Consideration of the restrictions imposed by G.O. Ms. No 111 M.A. dated 08.03.1996 read along with the judgment delivered by Hon'ble Supreme Court of India in Civil Appeal Nos. 368 to 371/99 in the case of A.P. Pollution Control Board vs. Prof. M.V. Naidu (Retd) and others and operation thereof with regard to sub-clause 3 of G.O. Ms. No 111 M.A. dated 08.03.1996, with regard to the direction *"not to take up any building work / check dams / lift irrigation works / storage reservoirs across vagus flowing in the catchment areas"*.

(b) To consider the relevant hydrological data and ground water data in the catchment areas with a view to finding out whether any relaxation can be made without affecting the ecological balance in the reservoirs of Himayath Sagar and Osman Sagar, with regard to permitting check dams / bore wells etc.,

To meet the objective, the study was undertaken by considering the various issues related to both surface and ground water regimes in the catchment areas of the two lakes since the they are integral parts of the total hydrological system.

4.2 Hydrological aspects of Osman Sagar & Himayath Sagar Lakes

Osman Sagar Lake has formed on Musi River, a 6th order stream whereas Himayath Sagar has been formed on Musa River, a 5th order stream. Musi and Musa rivers are known to be a perennial stream in the past during normal rainfall years under natural groundwater conditions. However it has become ephemeral as a result of vagaries of monsoons, recurrence of droughts and ever increasing groundwater withdrawals along the banks of the valley system. Generally the intermittent streams in granitic terrain flow for much longer period during the year than those of equal length and size in basaltic areas because of the nature of joints and fracture planes, which are less in them than that of the former. Peak flows could occur just after intense rainfall and during post-monsoon season. Small streams in headwater areas of basaltic terrain are ephemeral for most of the year. Many springs arise along the contact zone of basalt-granite. Below this stratigraphic contact zone, intermittent streams have been observed. In headwater areas in gneissic terrain, streams rise from seepages and gain runoff downstream. The gneissic terrain is dotted with several tanks along the stream courses.

The monsoon was above normal in 1995 and 1996 in Ranga Reddy and Medak districts-covering the catchment areas of these two main reservoirs. For the first time in five years, Osman Sagar reservoir received full inflows and surplus with a full storage of 3.726 TMC on 2nd October, 1996. Himayath Sagar recorded a maximum storage of 2.245 TMC against its capacity of 2.96 TMC on 28th November, 1995(Source: HMWSSB Annual report,1997). Rainfall in Hyderabad, Ranga Reddy and Medak district was 1056, 924 and 996 mm respectively during the said period, well over normal rainfall of 845, 812 and 959 mm respectively. After a

lean period commencing from the monsoon of 1992, the water shortage faced by the twin cities finally eased during this period.

Frequency of drought and excess rainfall analysis of 23 years rainfall data from Chevella rain gauge station and Hyderabad meteorological station during 1974-75 to 1996-97 and 11 years of rainfall data from Moinabad rain gauge station during 1986-87 to 1996-97 was analyzed by Mohanrao (1997). Average rainfall recorded at Gundipet for 1901 – 1950 is 798 mm and the average annual rainfall during 1932-89 is 800.52 mm. Average rainfall at Chevella, Janwada and Gundipet is 751.71 mm. Most severe droughts have occurred during 1918, 1972, 1977 and 1987 and 2003, 2004. Minimum daily rainfall recorded at Gundipet is 218 mm (1977). Maximum annual rainfall recorded at Gundipet is 1412 mm (1978). The annual rainfall pattern in Ranga Reddy district is presented in Table 4.1.

Table 4.1 Annual rainfall pattern in Ranga Reddy district

Location	Annual	SW	NR	Years	Max	Year	Min	Year
Rajendranagar	838	578	202	8	2010	1995	366	1988
Shamshabad	788	571	169	16	1936	1995	434	1986
Chevella	777	557	135	25	1626	1995	399	1971
Shabad	710	562	103	15	1063	1983	428	1992
Moinabad	875	632	165	10	1849	1995	319	1986
Shankerpally	85	623	145	10	1407	1995	109	1985
Vikarabad	976	737	142	25	1544	1978	640	1971
Navabpet	924	666	180	10	526.4	1995	743.9	1991
Poodur	970	751	169	10	1462	1995	743	1991

4.2.1 Ground Water Conditions

Earlier the CGWB has drilled 40 exploratory wells, 8 of them are in Basalts and remaining fall in granitic terrain during 1970. Lithologs indicate that thickness of Deccan traps are between 30 –77 m. Weathered vesicular fractured and massive traps are normally encountered successively. The maximum thickness of weathered zone is 18 m. In granitic terrain the exploratory drilling down to 164 m has indicated that in general the weathered zone is followed by massive granite with occasional fractured zones of limited thickness. In hard rock areas, the occurrence and movement of groundwater mainly depend on the secondary porosity and permeability resulting from faults, fractures, joints etc. and associated weathering. The depth of weathering and nature of weathered material depend upon the landform conditions. The weathered zones act as storage reservoirs for holding groundwater, whereas the fractures below them circulate the groundwater by acting as conduits.

The catchment areas comprise predominantly two hydrogeologic environments (i) Granitic terrain and (ii) Lateritic – Basaltic terrain. In granitic terrain, groundwater occurs in inter-granular pore spaces of unconsolidated weathered material and in the porous secondary structures (mostly sheet fractures) under semi-confined conditions. The average depth to water level ranges from 10-20 m in recharge areas (uplands) and from ground level to about 3 m in valley bottoms. The recharge areas constitute about 70 per cent of the drainage basin in granitic terrain. The productive aquifers in granitic terrain are met at depth of 15 to 50 m below land surface, depending on topography.

Various studies presenting about the contribution to the ground water from rainfall are reviewed. Rangarao computed average infiltration rate of 15.9% in granitic terrain of Musi catchment in Nalgonda district. Canadian Assisted Ground Water Project of CGWB findings indicates recharge rate of

15- 20% of rainfall. Narasimha Reddy et al 1989 computed recharge in the granties around Hyderabad as 120 mm (15% of rainfall). The recharge rate from rainfall to the ground water in Granite formation is presented in table 4.2

Table 4.2 Ground Water Recharge Percentage in Granites from annual rainfall

Morphological Feature	Slope	Soils	% Recharge
Pediment –Inselberg complex slope	5-20%	coarse sandy loam	0.08
Shallow weathered pediplain	2-10%	sandy loam	0.12
Moderately weathered	2-10%	Sandy loam	0.15
Deeply weathered pediplain	2-10%	Fine sandy loam	0.2
Pediplain with black soil	2-10%	fine clay loam	0.1

4.3 Field Studies

Field investigations were undertaken in the both the catchments of the two lakes to collect information influencing the hydrological regime both surface and ground water. EPTRI and NRGRI team had conducted extensive surveys in this regard and contacted number agencies as well to obtain the secondary data available with them.

4.3.1 Surface Water

During the study period, i.e. both post -monsoon (during September to December 2004) and pre-monsoon (during March to June 2005) there are no flows into the lakes. The Himayath Sagar Lake was totally dry during the post-monsoon period.

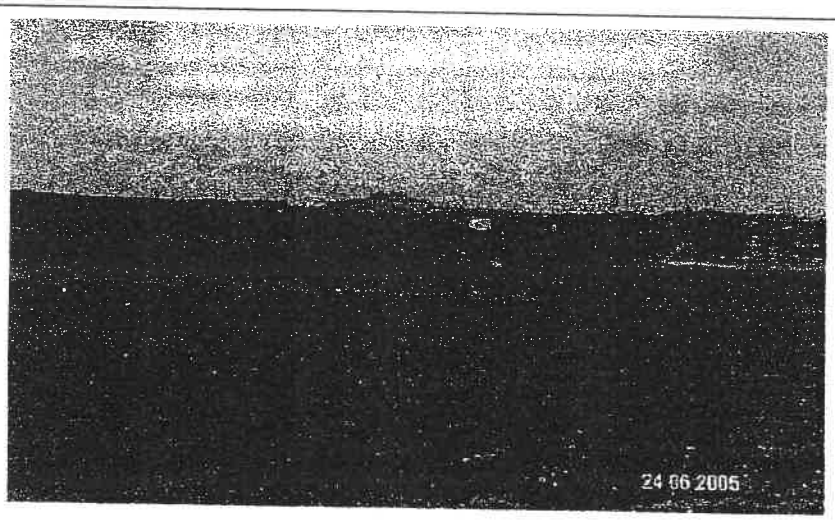


Fig.4.1 Himayath Sagar lake during pre-monsoon

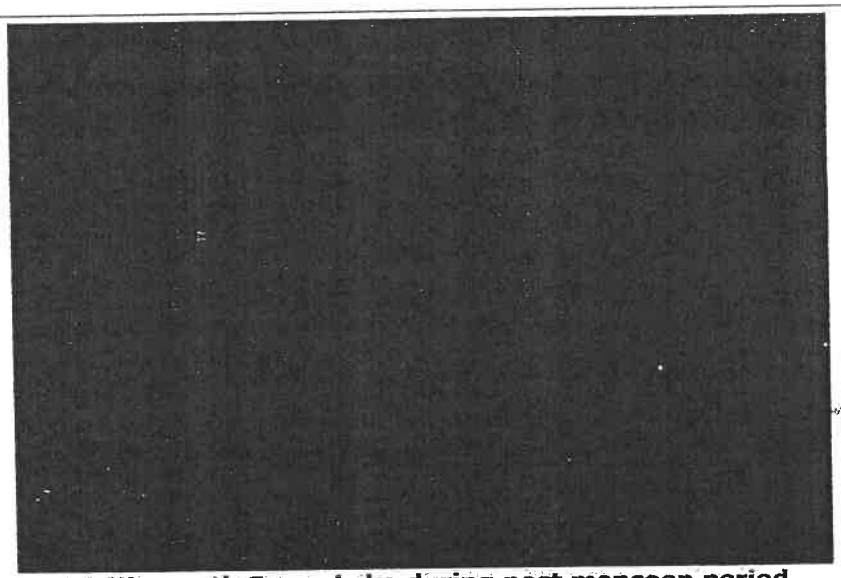


Fig. 4.2 Himayath Sagar Lake during post monsoon period, November, 2004

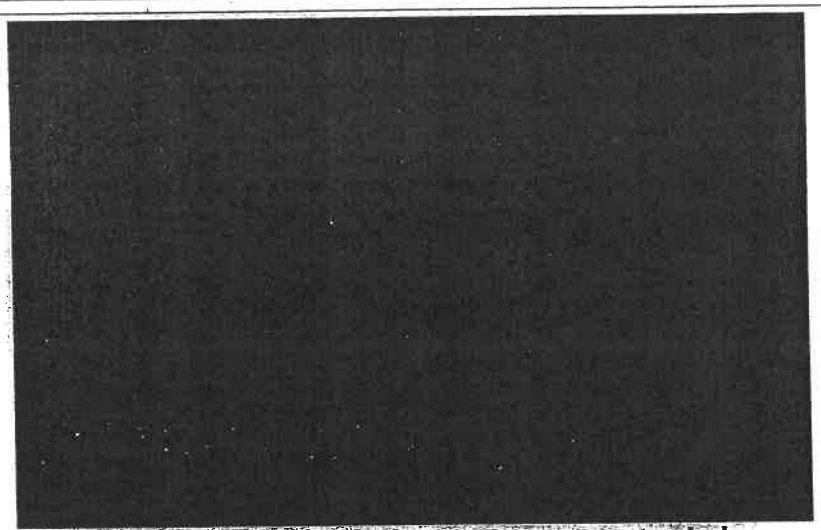


Fig. 4.3 Osman Sagar Lake during post monsoon period, September, 2004

Surface water in Osman Sagar Lake was available upto March, 2005 which facilitated HMWSSB to draw limited water by gravity for drinking water needs of Hyderabad.

In view of this, water samples were collected from the two lakes considering the water spread during the study period. The sampling locations were identified considering the activities on the shore that contribute to any discharges, lake depth and lake inflow areas. Representative water samples were collected from both the reservoirs, Osman Sagar and Himayath Sagar and analysis was carried out at EPTRI laboratory. The test results of water samples collected from Osman Sagar and Himayath Sagar lakes are presented in Table 4.3 and Table 4.4. The sampling locations in Osman Sagar Lake are presented in Figure 4.5. In case of Himayath Sagar, the samples were collected near the intake point and in the middle of the lake with meagre water.

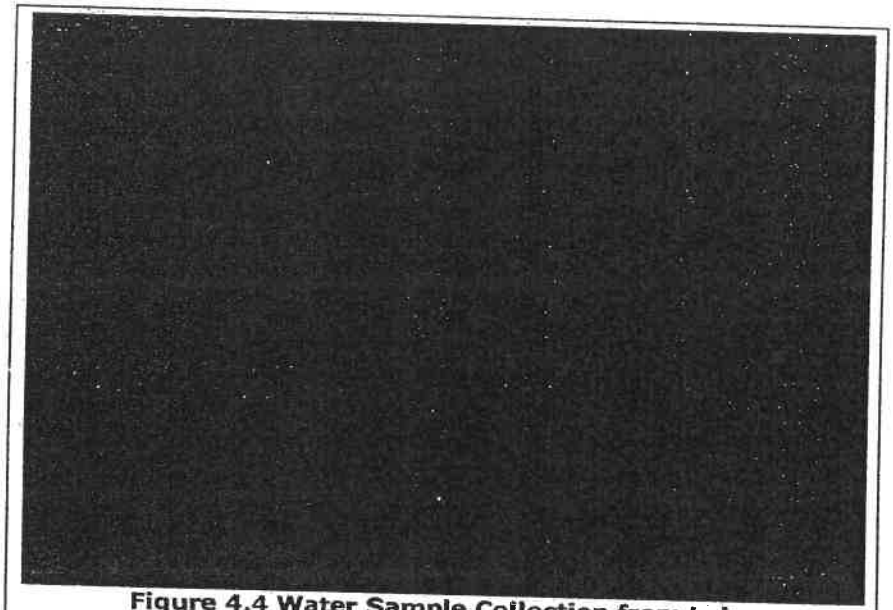


Figure 4.4 Water Sample Collection from Lake

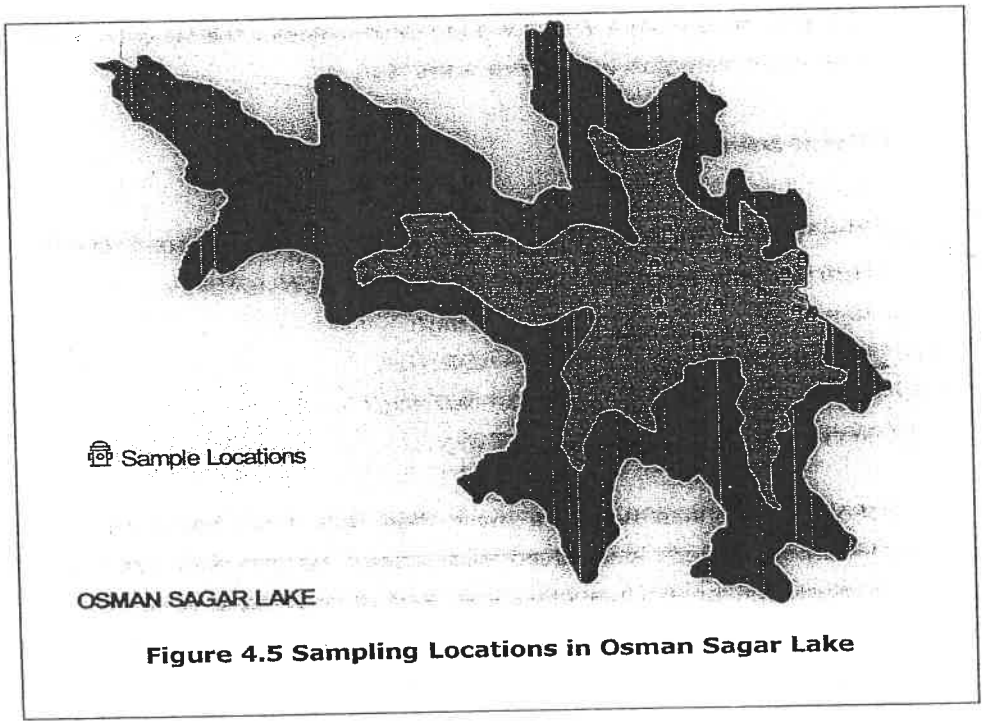


Figure 4.5 Sampling Locations in Osman Sagar Lake

The important water quality characteristics are reviewed based on the analysis of water samples of Osman Sagar and Himayath Sagar lakes.

pH

pH is the negative logarithm of hydrogen ion concentration. For acidic waters pH ranges from 0-7 and for alkaline waters pH varies from 7-14. Natural waters usually contain pH 6.5 – 7.5. In general, acidic waters are sour and alkaline waters are bitter. If pH is less, algae die, fish cannot reproduce and it causes acidity, corrosion, irritation of mucous membranes, tuberculosis and other health problems in humans.

The pH varies from 8.2 to 9.7 and higher values are noticed near locations where more human activities are present.

Total Hardness

The degree of hardness of drinking water has been classified in terms of the equivalent $Caco_3$ concentration as follows:

Soft	0 – 75 mg/l
Moderately Hard	75 – 150 mg/l
Hard	150 – 300 mg/l
Very hard	>300 mg/l

If water contains hardness more than 300 mg/l, household pipes can become choked with deposited scale. Hard water also deposited incrustation on kitchen utensil as well as increasing soap consumption. Based on the above classification, water in Osman Sagar Lake can be classified as soft, since total hardness varies from 37.7 to 77.9. mg/l. Based on the above classification, water in Himayath Sagar lake can be classified as moderately hard since, total hardness varies from 133 to 138mg/l. Total hardness of all the water samples is well with in the drinking water standards (i.e. 300 mg/l).

Alkalinity

Alkalinity provides an idea of the nature of salts present in water. If it is equal to hardness, calcium and magnesium salts are only resent in water. If alkalinity is less than hardness sulfates of calcium and magnesium must be there. Greater alkalinity shows the presence of alkali salts of sodium and potassium in addition to those of calcium and magnesium. All the surface water samples(Both Osman Sagar and Himayath Sagar lakes) analyzed for alkalinity are well with in the standards.

Chlorides

Water containing chlorides in excess of 250 mg/l is considered undesirable for drinking purposes. Chlorides are corrosive and impart permanent hardness to water. Water with chlorides in excess of 2000 mg/l is not recommended for construction purpose also. High chlorides content also has a deleterious effect on metallic pipes and structures as well as on agricultural plants.

Chlorides concentration in all water samples (Osman Sagar and Himayath Sagar Lakes) are well within the drinking water standards.

Fluorides

Fluoride concentration in drinking water is very important as levels (less than 1ppm) may reduce the incidence of dental caries in both the children and adults. If fluoride is more than 1.5 mg/l, it leads to mottling of teeth. Fluoride in excess of 5 ppm, causes skeletal fluorosis. Fluorides in all the water samples are well within the drinking water standards.

Nitrates

Nitrates is the most highly oxidized form of nitrogen compounds commonly present in natural waters because it is the product of the aerobic decomposition of organic nitrogenous matter. Significant sources of nitrates are chemical fertilizers, decayed vegetable and animal matter, domestic effluents sewage sludge disposal to land, industrial discharge and leachates from refuse dumps. Nitrates in drinking water should not exceed 45 mg/l (according to IS10500:1991). The presence of high nitrates not only causes Methemoglobenaemia, in infants, but has also been reported to cause cancer.

Nitrate concentration in all water samples (Osman Sagar and Himayath Sagar Lakes) are well within the drinking water standards.

Sulfates

Discharge of industrial waste and domestic sewage in water tends to increase sulfate concentration in drinking water, gives offensive odour objectionable taste and laxative effects. Sulfates also corrode steel and affect the solidity and strength of concrete. $MgSO_4$ act as a purgative in adults and causes temporary diarrhea and disorders of alimentary tract.

Sulfate concentrations in all the water samples (Both Osman Sagar and Himayath Sagar Lakes) analyzed are well within the drinking water standards.

Biological Oxygen Demand (BOD)

The presence of oxygen is necessary for the livelihood of organisms. The aerobic action continues till the oxygen is present in water. As the oxygen exhausts the anerobic action begins due to which foul smell starts coming. Therefore indirectly the decomposable matters require oxygen which is used by the organisms. The Biological Oxygen Demand of water is the quantity of oxygen required for the biological oxidation of the decomposable matter at specified temperature within the specified time.

BOD concentration in all water samples in Osman Sagar Lake is well with in the standards (3mg/l) except one sample having 11mg/l. In Himayath Sagar lake BOD levels are high (>3mg/l) since the population living very near to the catchment completely depend for irrigation, domestic and all other purposes on the water resources available in the lake. These activities contribute pollutants to water resources resulting in the increased Biological Oxygen Demand.

Table 4.3 Water Quality in Osman Sagar Lake

S.No	Test Parameter (s)	Unit	Test Method	Result				
				OS-1	OS-2	OS-3	OS-4	OS-5
1.	pH	--	4500.H+-B	8.9	8.4	9.2	9.0	9.1
2.	Temperature	^0C	--	24.5	24.1	24.2	24.2	24.5
3.	Colour	Pt. Co Scale	2120.B	5.0	5.0	5.0	<5.0	<5.0
4.	Odour	--	2150-B	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed
5.	Taste	--	2160—B	No flavour observed	No flavour observed	No flavour observed	No flavour observed	No flavour observed
6.	Turbidity	NTU	2130-B	<1.0	<1.0	<1.0	<1.0	<1.0
7.	Total Hardness as $CaCO_3$	mg/L	2340-C	69.3	69.3	69.3	74.3	69.3
8.	Calcium Hardness as	mg/L	2340-C	34.7	34.7	29.7	34.7	29.7

414

S.No	Test Parameter (s)	Unit	Test Method	Result				
				OS-1	OS-2	OS-3	OS-4	OS-5
9.	Magnesium Hardness	mg/L	2340-C	34.7	34.7	39.6	39.6	39.6
10.	Total Dissolved Solids	mg/L	2540-C	130	135	135	125	130
11.	Chloride as Cl^-	mg/L	4500.Cl-B	12.5	12.5	13.5	11.5	12.5
12.	Calcium as Ca	mg/L	2340-C	13.9	13.9	11.9	13.9	11.9
13.	Fluoride as F	mg/L	4500.F-C	0.62	0.79	0.91	0.97	0.99
14.	Magnesium as Mg	mg/L	2340-C	8.4	8.4	9.6	9.6	9.6
15.	Sulfate as SO_4^{-2}	mg/L	4500.So4-2-E	11.9	11.5	11.6	12.1	13.0
16.	Nitrate as NO_3	mg/L	4500.No3-B	1.30	3.77	3.60	0.61	0.85
17.	Alkalinity as $CaCO_3$	mg/L	2320-B	88.4	88.4	81.6	88.4	88.4
17.	Iron as Fe	mg/L	3030K/3111.B	0.43	0.45	0.45	0.61	0.67
19.	Copper as Cu	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
20.	Nickel as Ni	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3030K/3111.B	0.026	0.017	BDL	BDL	BDL
22.	Zinc as Zn	mg/L	3030K/3111.B	0.014	0.009	0.009	0.009	0.010
23.	Cadmium as Cd	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
24.	Chromium as Cr^6	mg/L	3500.Cr-B	BDL	BDL	BDL	BDL	BDL

S.No	Test Parameter (s)	Unit	Test Method	Result				
				OS-1	OS-2	OS-3	OS-4	OS-5
25.	Cobalt as Co	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
26.	Lead as Pb	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
27.	Boron as B	mg/L	4500.B-C	BDL	BDL	BDL	BDL	BDL
28.	SAR	--	By Calculation	0.795	0.795	0.795	0.768	0.795
29.	Percent Sodium	%	By Calculation	31.5	31.5	31.7	30.3	31.7
30.	Chemical Oxygen Demand (COD)	mg/L	5220 – D	9	12	14	9	10
31.	Biological Oxygen Demand (BOD)	mg/L	5210 – B	3	3	3	3	3

S.No	Test Parameter (S)	Unit	Test Method	Result				
				OS-6	OS-7	OS-8	OS-9	OS-10
1.	pH	--	4500.H+-B	9.3	9.2	9.4	9.7	9.2
2.	Temperature	^{0}C	--	24.6	24.0	24.1	24.1	23.8
3.	Colour	Pt. Co Scale	2120.B	<5.0	5.0	20	15	20
4.	Odour	--	2150-B	No odour observed	No odour	No odour	No odour	No odour
5.	Taste	--	2160—B	No flavour observed	No flavour	No flavour	No flavour	No flavour
6.	Turbidity	NTU	2130-B	<1.0	<1.0	6.9	4.7	8.0
7.	Total Hardness as $CaCO_3$	mg/L	2340-C	69.3	70.4	65.3	60.3	65.3
8.	Calcium Hardness as	mg/L	2340-C	29.7	40.2	35.2	30.2	35.2
9.	Magnesium Hardness	mg/L	2340-C	39.6	30.2	30.2	30.2	30.2
10.	Total Dissolved Solids	mg/L	2540-C	125	120	120	110	130
11.	Chloride as Cl^-	mg/L	4500.Cl-B	10.6	11.5	11.5	12.5	12.5
12.	Calcium as Ca	mg/L	2340-C	11.9	16.1	14.1	12.1	14.1
13.	Fluoride as F	mg/L	4500.F-C	0.89	0.65	0.78	0.54	0.48

S.No	Test Parameter (s)	Unit	Test Method	Result				
				OS-6	OS-7	OS-8	OS-9	OS-10
14.	Magnesium as Mg	mg/L	2340-C	9.6	7.30	7.30	7.30	7.3
15.	Sulfate as SO_4^{-2}	mg/L	4500.So4-2-E	12.3	11.4	12.7	11.8	13.9
16.	Nitrate as NO_3	mg/L	4500.No3-B	0.679	0.773	0.617	1.03	0.837
17.	Alkalinity as $CaCO_3$	mg/L	2320-B	81.6	88.8	88.8	72.2	88.8
18.	Iron as Fe	mg/L	3030K/3111.B	0.441	0.441	0.313	0.291	0.297
19.	Copper as Cu	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
20.	Nickel as Ni	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
22.	Zinc as Zn	mg/L	3030K/3111.B	0.013	0.015	0.014	0.021	0.014
23.	Cadmium as Cd	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL
24.	Chromium as Cr^6	mg/L	3500.Cr-B	BDL	BDL	BDL	BDL	BDL
25.	Cobalt as Co	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL

S.No	Test Parameter (s)	Unit	Test Method	Result				
				OS-6	OS-7	OS-8	OS-9	OS-10
26.	Lead as Pb	mg/L	3030K/3111. B	BDL	BDL	BDL	BDL	BDL
27.	Boron as B	mg/L	4500.B-C	BDL	0.102	BDL	BDL	BDL
28.	SAR	--	By Calculation	0.795	0.715	0.742	0.772	0.797
29.	Percent Sodium	%	By Calculation	31.7	29.3	31.0	329	32.4
30.	Chemical Oxygen Demand (COD)	mg/L	5220 – D	10	35	15	12	15
31.	Biological Oxygen Demand (BOD)	mg/L	5210 – B	3	11	NIL	NIL	NIL
32.	Chlorinated Pesticides	µg/L	6630 -D	*	*	ND	ND	*
33.	Phosphorous Pesticides	µg/L	6630 –D	*	*	ND	ND	*

S.No	Test Parameter (s)	Unit	Test Method	Result					
				OS-11	OS-12	OS-13	OS-14	OS-15	OS-16
1.	pH	--	4500.H+-B	9.3	9.1	9.2	8.3	8.4	8.2
2.	Temperature	^0C	--	24.0	23.8	24.0	30.1	30.0	30.0
3.	Colour	Pt. Co Scale	2120.B	10	10	5	15	25	20
4.	Odour	--	2150-B	No odour	No odour	No odour	No odour observed	No odour observed	No odour observed
5.	Taste	--	2160—B	No flavour	No flavour	No flavour	No flavour observed	No flavour observed	No flavour observed
6.	Turbidity	NTU	2130-B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7.	Total Hardness as $CaCO_3$	mg/L	2340-C	67.8	67.8	70.4	37.7	62.8	77.9
8.	Calcium Hardness as	mg/L	2340-C	35.2	30.2	35.2	35.2	50.3	70.4
9.	Magnesium Hardness	mg/L	2340-C	32.7	37.7	35.2	2.50	12.6	7.50
10.	Total Dissolved Solids	mg/L	2540-C	120	125	125	140	190	170
11.	Chloride as Cl^-	mg/L	4500.Cl-B	11.5	11.5	12.5	12.5	16.3	16.3
12.	Calcium as Ca	mg/L	2340-C	14.1	12.1	14.1	14.1	20.1	28.1
13.	Fluoride as F	mg/L	4500.F-C	0.54	0.62	0.57	0.68	0.73	0.67

S.No	Test Parameter (s)	Unit	Test Method	Result					
				OS-11	OS-12	OS-13	OS-14	OS-15	OS-16
14.	Magnesium as Mg	mg/L	2340-C	7.9	9.2	8.5	0.600	3.10	1.80
15.	Sulfate as SO_4^{-2}	mg/L	4500.So4-2-E	9.4	9.5	9.8	5.07	5.16	5.26
16.	Nitrate as NO_3	mg/L	4500.No3-B	0.413	0.617	2.25	0.385	1.39	0.773
17.	Alkalinity as $CaCO_3$	mg/L	2320-B	88.8	83.3	88.8	111	167	139
18.	Iron as Fe	mg/L	3030K/3111. B	0.457	0.498	0.593	0.253	0.312	0.617
19.	Copper as Cu	mg/L	3030K/3111. B	BDL	BDL	BDL	BDL	BDL	BDL
20.	Nickel as Ni	mg/L	3030K/3111. B	BDL	BDL	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3030K/3111. B	BDL	BDL	0.030	0.030	0.070	0.020
22.	Zinc as Zn	mg/L	3030K/3111. B	0.015	0.030	0.065	0.018	0.028	0.019
23.	Cadmium as Cd	mg/L	3030K/3111. B	BDL	BDL	BDL	BDL	BDL	BDL
24.	Chromium as Cr^6	mg/L	3500.Cr-B	BDL	BDL	BDL	BDL	BDL	BDL
25.	Cobalt as Co	mg/L	3030K/3111. B	BDL	BDL	BDL	BDL	DL	BDL

S.No	Test Parameter (S)	Unit	Test Method	Result					
				OS-11	OS-12	OS-13	OS-14	OS-15	OS-16
26.	Lead as Pb	mg/L	3030K/3111.B	BDL	BDL	BDL	BDL	BDL	BDL
27.	Boron as B	mg/L	4500.B-C	BDL	BDL	BDL	BDL	BDL	BDL
28.	SAR	--	By Calculation	0.729	0.727	0.716	1.19	1.48	0.933
29.	Percent Sodium	%	By Calculation	32.0	29.9	29.3	45.6	44.7	32.3
30.	Chemical Oxygen Demand (COD)	mg/L	5220 - D	5	5	5	15	12	12
31.	Biological Oxygen Demand (BOD)	mg/L	5210 - B	NIL	NIL	NIL	NIL	NIL	NIL
32.	Chlorinated Pesticides	µg/L	6630 -D	*	*	*	*		
33.	Phosphorous Pesticides	µg/L	6630 -D	*	*	*	*		

422

Table 4.4 Water Quality in Himayath Sagar Lake

S.No	Test Parameter (S)	Unit	Test Method	Result	
				HS-1	HS-2
1	pH	--	4500.H+-B	8.3	8.3
2	Temperature	0C	--	23.5	23.4
3	Colour	Pt. Co Scale	2120.B	10	10
4	Odour	--	2150-B	No odour	No odour
5	Taste	--	2160—B	No Flavour	No Flavour
6	Turbidity	NTU	2130-B	12	10
7	Total Hardness as $CaCO_3$	mg/L	2340-C	133	138
8	Calcium Hardness as	mg/L	2340-C	80	70
9	Magnesium Hardness	mg/L	2340-C	53	68
10	Total Dissolved Solids	mg/L	2540-C	250	180
11	Chloride as Cl^-	mg/L	4500.Cl-B	23.7	9.4
12	Calcium as Ca	mg/L	2340-C	32.2	28.1
13	Fluoride as F	mg/L	4500.F-C	0.65	0.77
14	Magnesium as Mg	mg/L	2340-C	12.8	16.5
15	Sulfate as SO_4^{-2}	mg/L	4500.So4-2-E	23.7	34.2
16	NItrate as NO^3	mg/L	4500.No3-B	6.36	9.23
17	Alkalinity as $CaCO^3$	mg/L	2320-B	167	172

BDL- Below Detectable Limit

423

Table 4.4 Water Quality in Himayath Sagar Lake (Continued)

S.No	Test Parameter (s)	Unit	Test Method	Result	
				HS-1	HS-2
18	Iron as Fe	mg/L	3030K/3111.B	14.3	13.8
19	Copper as Cu	mg/L	3030K/3111.B	BDL	BDL
20	Nickel as Ni	mg/L	3030K/3111.B	0.075	0.066
21	Manganese as Mn	mg/L	3030K/3111.B	0.527	0.416
22	Zinc as Zn	mg/L	3030K/3111.B	0.074	0.063
23	Cadmium as Cd	mg/L	3030K/3111.B	BDL	BDL
24	Chromium as Cr^6	mg/L	3500.Cr-B	0.088	0.083
25	Cobalt as Co	mg/L	3030K/3111.B	BDL	BDL
26	Lead as Pb	mg/L	3030K/3111.B	BDL	BDL
27	Boron as B	mg/L	4500.B-C	BDL	BDL
28	SAR	--	By Calculation	1	0.886
29	Percent Sodium	%	By Calculation	29.3	26.4
30	Chemical Oxygen Demand	mg/L	5220 -D	70	40
31	Bio-chemical Oxygen Demand	mg/L	5210 - B	17	20

BDL- Below Detectable Limit

4.1.1 Existing Water Harvesting Structures in the Catchment Areas

Considering the regulations in vogue banning construction of the water harvesting structure viz., check dams, rock fill dams, percolation tanks, mini percolation tanks, farm ponds, sunken pond, and continuous contour trenches. Iinvenstorization of above Water Harvesting Structures was carried out. Since the catchment area was large, the teams approached the agencies involved in construction of such structures in respective administrative mandals. It is interesting to note that a number of structures were constructed by various State Departments violating the Government regulation G.O.Ms.No. 111. Apart from this, some intervening structures were constructed by local enterprising farmers.

In the catchment area during 2000 – 2003 under various programmes, District Water Management Agency (DWMA), Ranga Reddy District, Andhra Pradesh Irrigation Development Corporation, State Forest Department have reported that number of water harvesting structures were constructed in the sub-watersheds of these two catchments. The consolidated list of various schemes executed in both catchment areas in the respective mandals during 2000-2003 is tabulated and presented in Table 4.5.

Table 4.5 Water harvesting Structures Constructed during Years 2000 – 2003

	Check Dam	Rock Filled Dam	Percolation Tank	Mini Percolation Tank	Contour Bunding	Farm Pond	Sunken Pond	Continuous Contour Trench
Pudur	208	1755	90	6	2893	36	368	147
Shabad	98	281	-	0	709	1	155	10
Shamshabad	248	931	5	12	722	11	2498	57
Shankerpally	134	2260	5	74	2015	3	347	142
Vikarabad	106	1707	23	46	1123	111	392	749
Chevella	165	2028	5	24	3927	2	1015	179
Moinabad	37	1454	-	0	175	-	376	-
Nawabpet	138	410	12	4	745	-	513	283
Pargi	206	2571	85	155	2928	9	917	113
Total	11143	13397	226	321	15237	173	6581	1680

* District Water Management Agency (DWMA), Ranga Reddy District, Andhra Pradesh Irrigation Development Corporation

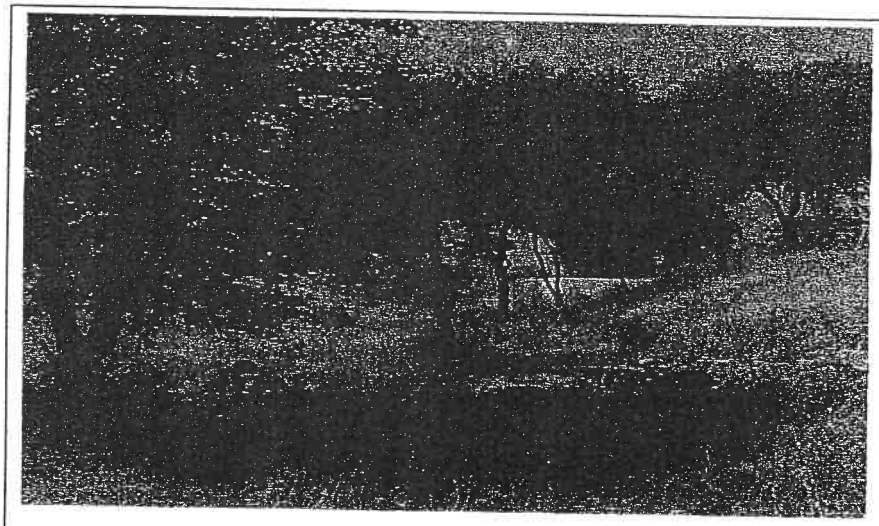


Fig.4.6 Rock fill dam 50 m below the check dam Pameña village

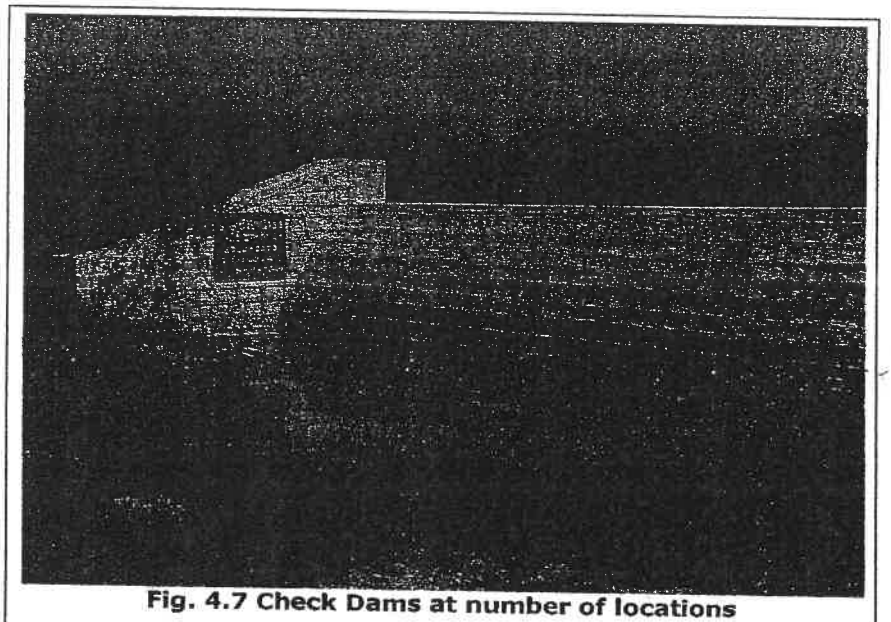


Fig. 4.7 Check Dams at number of locations

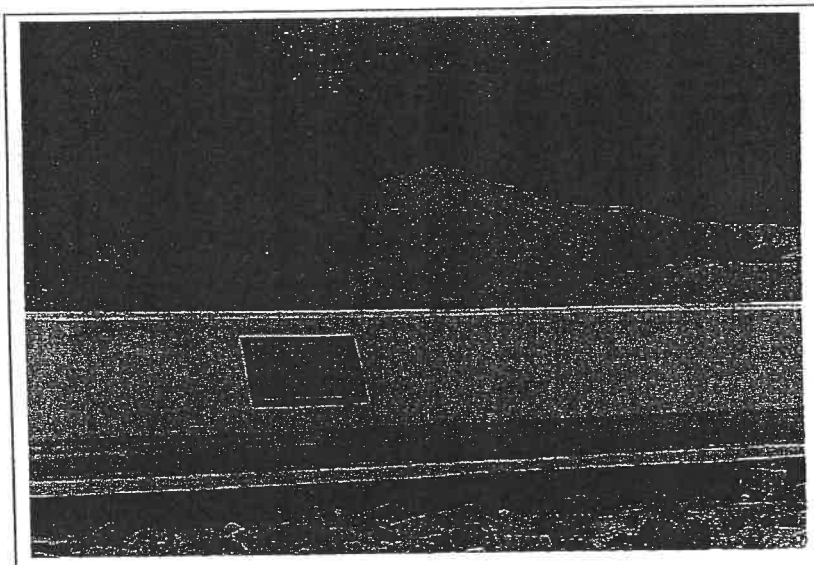


Fig. 4.7a Check Dams at number of locations

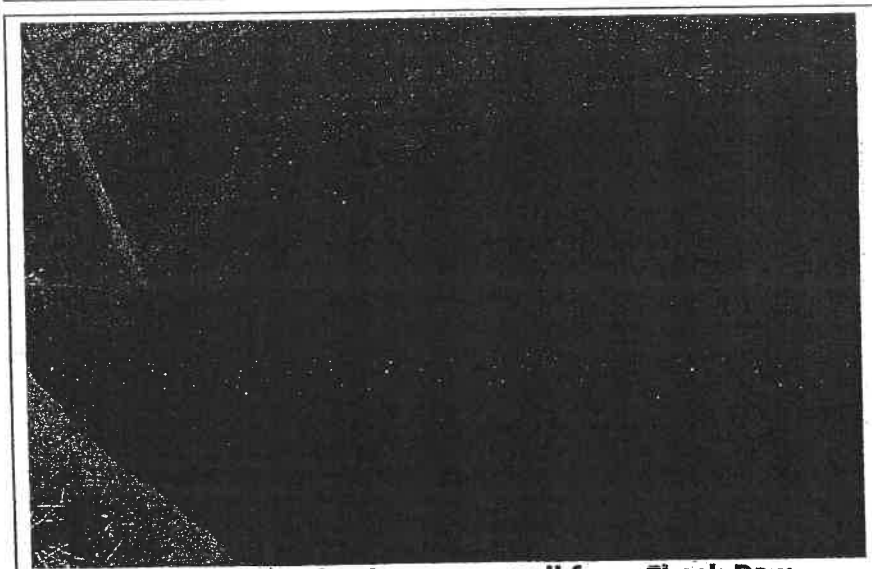


Fig. 4.7 b Pumping into open well from Check Dam

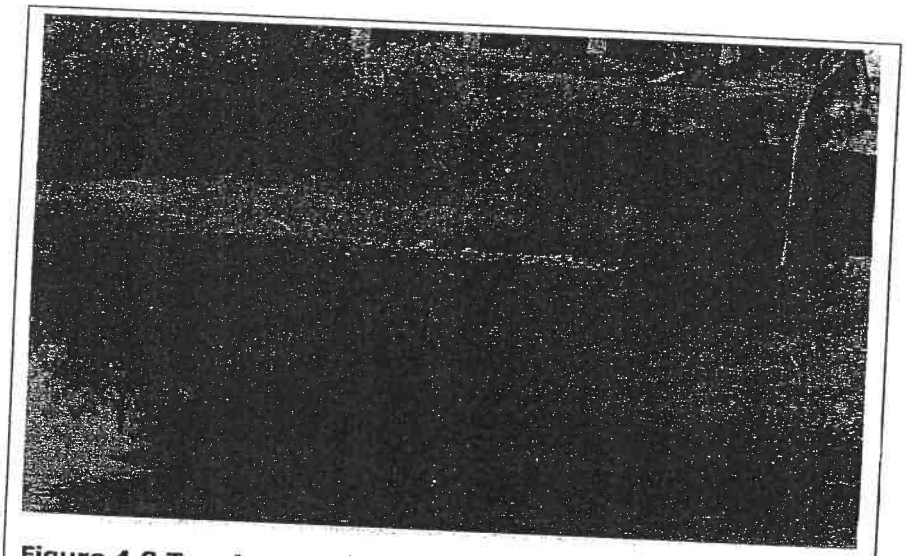


Figure 4.8 Tapping stream flow by tankers near Attapur

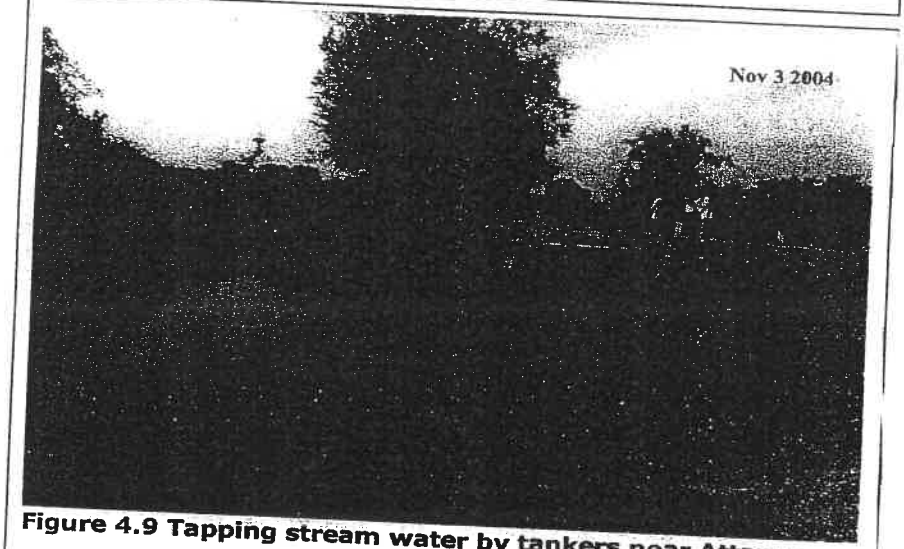


Figure 4.9 Tapping stream water by tankers near Attapur

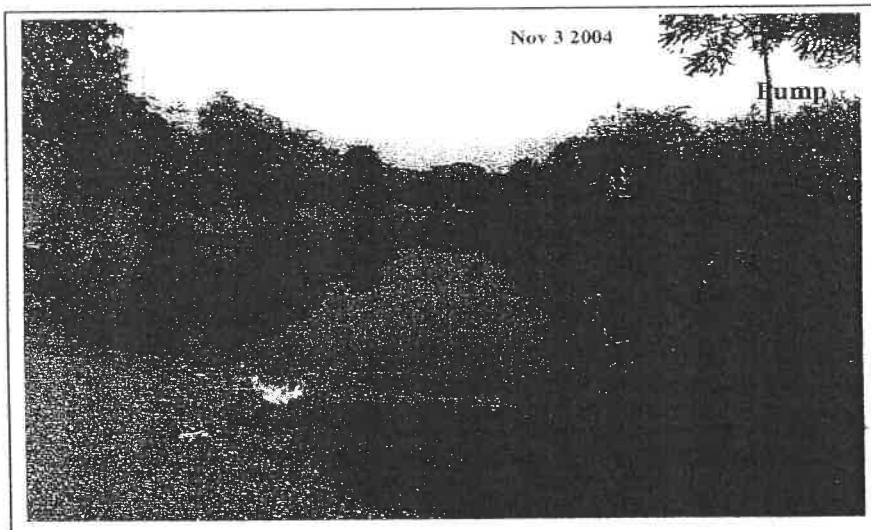


Fig 4.10 Musi River flow tapped by blocking near Chittigadda Railway bridge

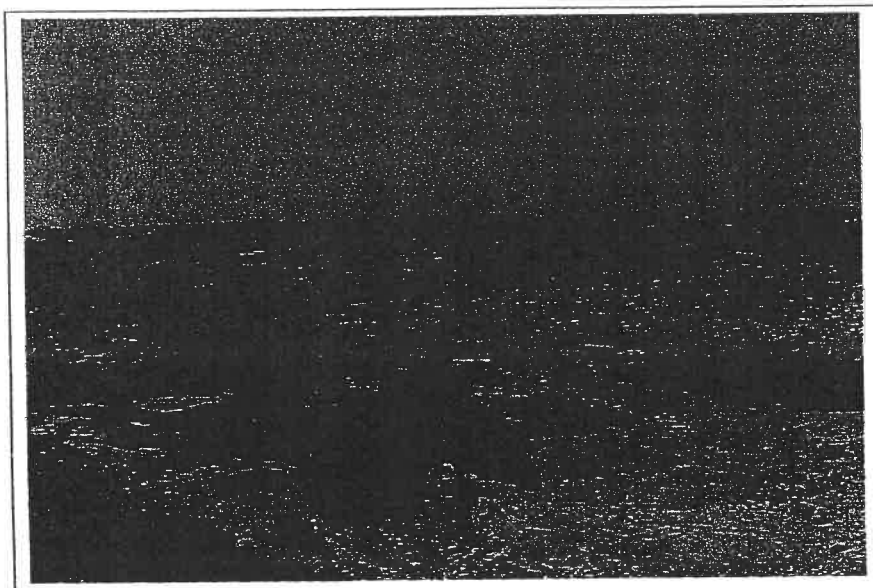


Fig. 4.11 Quarrying area very near to lakes obstructing the stream flows and local pool formations

Apart from these water harvesting structures, stream flows are being tapped directly by lift through tankers after forming artificial pools in the streams. It was also noticed that the farmers are directly pumping from the water harvesting structures for agriculture. The abandoned quarry areas are altering the topography in the some regions, creating new water pools and obstructing the natural flows into the lakes.

Though the intention of construction of the water harvesting structures is to improve the ground water or soil moisture content, the ready exploitation of the surface waters stored at these locations has greater impact on the flows into the two lakes. This over exploitation in 1st order, 2nd order stream levels and even at 3rd order level converted the total catchment as treated catchment area. The scant rainfall accompanied by tapping all over the catchment has increased the evaporation of the surface runoffs, exploitation at micro watershed level resulting into the reduced flows in to the two rivers.

4.4 Ground Water Condition

4.4.1 Depth to Ground Water Table

Monitoring was conducted in about 48 wells in Himayath Sagar lake catchment area and about 49 wells in Osman Sagar lake catchment area to assess the depth to ground water level during post monsoon – November, 2004 and during pre monsoon – May, 2005. Table 4.6 and Table 4.7 presents the well inventory data. The monitoring locations are presented in Figure 4.12 and 4.17 respectively. The depth to groundwater level in the catchments areas have been found varying from 4 – >20 m during post monsoon - November 2004 and same were presented in Figures 4.13 to 4.14 and 4.18 to 4.19 covering in Himayath Sagar and Osman Sagar lake catchments respectively. The post monsoon groundwater conditions have been analysed using the groundwater level contours reduced to the mean sea level during November 2004 and the contours show a predominant regional groundwater flow from West to East with local flow towards the Musi and Musa rivers in the catchments areas.

The pre-monsoon groundwater conditions have been analysed by depth to groundwater level contours of May 2005. The groundwater level contours during the period also indicate same flow pattern with steep gradients towards the river courses which is evident from the Figures 4.15 to 4.16 and 4.20 to 4.21 corresponding to Himayath Sagar and Osman Sagar lake catchments respectively. Generally, water table has a configuration similar to that of land surface; however, depths to water levels are greater in upland areas than in valley bottoms. Depth to the lowest annual water level varies from one meter in granites low lands to forty meters in basaltic up lands. In granitic terrain piezometric level divides coincide with phreatic level and topographic divides. In basaltic terrain the maximum

water level fluctuation is about 20 m; average water level fluctuation along the valley bottoms is approximately 6 m.

Unsaturated regions may occur in basaltic strata, particularly along valley sides, where numerous contact springs de-water aquifers locally. In Basaltic terrain the position of phreatic level divides may be some distances from phreatic level and topographic divides. While the dominant lithological units in the area are Peninsular gneisses and granites occupying about 88% of the area. Deccan traps occur in about 10% of the area. The granites are grey and pink in colour. The peninsular gneisses and granites are traversed by dolerite dykes, pegmatite, quartz and epidote veins. Towards western part of the area, the granites and peninsular gneisses are overlain by Deccan Traps. Narrow strip of alluvium occupying about 2% of the area is also along the Musa River course in the south. Different geomorphological units identified and mapped in the area are mesa/butte, residual hills, pediment-inselberg complex, pediplain and flood plain. Most of the area is occupied by pediments. Residual hills in granite region and mesa/butte in Deccan traps region are found along the drainage divide.

During low precipitation years, like 1972 when the precipitation during that year was lowest by 50 per cent of average annual rainfall, demand for groundwater was highest. During 1973, 1974 years the precipitation was near normal. Peninsular granite gneisses are the chief rock formations which are jointed and faulted with fracture systems developed along the lineaments. The saprolitic zone extends down to 15 m at places. Details on groundwater structures at 245 locations revealed that groundwater occurs under phreatic conditions in the interconnected secondary porosity similar to that of granular porosity in saprolitic zones and fissure porosity of massive varieties. Soils in the area belong to the low nutrient alfisol variety, thereby leading the common vine cultivators to the heavy application of inorganic fertilizers.

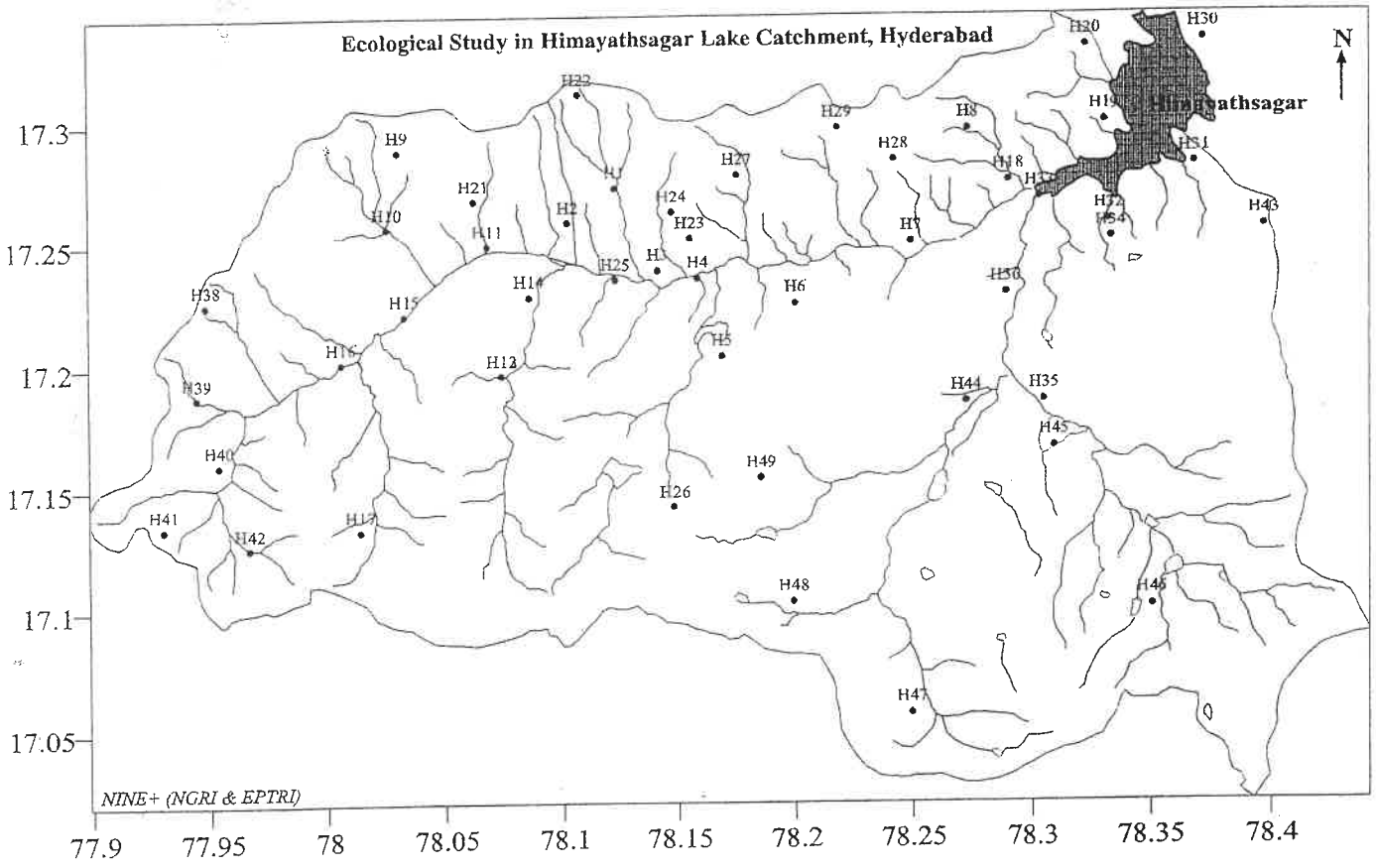


Figure.4.12 Location of Observation Wells in the Catchment Area of Himayath Sagar Lake

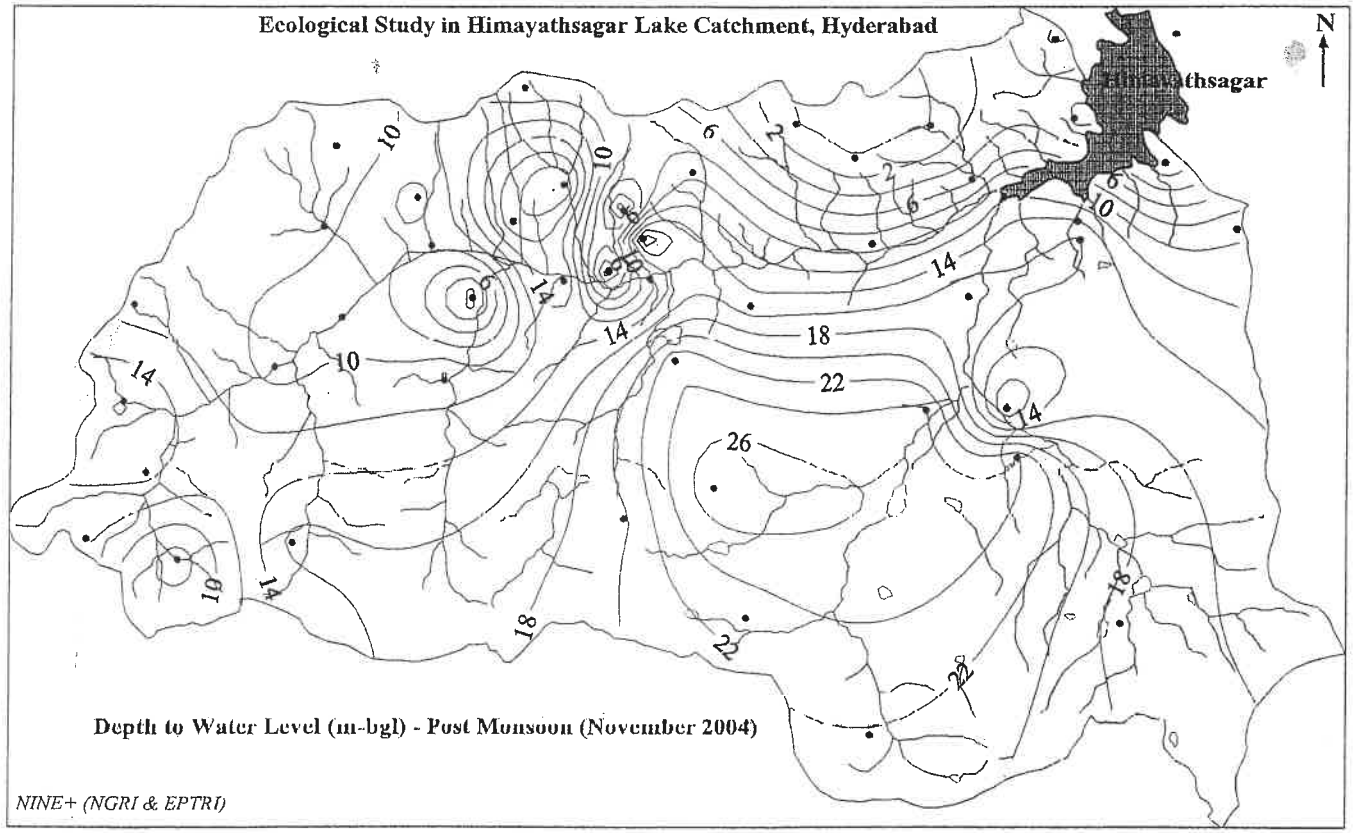


Figure.4.13 Depth to Ground Water Level in the Catchment area of Himayath Sagar Lake – November 2004

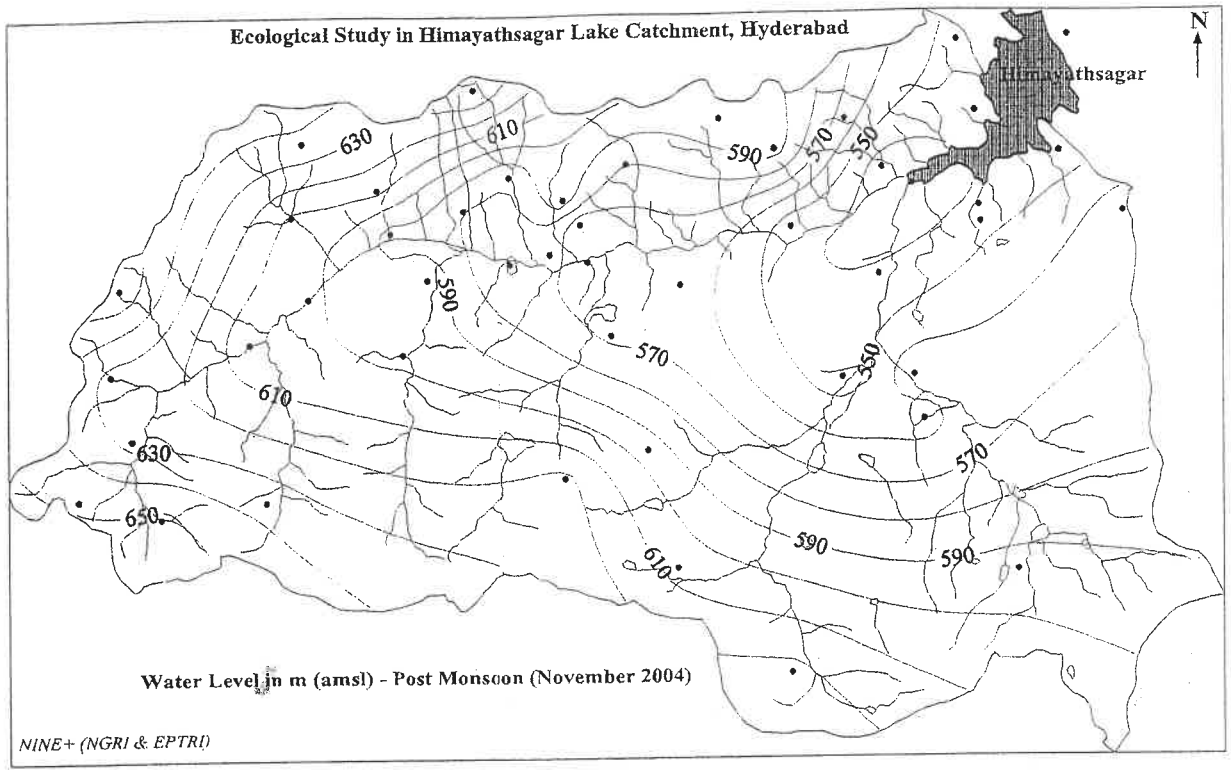


Figure.4.14 Ground Water Level Contours m (amsl) in the Catchment Area of Himayath Sagar Lake – November 2004

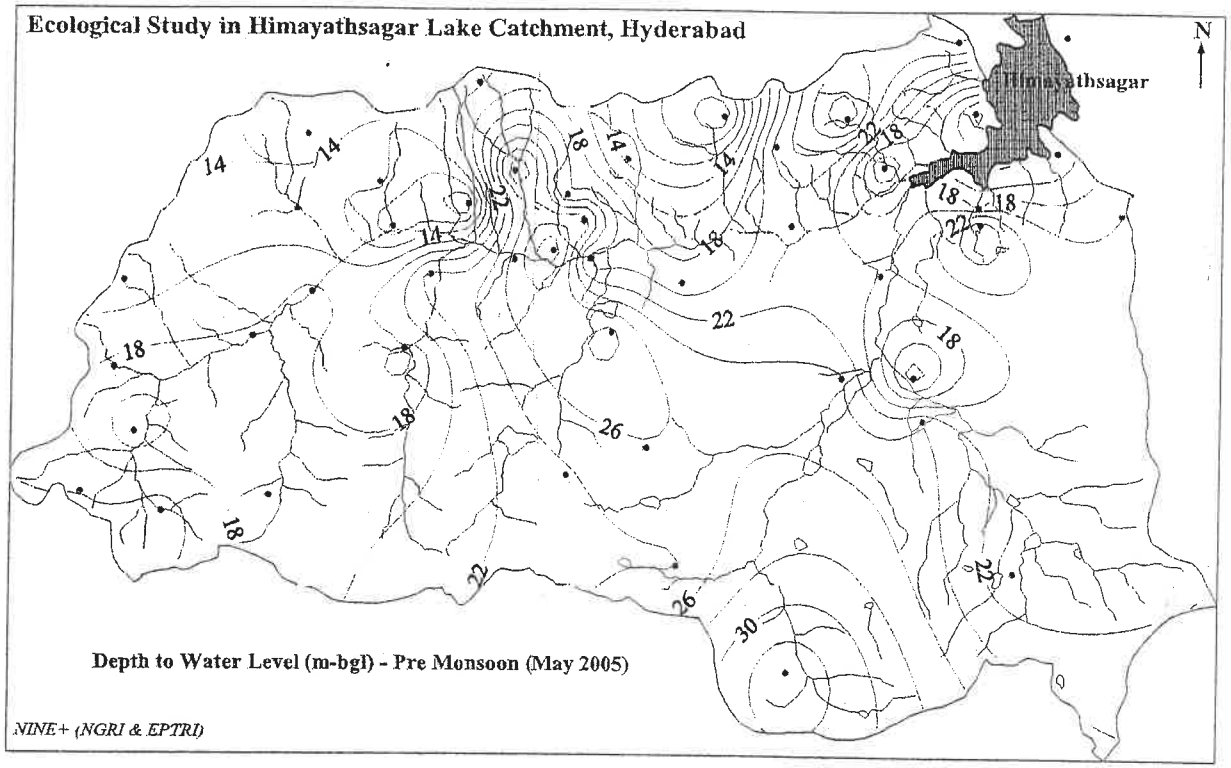


Figure.4.15 Depth to Ground Water Level in the Catchment Area of Himayath Sagar Lake – May, 2005

437

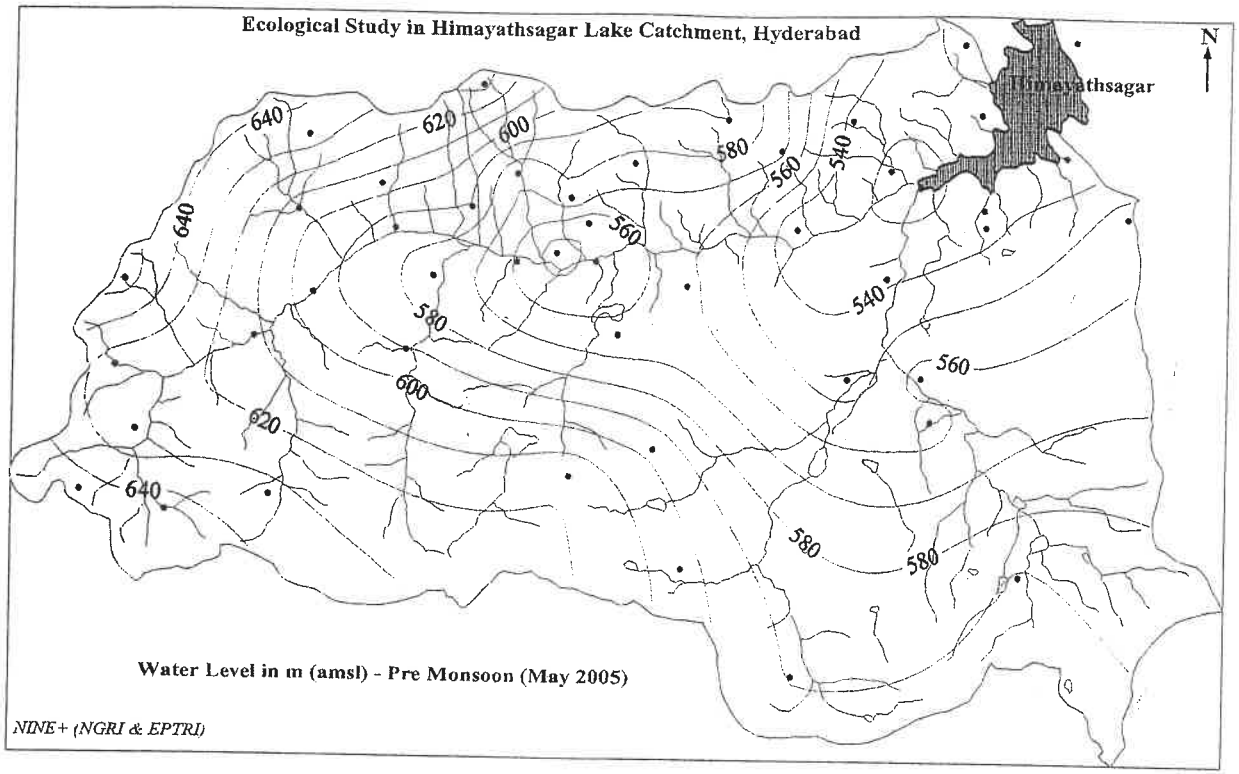


Figure.4.16 Ground Water Level Contours m (amsl) in the Catchment Area of Himayath Sagar Lake – May 2005

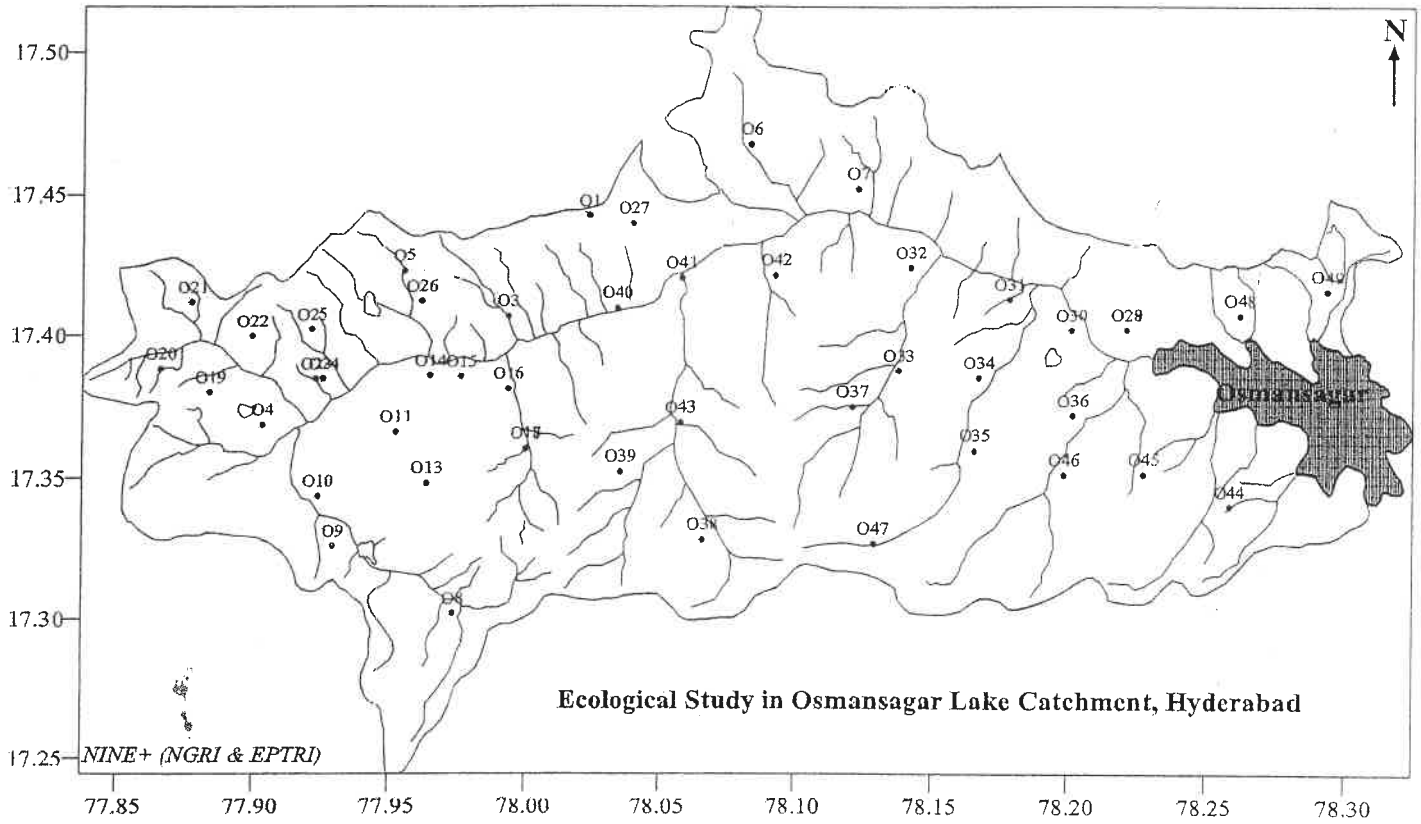


Figure.4.17 Observation Wells in the Catchment Area of Osman Sagar Lake

440

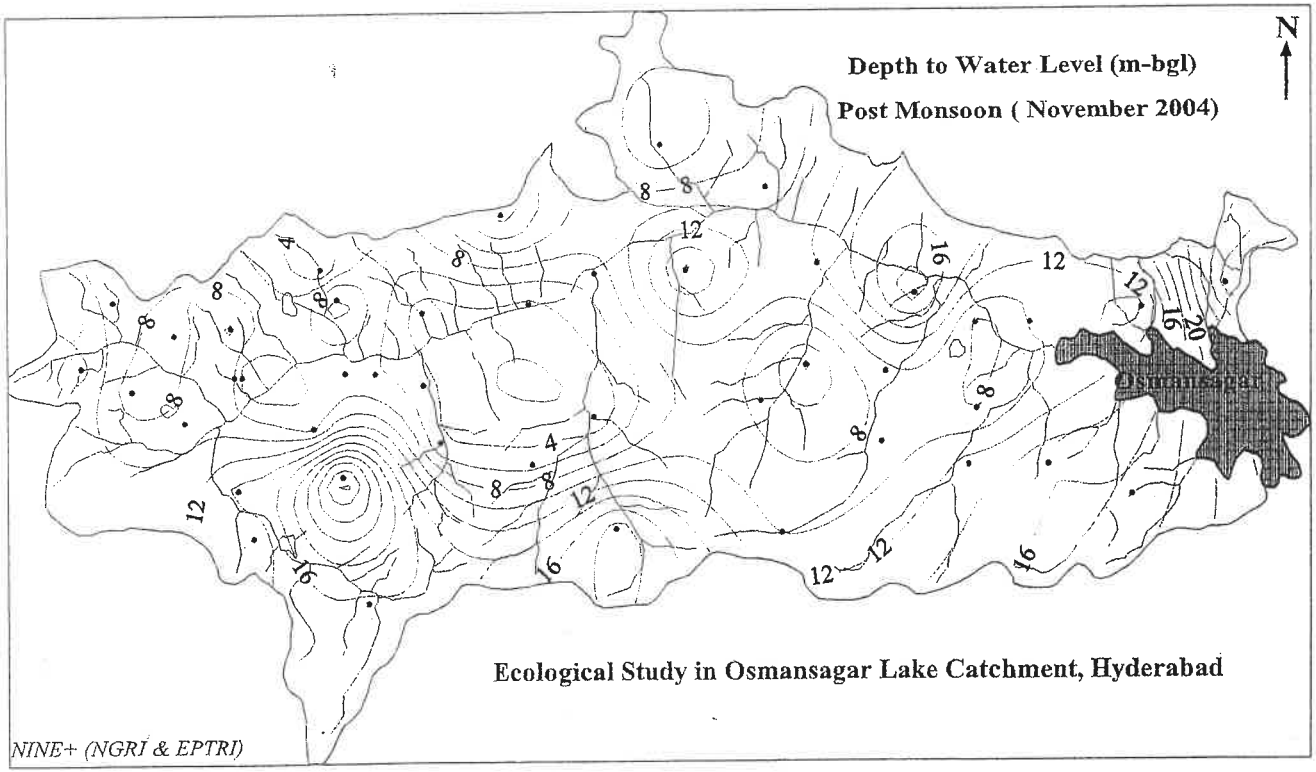


Figure.4.18 Depth to Ground Water Level in the Catchment Area of Osman Sagar Lake – November 2004

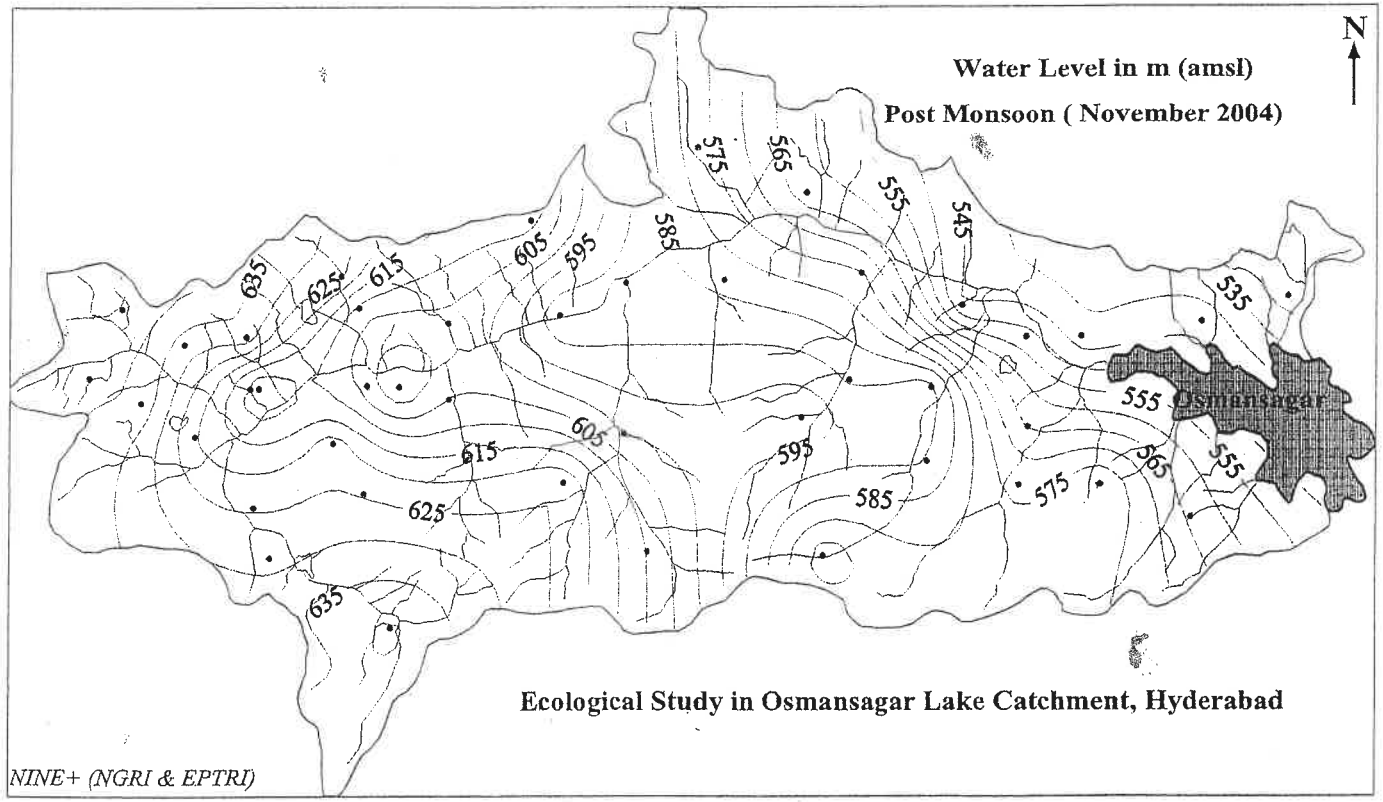


Figure.4.19 Ground Water Level Contours m (amsl) in the Catchment Area of Osman Sagar Lake – November 2004

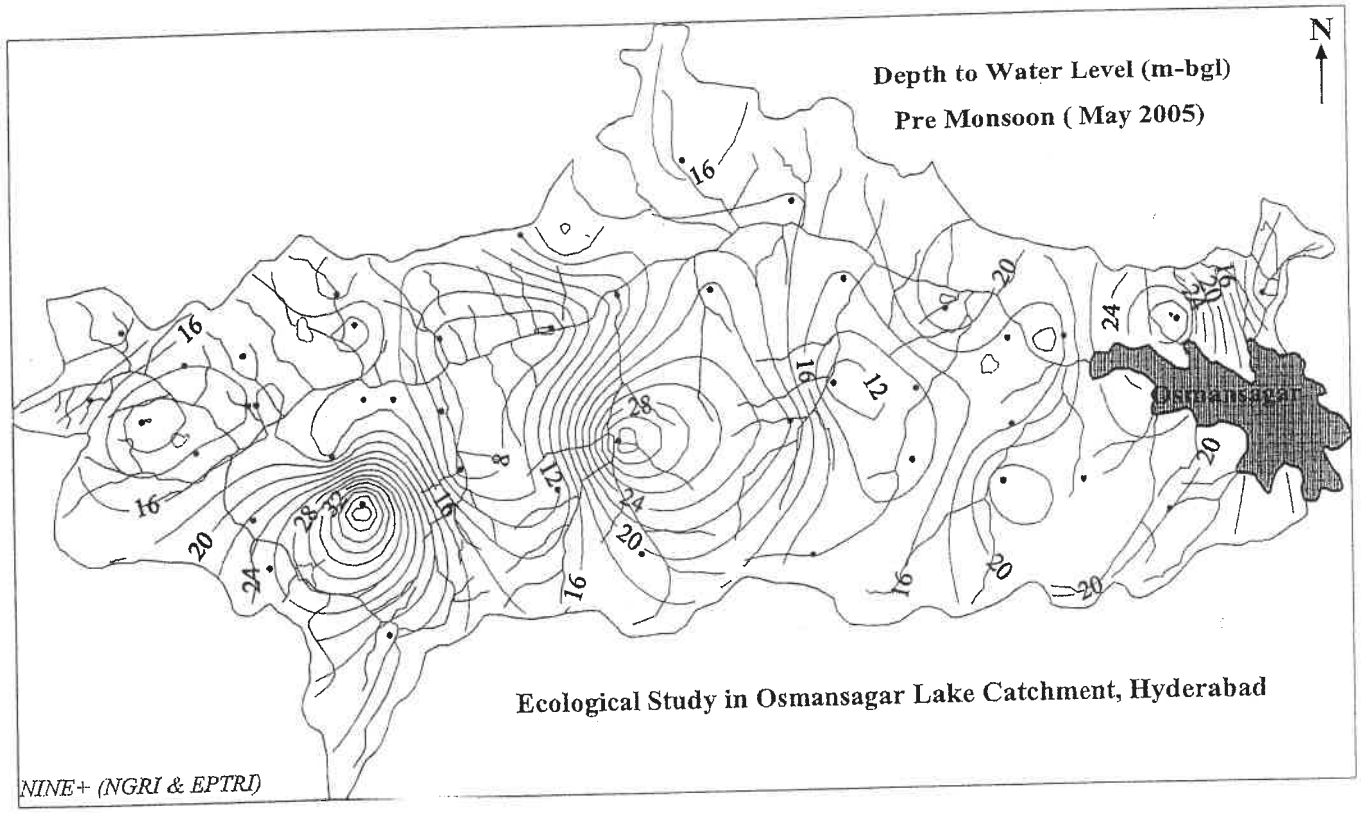


Figure.4.20 Depth to Ground Water Level in the Catchment Area of Osman Sagar Lake – May, 2005

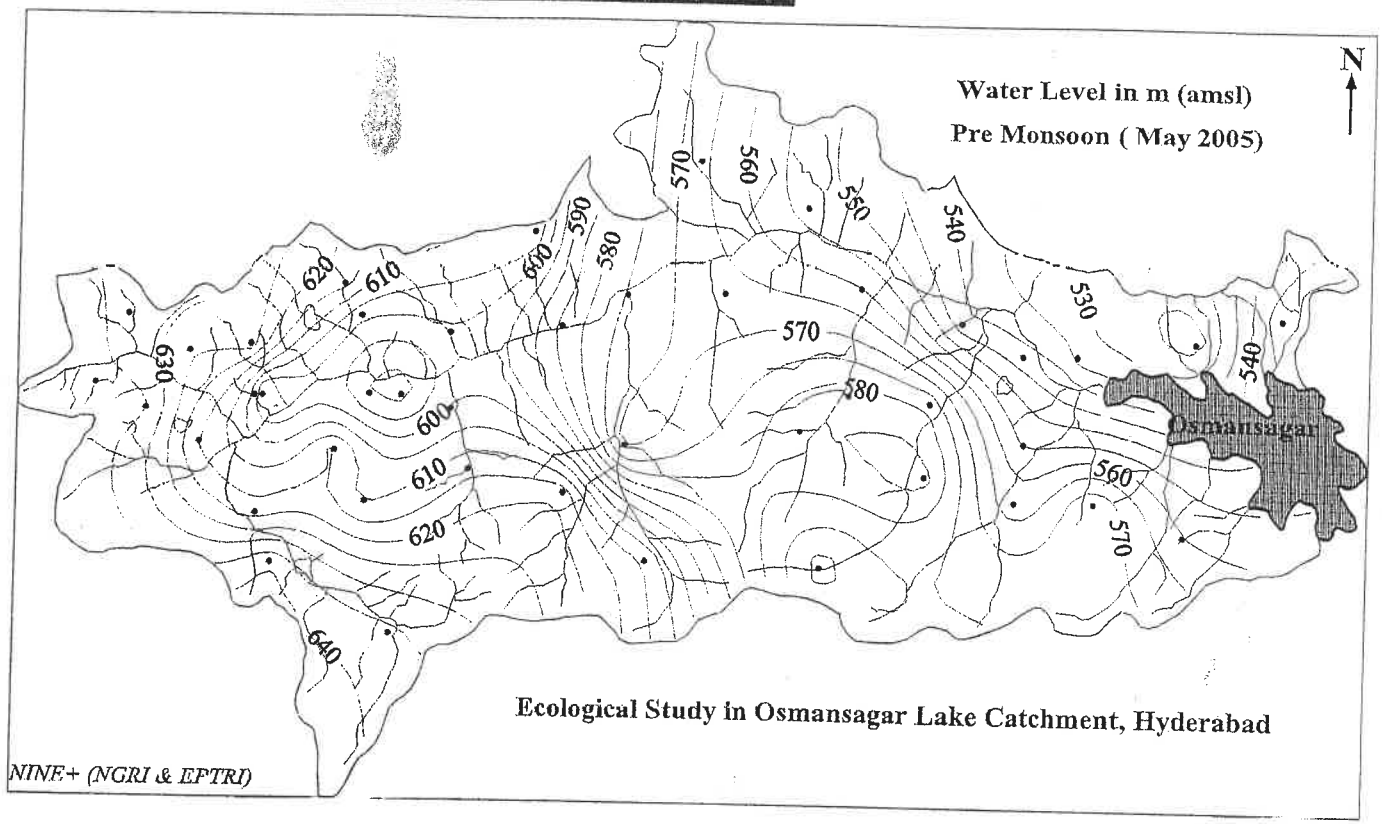


Figure.4.21 Groundwater Level Contours m (amsl) In the Catchment Area of Osman Sagar Lake – May 2005

Table 4.6 Well Inventory in the Catchment Area of Himayath Sagar Lake – November 2004

Sample No.	Type of Well	Latitude	Longitude	Location	M.P.(m)	DTW (m)	R.L	
							G.L	Top
HM-1	H.P.	17 16.389	78 07.371	Pamana	0.5	21.5	601.18	601.55
HM-2	H.P.	17 15.523	78 06.142	Near Racha Banda, Ikkareddyguda	0.5	18.14	597.385	597.82
HM-3	B.W.	17 14.340	78 08.488	Agl.Borewell, at bank of Musa river, Nagargudem			575.83	
HM-4	H.P.	17 14.137	78 09.515	Rudraram	0.3	11.46	573.61	574.07
HM-5	H.P.	17 12.240	78 10.137	In front of Anganwadi Bldg., Machanpalli	0.5	24.1	591.1	591.64
HM-6	H.P.	17 13.524	78 12.013	Near Bus stand on Mainroad, Hytabad	0.4	15.2	581.22	581.73
HM-7	H.P.	17 15.009	78 14.957	after bridge on Musa, Venkatapur	0.6	9.63	552.005	552.555
HM-8	H.P.	17 17.820	78 16.405	near Gram panchayat office, opp.temple, Surangal			566.1	566.66
HM-9	H.P.	17 17.321	78 01.794	Opp. Church at the entrance of Chittampalli	0.5	12.6	649.85	650.36
HM-10	H.P.	17 15.390	78 01.519	Inside Z.P.High school, Changomal	0.5	10.95	618.42	618.94
HM-11	H.P.	17 14.946	78 04.120	in Harijanwada, behind house of Erra Jangayya, Devarampalli	0.5	9.35	594.52	595.02
HM-12	H.P.	17 11.781	78 04.471	Adj.Hanuman Temple, Babulgaon	0.5	11.26	608.62	609.24
HM-13	H.P.	17 11.782	78 04.471	Adj.Pahilwansab Darga,Rd towards Babulgaon,Shahbad	0.5	13.5	606.23	606.72
HM-14	H.P.	17 13.711	78 05.159	Under Maktaguda Water Supply tank, Maktaguda			598.18	598.71
HM-15	H.P.	17 13.244	78 01.961	Adj.M.P.Primary School, Kadmur	0.5	10.16	612.24	612.72
HM-16	H.P.	17 12.091	78 00.360	Inside Z.P.High school, Kankal	0.5	9.62	611.63	612.41
HM-17	H.P.	17 07.947	78 00.828	adj.M.p.High School, Tummalapalli	0.5	17.2	653.16	653.66
HM-18	H.P.	17 16.537	78 17.421	Opp. Raktamysamma Temple, Amdapuram	0.4	5.71	538.83	539.42
HM-19	H.P.	17 17.988	78 19.869	at Village Entrance from Amdapur to Nagireddiguda, Nagireddiguda	0.5	1.85	546.63	547.09
HM-20	H.P.	17 20.284	78 19.618	Adj.Telephone Exchange, Aziznagar	0.5	7	552.47	552.95
HM-21	H.P.	17 16.085	78 03.761	Adj. Kuruva chandrayy house, Ghanapur	0.6	7.5	619.98	620.48
HM-22	H.P.	17 18.70	78 06.402	at the entrance of village, Damaragidda	0.5	8.89	648.9	649.22
HM-23	H.P.	17 15.112	78 09.321	inside z.p.High school, Gundala	0.5	21.28	580.11	580.62
HM-24	H.P.	17 15.776	78 08.857	Behind Pedbalreddy house, Road Back of Temple, Saireddigudå	0.5		598.59	598.6
HM-25	H.P.	17 14.098	78 07.394	inside Z.P.High school, Tadlapalli	0.5	17.86	585.18	585.2

Table 4.6 Well Inventory in the Catchment Area of Himayath Sagar Lake – November 2004 (contd.)

Sample No.	Type of Well	Latitude	Longitude	Location	M.P(m)	DTW (m)	R.L	
							G.L	Top
HM-28	B.W.	17 17.055	78 14.516	Adj.Kesepalli Govindreddy house, Kanchamoniguda			596.55	597.26
HM-29	H.P.	17 17.849	78 13.073	Behind Hanuman Temple, Nachammaguda(or) Sajjanpally			596.55	597.26
HM-30	H.P.	17 19.972	78 22.345	at Chowrasta, Khalijkhandarga, D/S of Himayath Sagar Bund	0.5	4.49	528.55	529.07
HM-31	B.W.	17 16.931	78 22.128	at the entrance of village, Kotwalguda			543.94	544.74
HM-32	H.P.	17 15.519	78 19.983	Opp.M.P.High School, on road to Kavvaguda, Narkhuda	0.5	14.6	555.78	556.25
HM-33	H.P.	17 16.114	78 18.211	at the entrance of village, Sultanpalli	0.5	13.02	544.13	544.67
HM-34	H.P.	17 15.088	78 20.033	inside M.P.Primary school, Chaudarguda	0.6	16.96	563.63	564.06
HM-35	H.P.	17 11.144	78 18.302	Adj.Veer Hanuman Temple at the village entrance, Palmakul	0.5	9.75	577.35	577.84
HM-36	H.P.	17 13.753	78 17.348	Adj.Watersupply tank, Adj.Boddurai, Nanajpur	0.5	18	558.31	558.765
HM-37	H.P.	17 13.246	78 58.837	opp.Water tank, Peddaumityal	0.4	9.2	648.74	649.19
HM-38	H.P.	17 13.536	77 56.907	Deonanguda	0.6	11.5	669.42	670.1
HM-39	H.P.	17 11.283	77 56.662	Adj.Z.P.High School, Madhawaram	0.5	16.8	642.28	642.67
HM-40	H.P.	17 09.612	77 57.232	chowrasta, Palkampalle	0.7	15.4	640.51	641.26
HM-41	H.P.	17 08.034	77 55.787	at the entrance, Khudwandpur	0.5	12.8	660.03	660.51
HM-42	H.P.	17 07.535	77 57.995	opp. primary schoo, Chittal	0.5	7.1	659.43	660.03
HM-43	H.P.	17 15.353	78 23.844	Shamshabad to Gollapalli road, adjacent to international airport boundary, Gollapalli	0.5	10	575.45	575.93
HM-44	H.P.	17 11.104	78 16.350	inside Amruthalayam, Mallapur	0.5	24.8	567.73	568.33
HM-45	H.P.	17 09.998	78 18.652	SC colony, Peddatupran	0.5	24.7	578.76	579.22
HM-46	H.P.	17 06.042	78 21.035	near Overhead Tank, Subhanpur	0.5	17.61	611.215	611.72
HM-47	H.P.	17 03.424	78 14. 972	near Temple, Buchhiguda	0.5	>30	622.57	623.11
HM-48	H.P.	17 06.166	78 11.941	Beside Overhead Tank, Nagulapalli	0.5	23.09	627.93	628.47
HM-49	H.P.	17 09.249	78 11.126	Beside Temple & Masjid, Mamidipalli	0.5	28.2	622.6	623.3

Table 4.7 Well Inventory in the Catchment Area of Osman Sagar Lake – November 2004

Sample No.	Type of Well	Latitude	Longitude	Location	M.P.(m)	DTW (m)	R.L (m-amsl)	
							G.L	Top
OS1	H.P.	17 26. 951	78 01.376	Near Sayannaguda Cross roads	0.5	16.05	628.6	629.11
OS2								
OS3	D.W.	17 24.413	77 59.582	Phulmamidi	0	2.7	606.35	606.93
OS4	D.W.	17 22.081	77 54.204	Besides St.James Grammar school, Kothaguda, Vikarabad	0	8.71	628.55	629.15
OS5	D.W.	17 25.387	77 57.291	Supply well to Nawabpet	0.85	2.35	627.76	628.54
OS6	D.W.	17 28.079	78 04.977	Dhobipet	0.25	3.95	580.7	581.2
OS7	H.P.	17 27.136	78 07.338	Near Shankarpalli, Fatepur	0.5	9.2	570.76	571.46
OS8	H.P.	17 18.113	77 58.372	Yenkepalli X roads	0.5	15.94	656.45	656.98
OS9	H.P.	17 19.561	77 55.771	inside Zillaparishad high school, Sivareddypet	0.4	12.22	640	640.55
OS10	H.P.	17 20.610	77 55.432	SC Colony, Pathur.	0.5	15.29	629.83	630.275
OS11	H.P.	17 21.934	77 57.135	Opp. Anwarloom Engg College,Sriramnagar Colony,Dhannaram.	0.5	7.4	639.55	640.18
OS12								
OS13	H.P.	17 20.885	77 57.800	Chinchalpet X Road.	0.7	28.9	652.76	653.18
OS14	H.P.	17 23.130	77 57.858	Opposite Darga, Chinchalpet.			602.78	603.31
OS15	H.P.	17 23.113	77 58.532	Near Anganwadi, Attapur.	0	6.2	600.38	601.19
OS16	T.W.	17 22.854	77 59.600	Near Kuruva Narasimha, Aknapur	1	6.02	610.51	611.26
OS17	H.P.	17 21.593	77 59.991	Siddlur	0.5	4.5	620.32	621.76
OS18	H.P.	17 21.593	77 59.991	Near Overhead tank & School, Girgantapalli	0.5	6.3	636.44	636.91
OS19	H.P.	17 22.776	77 53.040	Kompally	0.5	7.03	645.77	646.45
OS20	H.P.	17 23.283	77 51.929	Near overheqd tank, Madanapalli	0.5	13.32	653.37	653.85
OS21	H.P.	17 24.707	77 52.630	Near Overhead tank, Errapalli	0.6	10.1	654.92	652.57
OS22	H.P.	17 23.973	77 53.974	Mandanpalli	0.5	7.35	639.32	640.12
OS23	H.P.	17 23.070	77 55.353	Near Outskirts, Mulamada	0.4	10.6	618.31	618.74
OS24	H.P.	17 23.071	77 55.535	Pendhimadugu	0.5	3.82	607	607.1
OS25	D.W.	17 24.128	77 55.271	Ekmamidi	2	12.4	643.86	644.6

Table 4.7 Well Inventory in the Osman Sagar Catchment – November 2004 (contd)

Sample No.	Type of Well	Latitude	Longitude	Location	M.P.(m)	DTW (m)	R.L (m-amsl)	
							G.L	Top
OS27	H.P.	17.43972	78.039597	Ellakanda			619.16	619.56
OS28	H.P.	17 24.145	78 13.239	Opp.Anganwadi centre/Ambedkar yuvajana Sangham,Gopularam	0.5	9.75	609.15	609.72
OS29	H.P.	17 24.145	78 13.240	inside Zillaparishad high school, Chinnamangalaram	0.5	11.33	551.32	551.92
OS30	H.P.	17 24.137	78 12.047	Opp.Mudiraj Sangham, Proddatur	0.6	8	552.01	552.71
OS31	H.P.	17 24.790	78 10.691	Near Yellamma temple, Tangatur	0.6	20.64	559.82	560.47
OS32	H.P.	17 25.458	78 08.508	Yelwarti village			564.12	564.87
OS33	H.P.	17 23.257	78 08.261	Besides Z.P.School, Yenkepally	0.5	4.14	575.81	576.51
OS34	B.W.	17 23.113	78 10.035	Opp.Z.P.School, Gollagudu			592.87	592.87
OS35	H.P.	17 21.580	78 09.947	Gollapalli	0.4	9.21	592.88	593.38
OS36	H.P.	17 22.300	78 12.089	Chowrasta, Medipalli	0.5	8.22	599.07	599.67
OS37	H.P.	17 22.485	78 07.240	infront of Pochamma temple,Kothapalli.	0.7	8.33	571.74	572.23
OS38	H.P.	17 19.702	78 03.945	at the end of road adj.ambedkar statue	0.7	20	607.43	607.92
OS39	D.W.	17 21.122	78 02.111	in kummariwada, near house of Sabitaindrareddy, Kaukuntla	0.7	6	629.19	629.64
OS40	H.P.	17 24.587	78 02.023	Behind Pochamma Temple, Gangyada	0.7	4.12	629.91	630.62
OS41	H.P.	17 25.247	78 03.464	in S.C.Colony, Opp.Venkaiah house,GubbadiFathepur	0.5	7.31	588.65	589.3
OS42	H.P.	17 25.305	78 05.550	Adj. Mandula Paramaiah house, Rd.opp.Hanuman temple, Kottaguda	0.5	17.2		
OS43	H.P.	17 22.151	78 03.450	Adj.Ambedkar Statue at entrance, Tangadipalli	0.6	2.6		
OS44	H.P.	17 20.412	78 15.534	near overhead Tank, Peddamangalaram	0.5	16.83	601.68	602.21
OS45	H.P.	17 21.086	78 13.641	mazid backside,Tangadepalli road, Elkagudem	0.5	16.35	580.08	580.78
OS46	H.P.	17 21.079	78 11.906	temple backside, Ravulapalli	0.5	13.35	596.75	597.33
OS47	H.P.	17 19.614	78 07.717	opp. Primary school, Ibrahimpalli	0.5	10.24	585.14	585.74
OS48	H.P.	17 24.453	78 15.751	opp. School,near tank, Janwada road Mirjaguda	0.5	9.6	581.2	581.65
OS49	H.P.	17 24.966	78 17.602	Lingampalli road Wattinagulapalli	0.5	>30	552.84	553.44
							556.59	557.29

447

Pediplains are covered with reddish brown sand and clay soils. It spreads over the weathered granitic gneisses and sedimentary rocks. The zone of weathering is moderate to deep (5-20 m). Pediplains area is under cultivation for dry and wet crops. Drainage over the pediplain is dendritic and parallel controlled by the lineaments, fractures and mega joints.

Deccan traps unit is characterized by elevated uplands with steep slope and dissected by deep and narrow valleys occupied by different flows. Plateau region also forms drainage divides. Individual flows are hard and massive at bottom, which grades to vesicular to tuffacious at top. The volcanic flows are mostly flat or gently dipping with thickness of each flow ranging from 10-30 m separated many a times by 1 – 2 m thick red bole. Alluvial geomorphic unit is more or less a stratified deposit of sand, silt and clay, deposited by rivers and streams. Unit consists of the flood plain deposits on either side of Musi and Musa rivers. The thickness of alluvium varies from 3 – 15 m along rivers over the weathered granite and gneisses.

4.4.2 Ground Water Withdrawal

Open well yield 45 m^3/day with average pumping of 250 lpm for 3 hrs in Moinabad mandal whereas the bore wells pumping with 150 lpm rate for 8 hrs are yielding 90 m^3/day. The two catchments areas cover arable land 95%. Afforestation increases the infiltration, lessens the land erosion and thereby silt load in stream and reduces the peaks of runoff. The crop water requirement during monsoon and non-monsoon period are presented in table 4.8

Table 4.8 General Crop Water requirements

Crop	Monsoon	Non-monsoon
Paddy	0.95 m	1.2 m
Irrigated dry	0.2	0.45 m
Horticulture	0.15	0.6

*After deducting 50% of rainfall 0.25 m.

Reddy PR 1991, reported a yield range of 300 – 600 lpm for bore wells in the fractured zone of Peninsular Gneisses/Deccan Trap where for bore wells in the weathered zones of peninsular gneisses and deccan traps yield 0-200 lpm. Central Ground Water Board (CGWB), 1975 reported that specific yield value range 3 – 4 % for granite/Deccan trap. Maximum radius of influence of bore well in fractured zone of granite trap is worked out by taking maximum wel yield, average maximum draw down and specific yield of the aquifer. Bore well will run for 210 days in a year with maximum average yield of 300 lpm at average rate of 0.3 m^3/min for 16 hours in a day resulting in 60489 m^3/ year. Weathered zone bore wells yield 150 lpm with average rate of same as above with radius of influence is 231. 3 m. Open wells in weathered zone of granite will run 210 days in a year with an average discharge of 0.32 m^3/min for 4 hours daily with specific yield of 3% and radius of influence of about 172 m.

Unit draft 1.6 ham for bore wells during 1989-90 has reduced to 0.9 ham and the withdrawal from Open wells has reduced from 1.17 ham to 0.44 during 1995-96. Shallow aquifers in weathered zone have gone dry particularly on either side of drainage divide between Himayath Sagar and Osman Sagar catchments. There may be more wells irrigating the same command could be one reason for reduction of unit draft. Drying up of shallow aquifers has lead to changes in cropping pattern in the area.

Some of the grape gardens have been removed and the paddy growing areas have been converted to irrigate dry crop.

4.4.3 Ground Water Conditions

During 1985-90, Depth to phreatic surface during pre-monsoon ranged between 4 - 21 m bgl. During this period, the average annual fluctuations as observed in 30 observation wells is about 3 m. The yield of large diameter dug wells varies from 100 – 450 m^3/d for draw downs of 0.5 – 3 m (Vidyanath, 1990). The ground water consumptive use and scenario is presented in table 4.9.

Table 4.9 Ground Water Consumptive Use

Wells catering intensive irrigation	average about 200 m^3/d
Bore wells in granites yield	4 –20 m^3/hr for draw-downs of 10 – 18 m
Average K and T values	3.16 m/d - 51 m^2/d respectively
Vegetable and paddy	wells tap about 100 m^3/d
Vine cultivation	200 m^3/d
Normal dynamic reserve	27 m^3/d

4.4.4 Ground Water Table Potential in Ranga Reddy districts

The entire district is underlain by hard rock formation. Ground-water occurrence is mainly controlled by weathered and fractured rocks. The weathered zone generally extends from a few metres to about sixteen metres below the ground level. In this zone ground water occurs under

water table conditions. In the fractured and semi weathered zones groundwater occurs under semi-confined to confined conditions. Mostly dug wells tap ground-water from the weathered zone. Bore-wells are constructed to tap ground water from deeper fractured zones. The average yield of dug well and dug-cum-bore well varies from 30 to 80 m^3 per day. The yield of bore well ranges from 2-5 m^3/sec. As per APTRANCO there are 78904 energised wells in the district of March 999. In the district there are three mandals viz., Moinabad, Maheswaram and Shamshabad which are partly dark and the remaining four mandals are under white category.

Groundwater Structures

Due to exploitation of ground water through wells the water level in many parts of the district has declined over a period of time. In view of this most of the farmers prefer bore wells in lieu of dug wells. Dug wells have scope only in shallow water level areas adjoining streams / rivers and in the command areas of minor irrigation tanks.

Deepening of wells

The level of water table normally varies between 3.5 to 17 m during pre and post monsoon periods in different geological formation. Though generally drought conditions prevail in the district, torrential rains during the year 2000 may improve the water table resulting in reduced demand for deepening of wells marginally. The development has been duly reckoned for projection in respect of deepening of wells.

Irrigation Pumpsets

As per estimates of dug wells/bore wells there is potential for energization of 3000 to 4000 wells every year. An additional provision towards backlog

and conversions from oil engines to electric motors forming about 10% of the present programme may also be considered.

Groundwater department has categorized the Shamshabad 75% (semi critical), Chevella (97%) Critical, Chevella north 127% over developed areas. Shankarpally and Vikarabad mandals are safe (50%) groundwater for development and classified entire Rangareddy district as semi critical condition.

Present Groundwater Condition in the study area

A number of check dams have been built during 2000 –2004 in both the catchment areas. These human interventions have reduced the surface runoff realized by both Osman Sagar and Himayath Sagar lakes. However the check dams have helped little improvement of groundwater conditions locally. In view of continuous drought conditions, enough storage could not be built even under the check dams during last three years. The depth of groundwater level has been found varying from 4 - 23 m.

4.4.5 Aquifer System in the Study Region

The hard rock formations are lack of primary porosity. Hence the aquifer system in these rocks is developed in response to the development of secondary porosity due to various tectonic disturbances and weathering activity. The aquifer system at shallow depths is normally developed due to joints and in situ weathering of granitic rock and its thickness vary between less than a few meters to about 18 m. The deeper aquifer system is developed due to major joints, fractures, crevices, shear zones etc.

In Deccan trap formations, apart from structural aquifers, vesicular zones for the main aquifer system. The number of vesicular zones depends on

the number of flows encountered in the red bole. In hard rocks it is not uncommon to encounter dry fractures/joints.

Interpretation of VES data

The geoelectric sections along different profiles have been drawn to understand the aquifer geometry and the regional geology of laterites, basalts and granites distinguish the drainage pattern (Figures.4.22 & 4.25) and interpreted layer parameters are presented in Table 4.10 and 4.11.

Himayath Sagar Catchment Area

Profile AA': The profile runs in the Southern part of the river Musa from West to East. The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which in this case is not exceeding 30 m (Figure. 4.23). The weathered zone is underlain by thick fracture zone of about 20 m thickness could easily be distinguishable. The depth to bed rock seems to close to the ground surface near the Himayath Sagar lake.

Profile BB': The variation in thickness of weathered zone is attributable to the changes in the regional geological profile from granites to basalts (Figure. 4.23). The thickness of weathered zone in the profile is about < 20 m and is underlain by fracture zone of thick fracture zone in basaltic rocks.

Profile CC': The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which in this case is not exceeding 10 m (Figure. 4.23). The profile is passing in the northern part of the river Musa. The transition zone of Basalts to Laterite could seen the Western of the profile. The regional disposition of

weathered zone and fracture zones controlling the groundwater flow regime in the catchment area could be seen in Figure 4.23.

Osman Sagar Catchment Area

Profile AA': The various hydrogeological conditions inferred through CGWB and State Groundwater Department have been verified through the vertical geo-electric section along the profile (Figure. 4.26). The profile runs in the northern part of the river. The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which in this case is not exceeding 30 m. The weathered zone is underlain by thick fracture zone of about 20 m thickness could easily be distinguishable.

Profile BB': The thickness of weathered zone is found to be maximum since the profile is passing through the Musi river course (Figure. 4.26). The thickness of weathered zone in the profile is about 35 m and is underlain by fracture zone of about 20-25 m.

Profile CC': The thickness of weathered zone could be inferred from the apparent resistivity values representing < 80 ohm- m, which in this case is not exceeding 30 m (Figure 4.26). The profile is passing in the southern part of the river Musi. The weathered zone is underlain by fracture zone. In general, the weathering seem to be more as one moves across the river Musi from north to south. The weathering of the geological formations is also dependent on the length of the flow path and lineaments criss-cross the tributaries draining into the river Musi. The variation of weathered zone and fracture zone thickness from West to East for the entire catchment has been depicted in Figure 4.26.

Aquifer Parameters

The transmissivity of the aquifers (fractured granites) ranges from 19 to 290 m^2/day presented in Table 4.12; the specific yield of phreatic aquifers ranges from 0.01 to 0.04. The vertical permeability of the confining material ranges from 1.35 x 10^{-4} to 3.3 x 10^{-2} m/day. The annual water level fluctuation in granitic recharge areas exceeds 9 m whereas in low lands the water level fluctuation is less than 3 m during 1970s.

Table 4.12 Aquifer Parameters

Chevella	- 1.1 lps - 9.1 m^2/d (Regional high)
Maharajpet	- 0.6 lps - 31.65 m^2/d (Regiona low)
Vattinagulapalli	- 5 lps - 282 m^2/d (local low)
Moinabad	- 1 lps - 43.94 m^2/d
Himayath Sagar (local low)	- 1.58 lps – 36.5 m^2/d
Gaganpahad (local high)	- 5 lps - 155 m^2/d
Enmulanara (regional High)	- 2.5 lps – 89.86 m^2/d
Maheswaram (local high)	- 2.8 lps --129.1 m^2/ d

Source Dr.Mohan Rao et al

ANNEXURE-XV

Minutes of the 4th Lake Protection Committee Meeting held on 29-03-2011 at Conference Hall , Tarnaka, Hyderabad.

The meeting was chaired by the Metropolitan Commissioner; HMDA as the chairman of the Committee and the list of the Members/ Officers attended the meeting is annexed herewith.

1. The Member Environment & Convener of Lake Protection Committee (LPC) welcomed the members and the participants and made a power point presentation. The power point presentation includes (a) formation of Lake Protection Committee and its functions; (b) the decisions taken in the last 3 LPC meetings; (c) the action taken and to be taken on the decisions taken, in the previous LPC meetings.

2. The Collectors of the 5 districts are once again requested to address the respective Sub-Registrars, not to register the land included in the FTL and buffer zone of the lake duly communicating the details of survey numbers and the extent of the area involved, and to be published in the District Gazette. This is the very important decision taken in the 1st LPC and is to be followed up to its logical conclusion. This will ensure reduction in the litigations in the court of law, as well as educating the general public regarding the lake area and its buffer zone.

   (Action: Collectors)

3. The Collectors may chalk out a programme to create strong awareness about the lake FTL area and buffer zone and the land associated with it and all other related important issues for awareness of general public.

   (Action: Collectors)

4. The District Collectors and Chief Engineer, Minor Irrigation are once again requested to take urgent follow up action in demarcation of FTL and buffer zone of lakes and fixation of FTL pillars along with the latitude and longitude. In this connection, the Joint Collector, R.R.Distrct has informed that as

decided in the 1st LPC meeting the demarcation of FTL and fixation of FTL pillars are completed in 21 priority lakes. The committee felt that Revenue and Irrigation officials need to revisit the prioritized 21 lakes and confirm the demarcation and fixation of FTL pillars, ensuring its positioning once again.

(Action: Collectors & Chief Engineer, Minor Irrigation)

5. The Chief Engineer, Minor Irrigation is requested to furnish the details of 501 lakes of erstwhile HUDA area i.e. lake memoirs, maps and all other vital details duly organizing field inspection of the lakes by formation of number of teams and confirming the details of the lakes and status of the lakes at present. This is to be coordinated by the Collectors of the concerned districts and Chief Engineer, Minor Irrigation by formation of the multi disciplinary team as decided in the 1st LPC meeting.

(Action: Chief Engineer, Minor Irrigation)

6. It is also decided to put on website the details of FTL pillars with latitude and longitude associated with each lake in proper format, in the HMDA area. It is also decided to put up a board indicating all the vital details at the appropriate point of the lake or in the buffer area for the information to all concerned and general public.

(Action: Chief Engineer, Minor Irrigation)

7. It is also suggested to identify and mark the channels on upstream and downstream of the lakes with survey numbers as these have threat of encroachments. The Revenue Department and Irrigation department are requested to carry out the demarcation of the boundary of lake and nala upstream and downstream. The Executive Engineer I & CAD Department have assured that the Survey will be completed in the next fifteen days for fixation of FTL's in 501 lakes in Erstwhile HUDA area & Lake memoirs shall be prepared in due course.

(Action: Collectors & Chief Engineer, Minor Irrigation)

8. It is decided to initiate strict and appropriate action including seizing the vehicles, tools, machinery etc and criminal action against all concerned, involved in the solid waste or debris dumping in the lakes and its buffer area. With a view, of ongoing large scale construction activities in Hyderabad Metropolitan region area, the civic body concerned granting the building permission are requested to formulate a mechanism for safe and proper disposal of construction waste and debris, while granting the building construction permission. Municipal Authorities and District Collector, R.R and Hyderabad are requested to take up a massive campaign programme against the debris dumping, construction material dumping in the lake and buffer area including inflow and outflow channels. This will go a long way in protection and restoration of water bodies.

   (Action: Commissioner, GHMC; Collectors, R.R.District and Hyderabad & Commissioner of Police, Hyderabad and Cyberabad)

9. The Chairman, LPC has also suggested to identify and incorporate the debris dumping yards in the Master Plan under preparation so as to avoid illegal dumping of the debris in the lake.

   (Action: Metropolitan Commissioner, HMDA)

10. The Chairman of the LPC has reiterated that the LPC has the responsibility for all legal actions to be taken by different members and informed that Lok Ayukta is also insisting that LPC is responsible for all actions to be taken in protection of the lakes. The Members are requested to take action on all the court cases on priority basis with time limits and intimate the action taken so as to inform to the Lok Ayukta, High Court , Government etc.

    Lok Ayukta cases and High Court Cases, annexed in Annexure-II of these minutes are discussed with members and members of LPC were requested to take time bound action as per the directions of Hon'ble Lok Ayukta and Hon'ble High Court and submit action taken report in the matter.

    (Action: All members, LPC)

11. On the request of Joint Collector, Mahaboobnagar; Metropolitan Commissioner, HMDA has agreed to consider for release of ` 10 Lakhs, for lake restoration work in HMDA area of District Mahaboobnagar.

(Action: Collector, Mahaboobnagar)

12. It is informed that there are encroachments existing within the FTL of Ramanthapur Cheruvu which are to be evicted and further informed that there are sewage inflows into the lake and M.D (HMWS&SB) is requested to lay the sewerage network in the area as per Master Plan diverting the inflows. The E.E.(I & CADD) informed that the GHMC has developed a park on the water course coming from O.U which is to be cleared so that the water from the cacthment will enter into the lake.

(Action: Commissioner, GHMC; Managing Director, HMWS&SB)

13. The LPC decided that the week wise programme shall be taken up for all the prioritized 21 lakes, visiting, inspecting and to take action for the development and protection of these lakes. Collectors are requested to prepare the action plan programme in this regard.

(Action: Collector, Hyderabad; Collector, R.R.District)

14. On the suggestion, Chairman, LPC has requested the members to examine the proposals of adoption of lakes by the Corporates / Private Sector for its development and maintenance.

(Action: All members, LPC)

15. It is also decided to examine and formulate a proposal aimed at restoration and development of about 100 to 200 lakes on priority basis in the erstwhile HUDA area on the line of GHEP project executed by HUDA and pose the same for its funding and sanctioning to the appropriate funding agencies including the State Government / Central Government and other international funding agencies making it as a environmental project.

16. The Chairman, Lake Protection Committee concluded the meeting, thanking all the Members with a request to take necessary action on priority, in connection with Lok Ayukta and Court Cases particularly by Irrigation Department, District Collectors and concerned civic authorities.

Metropolitan Commissioner, HMDA.
&
Chairman, Lake Protection Committee.

To
All the members.

Copy submitted to Prl. Secretary, MA&UD Department, A.P. Secretariat, Hyderabad.

ANNEXURE-XVI

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE

ORIGINAL APPLICATION NO. 6 OF 2022

In the matter of:

Shri. P. V. Subramanya Varma ...Applicant

Versus

The State of Telangana and 32 Ors. ...Respondents

REPLY AFFIDAVIT FILED ON BEHALF OF RESPONDENT NO. 5 / CENTRAL POLLUTION CONTROL BOARD

I, H.D. Varalaxmi, D/o. Shri. H.S. Devaiah, Hindu, aged about 51 years, having office at the Regional Directorate – Chennai, Central Pollution Control Board, 2nd Floor, 77-A, Ambattur Industrial Estate, Chennai – 600 058, do hereby solemnly affirm and sincerely state as follows:-

1. I submit that, I am presently working as Scientist 'E' and holding Charge of Regional Director, Regional Directorate, Chennai, Central Pollution Control Board (hereinafter called as CPCB) and have been authorized to file the reply affidavit on behalf of Respondent No. 5. I am fully conversant with the facts of the case and hence, competent and authorized to depose and swear the present as under:

2. I submit that, the Applicant is mainly focusing about illegal operations of stone crushing units in Ranga Reddy and Sanga Reddy District thus by violating the Environmental guidelines issued by the Central/ State Governments, causing air and dust pollution in and around the vicinity of the units and impact on the environment and health hazards to the people of nearby villages. Since the petition does not have direct reference to this answering Respondent and most of the paragraphs details about illegal operations of stone crushing units Para wise reply is not attempted.

H.D

H.D VARALAXMI, M.Tech
Regional Director
CENTRAL POLLUTION CONTROL BOARD
MoEF & CC, Govt. of India
Regional Directorate (Chennai)
2nd Floor, 77-A, South Avenue Road,
Ambattur Industrial Estate, Chennai - 600 058

3. I submit that, Telangana State Pollution Control Board (hereinafter called as TSPCB), namely the 4th Respondent, is empowered to grant Consent to Establish (CTE) and Consent to Operate (CTO) under the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 to the Stone Crushing units after ensuring requisite facilities and also to ensure compliance of conditions of CTE and CTO to prevent air pollution and fugitive emissions.

4. I submit that, the answering Respondent, in compliance of the Order dated 28.02.2020 passed by the Hon'ble NGT, Principal Bench in the matter of OA No. 304 of 2019, had examined the minimum distance prescribed by various states with respect to mining operation of minor mineral and prepared a report on "Distance Criteria for Permitting Stone Quarrying" and filed report before the Hon'ble NGT on 09.07.2020. The Hon'ble NGT vide Order dated 21.07.2020 approved the said minimum distance criteria for operation of stone quarries close to residences and public roads and directed that the same distance criteria have to be followed throughout the country.

5. I submit that, in compliance with Orders dated 30.05.2019 and 09.10.2019 passed by the Hon'ble NGT, Principal Bench in the matter of O.A. No. 739 of 2018 in case of Residents of Gram Panchayat Varahiya Vs. State of Madhya Pradesh, the answering Respondent had developed the requisite mechanism for the assessment of damage to the air quality, public health and agriculture production loss by referring relevant documents. The formula/equations were developed for assessing the damage in monetary terms, which may be recovered from stone crushers operating illegally and/or without complying with the prescribed norms. The explanation/demonstration of the mechanism in terms of monetary calculations was circulated to all SPCBs/PCCs.

6. I submit that, the answering Respondent had received a complaint forwarded by Ministry of Environment, Forest and Climate Change (hereinafter called MoEF&CC), Delhi,

H.D VARALAXMI, M Tech
Regional Director
CENTRAL POLLUTION CONTROL BOARD
MoEF & CC, Govt. of India)
Regional Directorate (Chennai)
3rd Floor, 17-A, South Avenue Road,
Thiru Vi Ka Industrial Estate, Chennai - 600 032

namely, the 13th Respondent on 25.10.2021 and forwarded it to TSPCB, namely the 4th Respondent on November 9, 2021, requesting to investigate the matter and forward the Action Taken Report (ATR) to the complainant and 5th Respondent. The 4th Respondent had forwarded the Action Taken Report through email dated 15.02.2022 and the same was forwarded to the Applicant.

Hence in view of above, it is respectfully prayed that this Answering Respondent No. 5 will abide by the order(s)/direction(s) passed by this Hon'ble Tribunal.

DEPONENT

H.D VARALAXMI, M.Tech
Regional Director
CENTRAL POLLUTION CONTROL BOARD
MoEF & CC, Govt. of India
Regional Directorate (Chennai)
No. Plot - 77-A, South Avenue Road
SIDCO Industrial Estate, Chennai - 600 032

VERIFICATION

I, H.D. Varalaxmi, D/o. Shri. H.S. Devaiah, working as Scientist 'E' and Regional Director, Central Pollution Control Board, the 5th Respondent herein, do hereby declare that the contents of this Reply Affidavit is based on official record and information available in the office are true and correct to the best of my knowledge and belief.

Signed and verified at Chennai on this the 22nd day of February, 2022

DEPONENT

H.D VARALAXMI, M.Tech
Regional Director
CENTRAL POLLUTION CONTROL BOARD
MoEF & CC, Govt. of India
Regional Directorate (Chennai)
No. Plot - 77-A, South Avenue Road
SIDCO Industrial Estate, Chennai - 600 032

Counsel for CPCB

ANNEXURE - XVII

Item No. 02 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 739/2018

(With report dated 30.08.2019)

Residents of Gram Panchayat Varahiya Applicant(s)

Versus

State of M.P. Respondent(s)

Date of hearing: 09.10.2019

CORAM: **HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON**
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Applicant (s): None

For Respondent(s): Mr. Raj Kumar, Advocate for CPCB

ORDER

1. Question for consideration is the remedial action against dust pollution by illegal operation of stone crushers at Village Tilora, Rausa, Tehsil Mehar, District Satna at NH-7 (New Four lane) in the State of Madhya Pradesh.

2. Vide order dated 30.05.2019, after reviewing the earlier proceedings and considering the report dated 02.05.2019, recommending action against the defaulting stone crushers, the Tribunal directed the statutory authorities to proceed in accordance with law. The Tribunal also directed the CPCB to develop requisite mechanism for assessment of compensation for damage to the air quality,

agricultural production loss and damage assessment of health issues. The State PCB was also to furnish a further action taken report.

3. In view of the above, the CPCB has filed its report on 30.08.2019 suggesting following formulae:

Damage to Air Quality *(Damage $_{AQ}$)* in Rs.:

Damage $_{AQ}$ = **(Load**$_{pM10}$ **X** ***EP***$_{PM2.5}$**+(Load**$_{pM10}$ **X EP**$_{PM2.5}$**)**

Damage to Health due to Respiratory diseases (Damage$_H$) in Rs.:
Damage $_H$ ***No. of cases Reported (X) X COI*** *Affected area*

Agriculture Production Loss of Crop A by PM_{10} and PM 2.5 ($APL_{pMCropA}$) in Rs.:
$APL_{PMCropA} = APL_{CropA} \times 10\%$

The above formulae takes into account damage to air quality, health issues and agricultural production loss of crop which are to be calculated as follows:

The formula/equation for calculating the damage to the air quality (Damage $_{AQ}$) is derived by using the following values:

i. Total Load of PM10 in excess of the prescribed site in the affected site in Kg/day **(Load $_{PM10}$)**
ii. Total Load of PM2.5 in excess of the prescribed site in the affected site in Kg/day **(Load $_{PM\ 2.5}$)**
iii. Environmental Price for Average Particulate Emissions, PM10 **(EP_{PM10})**:Rs. 2519.34/kg Emission
iv. Environmental Price for Average Particulate Emissions, PM 2.5 i.e. **($EP_{PM2.5}$)**:Rs. 3665.36 /kg Emission

Damage to Air Quality in Monetary Terms /Environmental Price Rs. /day:

Damage $_{AQ}$ (Rs/day) = (Load$_{PM2.5}$ x EP$_{PM10}$) +(Load $_{PM2.5}$ x EP$_{PM10}$)

Eq (1)

Note:

a) *The value obtained from this formula should be multiplied by the number of days depending on the time period for which environmental damage is to be calculated.*

b) *The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for PM_{10} and $PM_{2.5}$ in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the Damage AQ with the contribution factor for stone Crushers.*

Damage to Health due to Respiratory diseases ($Damage_H$) in Rupees:

$Damage_H$ (Rs): No. of cases Reported (X) x COI $_{Affected\ area}$ Eq (2)

Note:

The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for Particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the **$Damage_H$** with the contribution factor for stone Crushers.

Agriculture Production Loss:

Model sensitivity studies carried out in India has identified NOx as the key pollutant causing as much as 93% of the crop loss, Since, NOx emissions are not directly related to stone crusher operation, it is proposed to attribute 100-93 = 7% (say 10%) of total yield loss to particulate matter emissions (PM1.0 and PM 2.5) to start with. The formula/equation for calculating the agricultural production loss is calculated by using the following details:

Average production yield for Crop A in Tonnes/Acre **($Yield_{Avgcrop\ A}$)**

Actual Yield of Crop A in the Affected area in Tonnes/Acre **($Yield_{ActcropA}$)** Affected Area in Acres **($Area_{Acr}$)**

Total Yield Loss **($Loss_{yld}$)= ($Yield_{ActcropA}$ - $Yield_{Avgcrop\ A}$) x AreaAcr** Minimum Sale Price of Crop A in Rs/Tonne (**MSP crop A)**

Agriculture Production Loss of Crop A (APLcropA) in Rs.:

$APL_{CropA} = LOSS_{Yld}$ X MSP Crop A
Eq (3)

Estimated Percentage Contribution of Stone Crushers in Yield Loss: 10%

Agriculture Production Loss of Crop A by PM_{10} and PM 2.5 (APLpmcropA) in Rs.:

$APL_{PMCropA} = APL_{CropA}$ x 10% **Eq (4)**

Note:

The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the $APL_{PMCropA}$ with the contribution factor for stone Crushers.

4. While we direct the CPCB to further explain the above in terms of monetary calculation and circulate .the same to all the State PCBs/PCCs, the Madhya Pradesh State PCB may now with the assistance of the CPCB take further action and furnish a report to this Tribunal by email at judicial-ngt@gov.in within one month. The CPCB may also prepare a scenario analysis report with a view to test the applicability of formulae to different situations.

5. A copy of this order be sent to the CPCB and the Madhya Pradesh State PCB by email.

List for further consideration on 13.12.2019.

Adarsh Kumar Goel, CP

S.P Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

October 09, 2019
Original Application No. 739/2018
AK

NATIONAL GREEN TRIBUNAL NEW DELHI

Item No. 09 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 304/2019

(With report dated 09.07.2020)

M. Haridasan & Ors. Applicant(s)

Versus

State of Kerala Respondent(s)

Date of hearing: 21.07.2020

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Respondent(s): Ms. Soni Singh, Advocate for CPCB
Mr. Jogy Scaria, Advocate for KSPCB

ORDER

1. The Issue for consideration is the safeguards in operation of stone quarries close to residences and public roads. At present, the Kerala State PCB has permitted the stone quarry beyond 50 mtrs. from residences and public roads.

2. The Tribunal considered the matter on 28.02.2020. Finding the distance to be inadequate, CPCB was required to consider the matter and report. It was observed:

> *"2. Accordingly, a report has been filed by the Kerala State PCB on 17.12.2019 retreating the distance criteria of 50 mtrs. and mentioning that no study is available with the CPCB.*

3. *We are of the view, as earlier observed that the* ***distance of 50 mtrs. for stone quarry, particularly when blasts are involved, is highly inadequate and can have deleterious effect on noise and air pollution, environment and public health.***

4. *In view of above, we direct the* ***CPCB to examine and lay down more stringent conditions and appropriately longer distance within one month and convey the same to the State Boards.*** *The State Board may take further action accordingly. Compliance reports be filed before the next date by email at judicial-ngt@gov.in."*

3. Accordingly, the CPCB has filed its report on 09.07.2020 concluding as follows:

"6.0 Conclusion:

In view of available information, following minimum distance criteria may be considered for permitting stone quarrying by SPCBs:

Mining Type		***Minimum Distance***	***Locations***
A.	***When Blasting is not involved***	***100 m***	*Residential/ Public buildings, Inhabitedsites, locations to be considered by States.*
B.	***When Blasting is involved***	***200 m *****	

*****Note: The regulations for danger zone (500 m) prescribed by Directorate General of Mines Safety also have to be complied compulsorily*** *and necessary measures should be taken to minimise the impact on environment.*

However, if any states is already having stringent criteria than the above for minor mineral mining (i.e. more prescribed distances than the above), the same shall be applicable."

4. In view of the above, the said criteria be followed throughout India.

The CPCB may monitor compliance.

A copy of this order be sent to the CPCB and all the State PCBs/PCCs by email for compliance.

The application is disposed of.

Adarsh Kumar Goel, CP

S. P. Wangdi, JM

Dr. Nagin Nanda, EM

July 21, 2020
Original Application No. 304/2019
AK

Item No.05:

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Appeal No.25 of 2020 (SZ)

(Through Video Conference)

IN THE MATTER OF

1) M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd.
Represented by its Authorized Signatory,
Sri.K. Ramalingam S/o. K. Bala Brahma Chary, aged about 50 years,
Designation: Managing Director,
R/o. 17, Cyber Meadows, Masid-banda,
Kondapur, Hyderabad – 500 084.

2) M/s. Aadeshwar Aggregates Pvt. Ltd.
Represented by its Authorized Signatory,
Sri. D. Sumanth, S/o. D. Subrahmanyam Reddy, aged about 30 Years,
Designation: Director,
R/o. Villa No.21, Vessella Villas,
Sri Ram Nagar Block C, Kondapur,
Kothaguda Post, Hyderabad – 500 084.

...Appellant(s)

Versus

1) The State of Telangana
Represented by its Principal Secretary,
Department of Mines and Geology,
Office at My Home Sarovar Plaza,
Flat No.203 & 204, 2nd Floor, House No.5
922, Shapurwadi, Adarshnagar, Secretariat Road, Hyderabad, Telangana – 500 063.

2) Telangana State Pollution Control Board,
Represented by its Member Secretary,
Office at Paryavaran Bhavan, A-3,
Industrial Estate, Sanath Nagar,
Hyderabad.

3) The Joint Chief Environmental Engineer,
Telangana State Pollution Control Board
Office at Podupu Bhavan – IV Floor,
Hyderabad Collectorate Complex,
Hyderabad.

4) Environmental Engineer,
Telangana State Pollution Control Board,
Regional Office – I, Ranga Reddy District.
Office at – D.No.2-14-154/101, Flat No.101,
My Residency, Beerappagudda, Uppal,
Hyderabad- 500 039.

5) The Deputy Director,
Department of Mines and Geology,
Regional Office – Hyderabad.
Office at Plot No.191 & 192,
Vignanpuri Colony, Beside Saheb Nagar
HMW&SB, B.N. Reddy Nagar, Rangareddy
District, Hyderabad – 500 079.

6) The Assistant Director,
Department of Mines and Geology,
District Office – Ranga Reddy
Office at 2-1-566/B/6/7, Nallakunta,
Street No.11, Near Shankermutt,
Hyderabad- 500 044.

...Respondent(s)

Date of Judgment: 28.09.2020.

CORAM:

HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER

HON'BLE MR. SAIBAL DASGUPTA, EXPERT MEMBER

For Appellant(s): Sri. Unnam Muralidhar Rao for
M/s. Unnam Law Firm.

For Respondent(s): Smt. H. Yasmeen Ali for R1, R5 & R6.
Sri. T. Saikrishnan through
Sri. B. Lakshmi Narasimhan for R2 to R4.

JUDGMENT

1. The above appeal has been filed by the appellant against the order rejecting the application for Consent to Establishment by the Telangana Nadu Pollution Control Board as per annexure – A1. Order. According to the appellant, they filed an appeal before the Telangana Pollution Control Board and that was also rejected, evidenced by Order dated 20.03.2020.

2. When the matter came up for hearing today through Video Conference. Sri. Unnam Muralidhar Rao represented the appellant. Smt. H. Yasmeen Ali represented respondents 1, 5 & 6 and Sri. T. Sai Krishnan through Sri. B. Lakshmi Narasimhan represented respondents 2 to 4.

3. The learned counsel appearing for the State of Telangana as well as Telangana Pollution Control Board submitted that though there is a separate appellate authority established under the pollution control laws under the Water (Prevention & Control of Pollution) Act, 1974 as well as Air (Prevention & Control of Pollution) Act, 1981, it is not functioning.

4. The learned counsel appearing for the appellant submitted that the Pollution Control Board is the appellate authority. We do not

think that the persons who is bound to issue an order itself can act as Appellate Authority as well.

5. Under Section 16 (1) (f) of National Green Tribunal Act, 2010, appeal will lie to this Tribunal only against the order passed by the appellate authority constituted under the Water (Prevention & Control of Pollution) Act, 1974 as well as Air (Prevention & Control of Pollution) Act, 1981 and not against the order of the Pollution Control Board.

6. However, it may be mentioned here that in view of the dictum laid down in the decision reported in ***Tamil Nadu Pollution Control Board Vs. Sterlite 2019 SCC Online SC 221***. This Tribunal cannot usurp the jurisdiction of the appellate authority and if the appellate authority is not functioning or not dealing with the matter, then the remedy of the appellant is to approach the Hon'ble High Court of Telangana for appropriate relief and not straight away come to this Tribunal challenging the order passed by the Pollution Control Board rejecting the application for Consent to Establish.

7. When this was pointed out, the learned counsel appearing for the appellant sought permission of this Tribunal to withdraw

this appeal with liberty to approach the appropriate forum in accordance with law.

8. The above submission is recorded and the appeal is dismissed as withdrawn with the above liberty.

.....J.M.
(Justice K. Ramakrishnan)

.....E.M.
(Shri. Saibal Dasgupta)

Appeal No.25/2020,
28th Septemeber, 2020 Mn.

NGT

ANNEXURE – XIX

State Level Environment Impact Assessment Authority (SEIAA)
Telangana State
Government of India
Ministry of Environment Forests & Climate Change
A-3, Industrial Estate, Sanathnagar, Hyderabad-500 018.

BY REGD. POST WITH ACK DUE

Order No. SEIAA/TS/OL/RRD-17/2016- 1910 **Dt:03.11.2016.**

Sub: SEIAA, TS – "Residential Villas" of M/s. Vessella Woods, Survey No. 51 (p), Madinaguda (V), Serilingampally (M), Ranga Reddy District. – Environmental Clearance – Issued – Reg.

I. This has reference to your application submitted online on 14.07.2016 (proposal no. SIA/TG/MIS/57444/2016) received on 22.09.2016 seeking Environmental Clearance for the proposed Residential Construction Project titled **"Residential Villas" of M/s. Vessella Woods, Survey Nos. 51 (p), Madinaguda (V), Serilingampally (M), Ranga Reddy District.** The capital cost of the project is Rs. 50.0 Crores.

II. It is noted that the proposal is for Construction Project in a total plot area of about 36,523.4 Sq.m. Out of that, Green area is 3,876.1 Sq.m. The total Built-up area is 28,974.8 Sq.m. The project consists of Independent Villa with (G + 2 Floors) to accommodate 82 units; and Amenities block with (G + 3 Floors). It is also noted that the parking area to be provided that each villa with 2 parking spaces. The amenities to be provided includes Sewage Treatment Plant (STP), Community center, MSW Segregation point, D.G. Sets for emergency supply – 2 x 250 kVA.

III. The source of fresh water is HMWS&SB. The total water requirement during occupational stage is 64.2 KLD. Out of that, fresh water requirement is 45.9 KLD & treated recycled waste water is 18.3 KLD. Quantity of sewage generated is 51.3 KLD. It is proposed to treat the sewage in a STP of capacity 60 KLD. The treated waste water is to be used for: flushing the toilets, and development of greenery. The excess treated waste water shall be discharged into the public sewer lines. The Garbage (263.2 kg/day) generated is to be sent to Municipal Solid Waste disposal site. STP sludge (3.0 kg/day) is to be used as manure, used oil and used batteries are to be sent to Authorized Recyclers.

IV. The proposal has been examined and processed in accordance with EIA Notification, 2006 & its amendments thereof. The State Level Expert Appraisal Committee (SEAC) examined the proposal in its meeting held on 28.09.2016. The project is exempted from Public Hearing as it is a Construction Project. Based on the information furnished, presentation made by the proponent and the consultant M/s. Team Labs & Consultants, Hyderabad; the Committee considered the project proposal and recommended for issue of Environmental Clearance. The State Level Environment Impact Assessment Authority (SEIAA) Telangana, in its meeting held on 20.10.2016 examined the proposal and recommendations of SEAC, Telangana and undertaking submitted by the proponent vide lr. dt. 28.09.2016 for not carrying out any construction activity in the earmarked Open area, Green area & Road area for issue of Environmental Clearance. Accordingly, after discussions in the matter and considering the recommendations of the SEAC, Telangana, **the SEIAA, Telangana hereby accords prior Environmental Clearance to the project** as mentioned at Para no. I under the provisions of the EIA Notification 2006 and its subsequent amendments issued under Environment (Protection) Act, 1986 subject to implementation of the following specific and general conditions:

PART – A: SPECIFIC CONDITIONS

I. Construction Phase:

i. Provision shall be made for the housing of the construction labour within the site with all necessary infrastructure and facilities such as safe drinking water, fuel for cooking, mobile toilets, mobile STP, medical health care, crèche etc., The housing may be in the form of temporary structures to be removed after the completion of the project. The safe disposal of wastewater and solid wastes generated during the construction phase should be ensured.

ii. A First Aid Room shall be provided in the project both during construction and operation of the project.

iii. All the topsoil excavated during construction activities should be stored for use in horticulture/landscape development within the project site.

iv. Disposal of debris waste, muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

v. Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.

vi. Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.

vii. Any hazardous waste including biomedical waste, if any, should be disposed of as per applicable Rules & norms with necessary approvals of the Telangana State Pollution Control Board.

viii. The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to E (P) Rules prescribed for air and noise emission standards.

ix. Vehicles hired for bringing construction material to the site should be in good condition and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.

x. Ambient noise levels should conform to the residential standards both during day and night as notified by the MoE&F, GOI from time to time. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by the CPCB.

xi. As per the provisions of Fly Ash Notification No: S.O. 2804 (E), dt. 03.11.2009, every construction agency engaged in the construction of buildings within a radius of hundred kilometers from a coal or lignite based thermal power plant shall use only fly ash based products for construction, such as: cement or concrete, fly ash bricks or blocks or tiles or clay fly ash bricks, blocks or tiles or cement fly ash bricks or bricks or blocks or similar products or a combination or aggregate of them in every construction project.

xii. Ready mixed concrete must be used in building construction.

xiii. Storm water control and its re-use shall be as per CGWB and BIS standards for various applications.

xiv. Permission to draw ground water shall be obtained from the competent Authority prior to construction/operation of the project.

xv. Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.

xvi. Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.

xvii. Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices of sensor based control.

xviii. Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air-conditioning. If necessary, high quality double glass with special reflective coating in window is to be used.

xix. Roof should meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirement.

xx. Adequate measures to reduce air and noise pollution during construction keeping in mind CPCB norms on noise limits.

xxi. Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all air-conditioned spaces while it is aspirational for non-air conditioned spaces by use of appropriate thermal insulation material to fulfill requirement.

xxii. The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipments, etc. as per National Building Code including protection measures from lightening etc.

xxiii. The proponent shall put tarpaulin on scaffolding around the area of construction and the building

xxiv. The proponent shall fully cover any kind of construction material stored in the site, in all respects so that it does not disperse in the Air in any form. The dust emissions from the construction site should be completely controlled and all precautions taken in that behalf. The proponent shall control dust emissions if any by fixing sprinklers, creation of green belt/Air barriers, etc,.

xxv. All construction material and debris shall be carried in the trucks or other vehicles which are fully covered and protected so as to ensure that the construction debries or the construction material does not get dispersed into the air or atmosphere.

xxvi. The vehicle carrying construction material and construction debris of any kind should be cleaned before it is permitted to ply on the road after unloading of such material.

xxvii. Every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris shall be provided with masks to prevent inhalation of dust particles. The proponent shall provide all medical help, investigation and treatment with the workers involved in the construction material and debris relatable to dust emission.

xxviii. The proponent shall compulsorily use wetjet in grinding and stone cutting, if any.

xxix. The proponent shall provide wind breaking walls around the construction site.

xxx. Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.

II. Occupational Phase:

i The installation of the Sewage Treatment Plant (STP) should be certified by an independent expert and a report in this regard should be submitted to the SEIAA before the project is commissioned for operation. Discharge of treated sewage shall conform to the norms & standards of the Telangana State Pollution Control Board. Sewage Treatment Plant should be monitored on a regular basis. No waste water shall be discharged outside the premises until outlet is connected to public sewer line. Till such time, the excess treated sewage, if any, is to be discharged into an artificial pond within the premises and can be utilized for recreational purpose.

ii Rain water harvesting for roof run-off and surface run-off, as plan submitted should be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease.

iii The solid waste generated should be properly collected & segregated before disposal to the City Municipal Facility. The organic waste shall be composted.

iv The D.G. Sets shall be provided with acoustic enclosures and adequate stack height as per CPCB norms. The fuel used for the diesel generator sets should be low sulphur diesel and should conform to E (P) Rules prescribed for air and noise emission standards.

v Any hazardous waste including biomedical waste should be disposed of as per applicable Rules & norms with necessary approvals of the Telangana State Pollution Control Board.

vi The green belt design along the periphery of the plot shall achieve attenuation factor conforming to the day and night noise standards prescribed for residential land use by the MoE&F, GOI/CPCB. The open spaces inside the plot should be suitably landscaped and covered with vegetation of indigenous variety. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

vii Incremental pollution loads on the ambient air quality, noise and water quality should be periodically monitored after commissioning of the project.

viii Application of solar energy should be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid systems or fully solar system for a portion of the apartments should be provided.

ix Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.

x Adequate number of parking spaces shall be provided for visitor vehicles. Rest room facilities should be provided for service population. The proponent shall provide public convenience facilities such as toilets, bathrooms, waiting rooms etc. for the drivers, workers etc. so as to maintain cleanness/hygienic conditions in the surroundings of the project.

xi The proponent shall comply with Energy Conservation Practices, Energy efficient practices and energy audit practices. Wherever feasible, green building concepts shall be adopted. Use of solar panels may be done to the extent possible.

xii Adequate measures should be taken to prevent odour problem from solid waste processing plant and STP.

xiii Green area of at least 10% of the site area shall be developed and maintained.

Part – B. General Conditions:

i. **This order is valid for a period of 7 years from the date of issue of this order.**

ii. "Consent for Establishment" shall be obtained from Telangana State Pollution Control Board under Air and Water Act before the start of any construction work at site.

iii. The environment safeguards contained in the EMP Report should be implemented in letter and spirit. The responsibility of implementation of environmental safeguards rests fully with the proponent ie., M/s. Vessella Woods.

iv. The proponent shall not carry out any construction activity in the earmarked Open area, Green area & Road area of the project as committed by the project proponent vide letter dt. 28.09.2016

v. All the conditions, liabilities and legal provisions contained in the EC shall be equally applicable to the successor management of the project in the event of the project proponent transferring the ownership, maintenance of management of the project to any other entity.

vi. The proponent shall submit half-yearly compliance reports in respect of the terms and conditions stipulated in this order & monitoring reports in hard and soft copies to the SEIAA and Ministry's Regional office, Chennai on 1st June and 1st December of each calendar year.

vii. Officials from the Regional Office of MoEF&CC, Chennai who would be monitoring the implementation of environmental safeguards should be given full co-operation, facilities and documents/data by the project proponents during their inspection. A complete set of all the documents shall be submitted to the CCF, Regional Office, MoEF&CC, Chennai.

viii. In the case of any change (s) in the scope of the project, the project would require a fresh appraisal by this SEIAA. No further expansion or modifications in the project shall be carried out without prior approval of the SEIAA, TS.

ix. The project proponent shall submit the copies of the environmental clearance to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

x. The project proponent shall obtain all other statutory clearances, as applicable, from the competent authorities.

xi. The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded environmental clearance and copies of clearance letters are available with the Telangana State Pollution Control Board. The advertisement should be made within 7 days from the day of issue of the clearance letter and a copy of the same should be forwarded to the Regional Office of this Ministry at Chennai.

xii. Environmental clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

xiii. The funds earmarked for environmental protection measures (Capital cost Rs. 90.85 Lakhs during construction phase and Rs. 3.25 lakhs during occupation phase; Recurring cost Rs. 6.83 lakhs per annum during construction phase and Rs. 14.66 lakhs per annum during occupation phase) should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the SEIAA and Ministry's Regional Office located at Chennai.

xiv. Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

xv. The SEIAA may revoke or suspend the order, if implementation of any of the above conditions is not satisfactory. The SEIAA reserves the right to alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

xvi. Concealing the factual data or failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986 without any prior notice.

xvii. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

Sd/-	Sd/-	Sd/-
MEMBER SECRETARY	MEMBER	CHAIRMAN,
SEIAA, T.S.	SEIAA, T.S.	SEIAA, T.S.

To

Sri Prashanth Reddy, Managing Director,
M/s. Vessella Woods,
1st Floor, North Commercial Block,
Cyber Meadows, Majid Banda, Kondapur,
Hyderabad – 500 084
Ph.No.+91-40-23014497/99
E-mail: info@vessella.in

//T.C.F.B.O//

SENIOR ENVIRONMENTAL ENGINEER
(Unit Head – III)

ANNEXURE – XX

TELANGANA STATE POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, A - 3, INDUSTRIAL ESTATE,
SANATHNAGAR, HYDERABAD - 500 018

Phone: 23887500
Fax: 040 – 23815631
Website: www.tspcb.cgg.gov.in

CONSENT ORDER FOR ESTABLISHMENT – ORANGE CATEGORY

Order No.1606228/TSPCB/CFE/RO-RR-I/HO/2018 **Dt.05.11.2018**

Sub: TSPCB – CFE – Proposed Construction Project of **"Residential Villas" of M/s. Vessella Woods, Survey No.51 (P), Madinaguda, Serilingampally (M), Rangareddy District – Consent for Establishment** of the Board under Sec.25 of Water (Prevention & Control of Pollution) Act, 1974 and Under Sec.21 of Air (Prevention & Control of Pollution) Act, 1981 – Issued – Reg.

Ref:
1. EC Order No.SEIAA/TS/OL/RRD-17/2016-1910, dated 03.11.2016.
2. CFE Application submitted through TS-iPASS on 26.09.2018.
3. RO, Rangareddy-I verification report dated 04.10.2018.
4. Minutes of the CFE Committee meeting held on 24.10.2018.

* * * * *

1. In the reference 2nd cited, an application was submitted to the Board seeking Consent for Establishment (CFE) for the proposed **Residential Villas Construction Project** with a project cost of Rs.50.0 Crores.

   The project consists of:

   "Independent Villa with (G+2 Floors) to accommodate 82 units; and Amenities Block with (G+3 Floors)."

2. As per the application, the above project is to be located at Survey No.51 (P), Madinaguda, Serilingampally, Ranga Reddy District with a total plot area of about 36523.4 Sq.mtrs. Out of that, Green area is 3876.1 Sq.mtrs. The total Built-up area is 28974.8 Sq.mtrs.

   The parking area to be provided that each Villa with 2 parking spaces.

   The amenities to be provided includes Sewage Treatment Plant (STP), Community centre, MSW Segregation point, DG Sets for emergency supply – 2 x 250 KVA.

3. In the reference 3rd cited, the Environmental Engineer, Regional Office, Rangareddy-I, T.S.Pollution Control Board reported that the above site was inspected on 04.10.2018 and observed that the site is surrounded by:

North	:	Open Land
South	:	Open Land followed by road from Chandanagar to Hafeezpet
East	:	Open Land of a Farmhouse situated adjacent to the site
West	:	Open Land

4. The Board, after careful scrutiny of the application and verification report of the Regional Officer and E.C. order dated 03.11.2016 issued by SEIAA and after examining in the CFE Committee meeting held on 24.10.2018, hereby issues **CONSENT FOR ESTABLISHMENT** to your project under Section 25 of Water (Prevention & Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to the project as mentioned at Para (1) & (2) only.**

5. This Consent Order now issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.

6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

Encl: Schedule 'A'
Schedule 'B'

Sd/-
MEMBER SECRETARY

To
"Residential Villas" of
M/s. Vessella Woods,
Survey No.51 (P), Madinaguda,
Serilingampally (M), Rangareddy District

Copy to:

1. The JCEE, TSPCB, Z.O., Hyderabad for information.
2. The E.E., TSPCB, R.O, Rangareddy-I for information and necessary action.

// T.C.F.B.O//

Senior Environmental Engineer
(Unit – I)

SCHEDULE – A

1. Separate energy meters shall be provided for Sewage Treatment Plant (STP) to record energy consumed.

2. The proponent shall obtain Consent for Operation (CFO) from TSPCB, as required Under Sec.25/26 of the Water (Prevention and Control of Pollution) Act, 1974 and under sec. 21/22 of the Air (Prevention and Control of Pollution) Act, 1981, before commencement of the activity.

3. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such modifications as deemed fit and stipulate any additional conditions by the Board.

4. The Consent of the Board shall be exhibited in the project premises at a conspicuous place for the information of the inspecting officers of different departments.

5. Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.

6. Good housekeeping shall be maintained. All pipe valves, sewers, drains shall be leak proof.

7. Rain Water Harvesting (RWH) structure (s) shall be established on the project site. Effluent shall not enter the RWH structures.

8. Half yearly progress report on project implementation shall be submitted to the RO, TSPCB.

9. The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.

10. **This order is valid for period of 5 years from the date of issue.**

SCHEDULE – B

Water:

1. The source of water is HMWS&SB. The maximum water consumption shall not exceed the following:

Sl.No.	Purpose	Quantity (KLD)
1.	Domestic	45.9
2.	Flushing & Green belt	18.3
	Total	**64.2 KLD** (45.9 fresh + 18.3 treated)

2. The maximum waste water generation shall not exceed the following:

Sl.No.	Purpose	Quantity (KLD)
1.	**Domestic & Flushing**	**51.3 KLD**

3. **Treatment & Disposal:**

The project shall modify the STP to meet the reusable standards as follows:

Parameter	Standards
pH	6.0 – 9.0
Oil & Grease	10 mg/l
Biochemical Oxygen Demand (BOD)	≤10 mg/l
Chemical Oxygen Demand (COD)	250 mg/l

The treated water shall be used for flushing the toilets and development of greenery. The excess treated waste water shall be discharged into the public sewer lines. The proponent has submitted the copy of the feasibility certificate from HMWS&SB in the meeting.

4. The Sewage Treatment Plant of 60 KLD capacity shall be constructed and commissioned along with the commissioning of the activity. All the units of the STP shall be impervious to prevent ground water pollution. STP shall be operated in a closed circuit so as to avoid smell nuisance.

5. During construction stage septic tank followed by soak pit shall be constructed to the temporary toilets / kitchen provided for the construction labour and shall be removed after completion of the project.

6. Rain water harvesting for roof run-off and surface run-off should be implemented. Before recharging the surface run off, pre-treatment must be done to remove, suspended matter, oil and grease.

7. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for Domestic, flushing, HVAC and gardening purposes.

Air:

8. Air pollution Control equipment shall be installed along with the commissioning of the activity and shall comply with the following for controlling air pollution.

Source	Control equipment
D.G. Sets – 2 x 250 KVA	Acoustic enclosures.

9. Diesel generators shall be installed in a closed area with silencers and suitable noise absorption systems. The ambient noise level shall not exceed 65 dB(A) during day time and 55 dB(A) during night time.

10. The fuel used for the diesel generator sets should be low sulphur diesel and should conform to the E (P) Rules prescribed for air and noise emission standards.

11. Ambient noise levels should conform to the residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by the CPCB.

12. Vehicles hired to bring construction material to the site should be in a good condition and should conform to ambient air and noise standards and should be operated only during non peak hours.

13. Necessary provisions should be made by providing tarpaulin / GI Sheets around the construction site to reduce the fugitive emissions to the surrounding area.

Solid / Hazardous Waste:

14. The proponent shall comply with the following:

Sl.No.	Solid Waste	Quantity	Disposal
1.	Garbage	263.2 Kg/day	Organic Waste Converter (48%) and balance quantity shall be disposed to MSW Facility.
2.	STP Sludge	3.0 Kg/day	Used as manure
3.	Used Batteries	5 Nos/year	Sent to authorized recyclers or returned to seller
4.	Used Lubricant oil	80 LPA	Sold to authorized recyclers
5.	Transformer oil	90 LPA	Sold to TSTRANSCO authorized contractors
6.	E-Waste	---	E-Waste authorized parties

15. **The proponent shall process, treat and dispose bio-degradable waste i.e., 48% of MSW through Organic Waste Convertor within the premises as per SWM Rules, 2016 as committed.**

16. The solid waste generated shall be properly collected and segregated before disposal to the municipal facility. Waste paper, cartons, thermocol, plastic waste, glass etc., shall be disposed to recycling units. E-Waste shall be disposed to authorized recycling units. The organic waste shall be composted.

17. All the topsoil excavated during construction activities should be stored for use in horticulture/landscape development within the project site.

18. Disposal of muck during construction phase should not create any adverse effect on the neighboring communities and shall be disposed taking the necessary precautions for general safety and health aspects of people, and it shall be disposed only in approved sites with the approval of competent authority.

19. The following Rules and Regulations notified by the MoE&F, GoI shall be implemented:

    a) Solid Waste Management Rules, 2016.
    b) Construction and Demolition Waste Management Rules, 2016.
    c) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
    d) Batteries (Management & Handling) Rules, 2001 and its Amendment Rules, 2010.
    e) E-Waste (Management) Rules, 2016 and its Amendment Rules, 2018.
    f) Bio-Medical Waste Management Rules, 2016 and its Amendment Rules, 2018.

Other Conditions:

20. The proponent shall develop green belt as stipulated in EC.

21. **The proponent shall install energy saving system by using solar street lights and solar heaters to save 2.55 lakh kwh, CFL lighting – 1.99 lakh kwh as committed.**

22. The proponent shall obtain necessary permissions for the proposed activity, from the concerned Government departments / concerned authorities.

23. The Construction and Demolition Waste during the construction of the project shall be disposed to authorized agencies as per the Construction and Demolition Waste Management Rules, 2016.

24. Adequate measures should be taken to prevent odour problem from solid waste processing plant and STP.

25. The proponent shall employ qualified personnel for operation and maintenance of STP. Proponent shall ensure 100% power backup for continuous operation of STP.

26. As per the provision of Fly ash Notification No.S.O.2804 (E), dt. 03.11.2009, every construction agency engaged in the construction of building within a radius of 100 km from a coal or lignite based thermal power plant shall use only fly ash based products for construction, such as cement or concrete, fly ash bricks or tiles or clay fly ash bricks, blocks or tiles or cement fly ash bricks or bricks or blocks or similar products or a combination or aggregate of them in every construction project. The proponent may approach concerned authority in this regard.

27. The proponent shall comply with all the directions issued by the Board from time to time.

28. Concealing the factual data or submission of fabricated data and failure to comply with any of the conditions mentioned in this order attracts action under the provisions of relevant pollution control Acts.

29. The Board reserves its right to modify above conditions or stipulate new / additional conditions and to take action including revocation of this order in the interest of public health and environment protection.

30. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

Sd/-
MEMBER SECRETARY

To
"Residential Villas" of
M/s. Vessella Woods,
Survey No.51 (P), Madinaguda,
Serilingampally (M), Rangareddy District

// T.C.F.B.O//

Senior Environmental Engineer
(Unit – I)

AADESHWAR AGGREGATES Pvt. Ltd.

ANNEXURE – XXI

16th December 2020

To, The Member Secretary
~~The Joint Environmental Engineer~~
Telangana State Pollution Control Board
Hyderabad, Telangana

Sub: Undertaking by Aadeshwar Aggregates Pvt Ltd
Ref: To our CFE Application: SML006058322656

Dear Sir,

With reference to the matter cited above, we herewith submit that we have set up the stone crushing unit as ancillary (Captive) to support our internal requirement of Vessella Constructions Pvt Ltd project by Name Vessella Woods. Vessella Constructions Pvt Ltd is 30% shareholder in Aadeshwar Aggregates Pvt Ltd. Please see the Company Incorporation and shareholding patter as per the attached documents.

Please see the EC certificate of Vessella Woods reference Order No: SEIAA/TS/OL/RRD-17/2016-1910 Dated 03/11/2016, valid for 7 years, that is until 2023. Also see the attached PCB certificate issued to Vessella Woods reference Order No: 1606228/TSPCB/CFE/RO-RR-1/HO/2018 dated 05/11/2018, valid for 5 years, that is until 2023.

Our activity is mainly ancillary to support our construction activity at Vessella Woods. We hereby undertake to stop the crushing activity on or before the expiry of EC and PCB permission to Vessella Woods project. In this connection we request you to grant us permission to carry out our stone crushing operation. Thanking you in anticipation. **Our CFE Application UID reference number: SML006058322656.**

With Best regards,
For Aadeshwar Aggregates

D. S. K. Reddy
Authorized Signaotry

Encl:

1. MDL,
2. GST,
3. PAN,
4. Factories Certificate,
5. MSME,
6. Certificate of Incorporation,
7. Shareholding Details of Aadeshwar Aggregates Pvt Ltd,
8. CFE Application of AAPL,
9. EC Certificate of Vessella Woods,
10. PCB certificate of Vessella Woods

ANNEXURE - XXII

Aadeshwar Aggregates Private Limited

To,

3rd April 2021

The Chairman,
Telangana State Pollution Control Board
Hyderabad, Telangana

Respected Sir,

Sub: Request for Captive/Ancillary permission for Aadeshwar Aggregates Pvt Ltd
Ref: To our CFE Application **UID reference number: SML006058322656**

Dear Sir,

With reference to the matter cited above, we herewith submit that we have set up the stone crushing unit as ancillary (Captive) to support our internal requirement of Vessella Constructions Pvt Ltd project by Name Vessella Woods. Vessella Constructions Pvt Ltd is 30% shareholder in Aadeshwar Aggregates Pvt Ltd. Please see the earlier letter dated 16th December 2020 to Member Secretary, TSPCB along will all supporting documents.

Please see the EC certificate of Vessella Woods reference Order No: SEIAA/TS/OL/RRD-17/2016-1910 Dated 03/11/2016, valid for 7 years, that is until 2023. Also see the attached PCB certificate issued to Vessella Woods reference Order No: 1606228/TSPCB/CFE/RO-RR-1/HO/2018 dated 05/11/2018, valid for 5 years, that is until 2023.

Our activity is mainly ancillary to support our construction activity at Vessella Woods. We hereby undertake to stop the crushing activity on or before the expiry of EC and PCB permission to Vessella Woods project. In this connection we request you to grant us permission to carry out our stone crushing operation. Thanking you in anticipation.

With Best regards,

For Aadeshwar Aggregates

M. Hirendra

Authorized Signatory

Encl: Letter Dated 16th Dec 2020

Chief Advisor to Govt. 03 APR 2021

Scanned with CamScanner

ANNEXURE- XXIII

HIGH COURT FOR THE STATE OF TELANGANA AT HYDERABAD
(Special Original Jurisdiction)

TUESDAY ,THE TWENTY THIRD DAY OF NOVEMBER
TWO THOUSAND AND TWENTY ONE

PRESENT

THE HONOURABLE THE CHIEF JUSTICE SATISH CHANDRA SHARMA
AND
THE HONOURABLE SRI JUSTICE A.RAJASHEKER REDDY

WRIT PETITION NO: 17554 OF 2020

Between:

1. M/s. Chiranjeeva Excavation and Infrastructure Pvt. Ltd., Represented by its Authorized Signatory, Sri. K. Ramalingam, S/o. K. Bala Brahma Chary, aged about 50 Years, Designation. Managing Director, R/o. 17, Cyber Meadows, Masjid-Banda, Kondapur, Hyderabad - 500 084.
2. M/s. Aadeshwar Aggregates Pvt. Ltd,, Represented by its Authorized Signatory, Sri. D. Sumanth S/o D SubrahmanyanaReddy, aged about 30 Years, Designation Director, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad - 500 084

...PETITIONERS

AND

1. State of Telangana, Represented by its Prl.Secretary, Department of Mines and Geology Office at - My Home Sarovar Plaza, Flat No. 203 and 204, 2nd Floor, House No - 5-922, Shapurwadi, Adarshnagar, Secretariat Road, Hyderabad, Telangana-500063.
2. Telangana State Pollution Control Board, Represented by its Member Secretary. Office at - ParyavaranBhavan, A-3, Industrial Estate, Sanath Nagar, Hyderabad.
3. The Joint Chief Environmental Engineer, Telangana State Pollution Control. Board, Office at H.No.6-3-1219, 2nd Floor, T.S. No.1, Part, Block, C, WardNo.91, Begumpet, Umanagar, Back side of Country Club,Hyderabad - 500 016.
4. Environmental Engineer, Telangana State Pollution Control Board, Regional Office - I, Ranga Reddy District. Office at - D.No.2-14-154/101, Flat No.101, My Residency, Beerappagudda, Uppal, Hyderabad - 500 039.
5. The Deputy Director, Department of Mines and Geology, Regional Office - Hyderabad. Office at - Plot No.191and 192, Vignanpuri Colony, beside Saheb Nagar HMWandSB, B.N. Reddy Nagar, Rangareddy District, Hyderabad-500 079.

6. The Assistant Director, Department of Mines and Geology, District office - Ranga Reddy. Office at - 2-1-566/B/6/7, Nallakunta, Street No.11, Near Shankermutt, Hyderabad - 500 044

...RESPONDENTS

Petition under Article 226 of the Constitution of India praying that in the circumstances stated in the affidavit filed therewith, the High Court may be pleased to issue a writ, order or direction, more particularly one in the nature of Writ of Mandamus

a. To declare the Rejection Order Dt.20/03/2020 of Respondents 2, 3 and 4 as unjust, illegal, arbitrary and unconstitutional, and violative of Articles 14, 19 (1) g and 21 of the Constitution of India.
b. To direct the Respondents to grant and issue Consent for Establishment (CFE) to the 2nd Petitioner for operating the Stone Crusher from Survey No.246/1, 246/2 of Vattinagulapally Village, Rajendra Mandal, RR District, on par with other existing stone crushers in Vattinagulapally Village.

IA NO: 1 OF 2020

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to direct the Respondents to forthwith grant a temporary permission to the 2nd Petitioner for operating the Stone Crusher located at Surrey No 246/1, 246/2 of Vattinagtdapally Village, Rajendra Vandal, RR District,subject to any conditions that may be imposed for controlling the dust emanating from the crusher, pending disposal of the main. WP in the interest of justice

IA NO: 2 OF 2020

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased permit to receive the additional documents on record in the present WP, in the writ petition.

IA NO: 1 OF 2021

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to receive the Additional documents and also to bring the additional pleadings on record may be allowed in the interest of justice.

IA NO: 3 OF 2021

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to receive the additional documents and also to bring the additional pleadings on record, may be allowed in the present WP in the interest of justice.

Counsel for the Petitioners:SRI. M/S. UNNAM LAW FIRM

Counsel for the Respondent Nos. 1, 5 & 6: GP FOR MINES AND GEOLOGY

Counsel for the Respondent Nos. 2 to 4: M/S. PADMAJA R N

The Court made the following:

THE HON'BLE THE CHIEF JUSTICE SATISH CHANDRA SHARMA

AND

THE HON'BLE SRI JUSTICE A.RAJASHEKER REDDY

W.P.No.17554 of 2020

ORDER: *(Per the Hon'ble the Chief Justice Satish Chandra Sharma)*

The present writ petition has been filed being aggrieved by the inaction on the part of the Telangana State Pollution Control Board in accepting the petitioners' applications and passing final orders in respect of environmental clearance, keeping in view the Water (Prevention & Control of Pollution) Act, 1974 and the Air (Prevention & Control of Pollution) Act, 1981.

When the matter was listed before this court, learned counsel for the petitioners has made a prayer for directing the Telangana State Pollution Control Board to decide the petitioners' applications in accordance with law.

Resultantly, without adverting to the merits of the case, the writ petition is disposed of with a direction to the Telangana State Pollution Control Board to decide the applications of the petitioners in accordance with law, within a period of 45 days from the date of receipt of such applications. The petitioners shall be free to submit hard copies to the Telangana State Pollution Control Board.

Pending miscellaneous applications, if any, shall stand closed.

SD/-K.VENKAIAH
ASSISTANT REGISTRAR

//TRUE COPY//

SECTION OFFICER

To,

1. The Prl.Secretary, Department of Mines and Geology, State of Telangana, Office at - My Home Sarovar Plaza, Flat No. 203 and 204, tad Floor, House No - 5-922, Shapurwadi, Adarshnagar, Secretariat Road, Hyderabad.
2. The Member Secretary, Telangana State Pollution Control Board, Office at - ParyavaranBhavan, A-3, Industrial Estate, Sanath Nagar, Hyderabad.

3. The Joint Chief Environmental Engineer, Telangana State Pollution Control. Board, Office at H.No.6-3-1219, 2nd Floor, T.S. No.1, Part, Block, C, WardNo.91, Begumpet, Umanagar, Back side of Country Club,Hyderabad - 500 016.
4. Environmental Engineer, Telangana State Pollution Control Board, Regional Office - I, Ranga Reddy District, Office at - D.No.2-14-154/101, Flat No.101, My Residency, Beerappagudda, Uppal, Hyderabad - 500 039.
5. The Deputy Director, Department of Mines and Geology, Regional Office - Hyderabad. Office at - Plot No.191and 192, Vignanpuri Colony, beside Saheb Nagar HMWandSB, B.N. Reddy Nagar, Rangareddy District, Hyderabad-500 079.
6. The Assistant Director, Department of Mines and Geology, District office - Ranga Reddy. Office at - 2-1-566/B/6/7, Nallakunta, Street No.11, Near Shankermutt, Hyderabad - 500 044
7. One CC to M/S. UNNAM LAW FIRM [OPUC]
8. One CC to M/s. Padmaja R N., SC for TSPCB (OPUC)
9. Two CCs to GP for Mines & Geology (TG) ,High Court for the State of Telangana. [OUT]
10. Two CD Copies.
11. One Spare Copy.

PM

ANNEXURE – XXIV

TELANGANA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE – I, RANGAREDDY DISTRICT
H.No.6-3-1219, Block C, Ward No.91, 2nd Floor, Backside of Country Club, Kundanbagh, Umanagar, Begumpet, Hyderabad - 500016.
Telephone: 040-23401520, email: ee-rr1-tspcb@telangana.gov.in.

Lr. No./RTI/PCB/RO.I-RRD/2021- 1884 **Date:** .02.2021.

Regd. Post with Ack. Due

To,
Sri. D Sumanth Reddy.,
H No. 21, Vesella Villas,
Masidbanda, Kondapur,
Hyderabad-500084.

Sir,

Sub:- TSPCB – RO.I-RRD – RTI Act – Application seeking information under RTI Act– Information Furnished- Reg.

Ref:- Your RTI application dated 28.01.2021.

***

With reference to the above, this office received your RTI application under Right to Information Act, 2005 seeking information regarding Stone crushers & RMC's located in 10 km radius.

In this regard, as per the records available with this office, the following information is furnished.

1. a) CFO issued to M/s. GMR Stone Crusher, (Formerly M/s. Progressive Construction Company), Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy District, M/s. Sri Srinivasa & Co., (Formerly M/s. P. Srinivas Stone Crushing Industry), Sy.No.452/1, Puppalaguda (V), Gandipet (M), Rangareddy District & M/s. Sri Rama Engineering Constructions, Sy.No.203, Vattinagulapalli (V), Gandipet (M), Rangareddy District.
   b) Captive CFE issued to M/s. Hyma Developers Pvt. Ltd., Sy.No.239 (P), 240(P),48,49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District.
2. List of closure orders issued to RMC's & Stone Crushers within 10 km radius enclosed.
3. a) Captive CFE issued to M/s. Hyma Developers Pvt. Ltd., Sy.No.239 (P), 240(P), 48,49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District.
   b) For construction projects having EC captive crusher issued.

This information is furnished under RTI Act, 2005.

Yours faithfully,

PUBLIC INFORMATION OFFICER.

ANNEXURE – XXV

TELANGANA STATE POLLUTION CONTROL BOARD
ZONAL OFFICE: HYDERABAD

G. Hanmantha Reddy
Joint Chief Environmental Engineer (FAC)

H.No.6-3-1219, T.S.No.1, Part, Block "C",
Ward No.91, Begumpet, Umanagar,
Near Country Club, Hyderabad - 500 016
Phone No: 040-23402495
Email: jcee-zhyd-tspcb@telangana.gov.in

DESPATCHED
ON 29/01/2020

CONSENT ORDER - ORANGE CATEGORY

Consent Order No: 1236 -RR-I/TSPCB/ZOH/TS-iPASS/CFO/2020-689 Date: 29.01.2020

(Consent Order for Existing/New or altered discharge of sewage and/or trade effluents/outlet under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof and Operation of the plant under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and amendments thereof.

CONSENT is hereby granted under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and orders made thereunder to

M/s. Sri Rama Engineering Constructions,
Sy.No.141/Part (141/1 to 141/7),
Vattinagulapally (V), Gandipet (M),
Rangareddy District

(Hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant, to discharge the effluents from the outlets and the quantity of Emissions per hour from the chimneys as detailed below:

I) Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge	Point of Disposal
1	Domestic effluents	0.5 KLD	Septic tank followed by soak pit.

ii) Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow	Emission Standards
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This consent order is valid for the manufacture of the following products with quantities mentioned below only:

Sl. No.	Product & By product	Total Quantity
1.	40 mm HBG Chips	400 cum/day
2.	20 mm HBG Chips	20 cum/day
3.	10 mm HBG Chips	20 cum/day

This order is subject to the provisions of 'the Acts' and the Rules' and amendments made thereunder and further subject to the terms and conditions incorporated in the schedule A & B enclosed to this order.

This combined order of Consent and Authorization shall be valid for a period ending with the **31.01.2021**

29/01/2020

JOINT CHIEF ENVIRONMENTAL ENGINEER (FAC)

Encl: Schedules A & B

To
M/s. Sri Rama Engineering Constructions,
Sy.No.141/Part (141/1 to 141/7),
Vattinagulapally (V), Gandipet (M),
Rangareddy District.
Email Id: sriramaec2016@gmail.com

Copy to the Member Secretary, TSPCB, Board Office, Hyderabad for information.
Copy submitted to The General Manager, District Industries Centre, 4th Floor, Rangareddy District Collectorate Office, Lakdikapool, Hyderabad.
Copy to the Environmental Engineer, TSPCB, Regional Office-I, Rangareddy District for information.

SCHEDULE – A

1. The applicant shall make applications **through online** for renewal of consent (under Water and Air Acts) and Authorization under HWM Rules **atleast 120 days before the date of expiry of this order**, along with prescribed fee under Water and Air Acts for obtaining consent of the Board **along with detailed compliance to the conditions stipulated in the CFO.**
2. The industry shall immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions etc.
3. a) All the fugitive emissions shall be controlled with proper measures.

   b) The applicant shall also install the equipment such as wind speed recorder and wind direction recorder.
4. The applicant shall not change or alter either the quality or the quantity or the rate of the discharge or the route of discharge and shall not change or alter either the prescribed quality or the rate of emission without the previous written permission of the Board.
5. The applicant shall, not later than 30 days from the date of issue of this consent order, certify in writing to the Board that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent. In absence of alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent, production shall be stopped.
6. Any up-set condition in any plant/plants of the industry, which result in, increased effluent discharge and/ or violation of standards stipulated in this order or the emission of any Air Pollutant into the environment in excess of the standards laid down by the Board, occurs or is apprehended to occur due to accident, or other unforeseen act or event, the person-in-charge of the premises, from where such discharge / emission occurs or is apprehended to occur shall forthwith intimate the fact of such occurrence or the apprehension of such occurrence to this Board, by fax / email under intimation to the Collector and District Magistrate.
7. In case of such episodal discharges / emissions mentioned in item 6 above, the industry should take immediate action to bring down the discharge / emission below the limits prescribed in this order.
8. A good house keeping shall be maintained both within the factory and in the premises. All hoods, pipes, valves, sewers and drains shall be leak proof. Floor washings shall be admitted into the effluent collection system only and shall not be allowed to find their way into storm drains or open areas.
9. a) The industry shall carryout analysis of waste water discharges or emissions through chimneys, for the parameters mentioned in Schedule – B of this order at regular intervals.

   b) The industry shall maintain following records to accessible to the Board, whenever required.
   1. Analysis reports of waste water/ emissions.
   2. Log book for operation of pollution control systems.
   3. Inspection book.
10. The applicant shall set up Ambient Air Quality Monitoring Stations for continuous recording of relevant critical parameters mentioned in Schedule - B as per the CPCB guidelines and submit monthly reports.
11. Separate power connection with energy meter shall be provided for the Pollution Control Equipments and record of power consumption and chemicals consumption for the operation of pollution control equipment shall be maintained separately.
12. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E (P) Rules, 1986 & its amendments thereof.
13. The applicant shall comply with the directives/orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. The applicant shall be liable for such legal action against him as per provisions of the Law/Act in case if non-

compliance of any order/directive issued at any time and/or violation of the terms and conditions of this consent order.

14. The applicant shall furnish to the visiting officer and / or the Board any information regarding the construction, installation or operation of the effluent treatment system/ air pollution control equipment and such other particulars as may be pertinent for preventing and controlling pollution.
15. The industry is liable to pay compensation for any environmental damage caused by it, as fixed by the Collector and District Magistrate as Civil liability.
16. All the rules & regulations notified by Ministry of Environment and Forests, Government of India in respect of management, handling, transportation and storage of hazardous chemicals and wastes shall be followed.
17. All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 shall be followed.
18. The applicant shall exhibit the consent order of the Board in the factory premises at a prominent place for the information of the inspecting officers of the different departments.
19. Not withstanding anything contained in this conditional letter or consent, the Board hereby reserves to it the right and powers under Section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and its amendments thereof and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and its amendments thereof to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.
20. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water rules, 1976 and Air Rules 1982, to such authority (herein after referred to as the Appellate Authority) constituted under Section 28 of the Water (prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

SCHEDULE - B

Special Conditions:

1. The industry shall take steps to reduce water consumption to the extent possible and consumption sh all NOT exceed the quantities prescribed below:

S. No.	Purpose	Total Consumption (KLD)
1.	Sprinkling	8.0 KLD
2.	Green belt	1.0 KLD
3.	Domestic	1.0 KLD
	Total	**10.0 KLD**

The Industry shall maintain separate water meters for the above areas and maintain records.

2. The industry shall remit water cess dues as per assessment orders as and when issued by the Board.
3. The industry should comply with the National ambient air quality standards as per MoEF, GoI notification dated. 18.11.2009 along the premises of the factory as prescribed below:

S. No.	Parameters	Standards in $\mu g/m^3$
1	Particulate Matter(PM_{10})	100
2	Particulate Matter ($PM_{2.5}$)	60
3	SO_2	80
4	NOx	80

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A).

4. The industry shall comply with all the Rules and Regulations specified in Water (P&C of P) Act, 1974, Air (P&C of P) Act, 1981.

5. The industry shall manufacture only consented products and shall produce within the consented capacities. Under no circumstances, the industry shall manufacture any un-consented products without obtaining CFE & CFO of the Board.

6. **As committed vide undertaking dt. 06.12.2019 the industry shall comply the following:**

   i. **The industry shall provide cladding to the vibrating screen in order to arrest the dust emissions within one month.**

   ii. **The industry shall provide covers to the dust conveyor belts within one month.**

   iii. **The industry shall provide laid metal roads within the premises within one month.**

   iv. **The industry shall construct wind breaking walls within one month to prevent dust spreading to the surrounding areas.**

   v. **The industry shall operate only after obtaining revocations of closure orders issued by the Board.**

   vi. **The industry shall shift the industry from the existing premises as and when the Government issues directions and shall abide to the policy of the Government.**

   vii. **The industry shall take all measures and shall not any nuisance in the surrounding area.**

7. The industry shall comply all the conditions in this order as per commitment in the bank guarantee dated 27.01.2020 for Rs. 1,00,000/- (Rupees One lakh only). Failure to comply with any of the consent conditions will compel the Board to forfeit the Bank Guarantee of Rs. 1,00,000/- (Rupees One lakh only) and the CFO issued by the Board shall be revoked if the Board receives any complaint regarding air pollution in and around the industry without any further notice.

8. The industry shall provide cladding to the vibrating screen so as to arrest the dust emissions.

9. The industry shall cover the screen with M.S. Sheets and a fan connected with motor to extract the dust generated during screening operations, should be installed. Dust should be vented out into a chamber wherein water sprinklers shall be permitted for dust suppression.

10. The industry shall provide elevated closed bunker should be constructed for collection of dust and the dust conveyor should be fully covered with M.S. Sheets. The loading of dust should be directly done into the trucks, which should be brought below the bunker bins.

11. The industry shall provide temporary water sprinklers at the time of un-loading of the raw material from the truck / tipper.

12. The industry shall provide water sprinklers on the conveyor carrying raw materials from bunker/ bin to the crusher. The water should be sprayed in the form of mist with the help of a motor. The industry shall provide water meter with recording facility to record the water used for sprinkler system.

13. The industry shall construct wind breaking walls around the crusher to prevent dust spreading to the surrounding areas.

14. The industry shall construct BT road from quarry to stone crushing unit.

15. The industry shall construct metal roads within the premises.

16. The industry shall carryout regular cleaning and wetting of the ground within the premises.

17. The industry shall develop 5 mtrs width of green belt along the boundary of the site in the 50 mtrs width buffer zone of the stone-crushing unit. This green belt shall be developed on outer side of the buffer zone so as to act as a barrier.

18. The suspended particulate matter measured between 3mtrs and 10mtrs from any processes equipment of a stone crushing unit shall not exceed 600 micrograms/m^3.

19. The industry shall not cause any air pollution / dust nuisance to the surrounding environment.
20. The industry shall maintain good housekeeping with-in the premises.
21. The industry shall submit Environmental Statement in Form V before 30th September every year as per Rule No.14 of Environmental (Protection) Act, 1986.
22. The following rules and regulations notified by the MoE&F, GoI shall be implemented:
    a) Solid Waste Management Rules, 2016.
    b) Construction and Demolition Waste Management Rules, 2016.
    c) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 & its amendments.
    d) Batteries (Management & Handling) Amendment Rules, 2010 & its amendments.
    e) E-Waste (Management) Rules, 2016.
23. The industry shall take all precautionary and safety measures during process operations
24. The industry shall maintain good housekeeping within the plant premises.
25. The industry shall comply with all the directions issued by the Board from time to time.
26. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts.
27. The industry shall comply with Rules & Regulations notified by Ministry of Law and Justice, Govt. of India, regarding the Public Liability Insurance Act, 1991.
28. The Board reserves its right to modify above conditions or stipulate any further conditions in the interest of environment protection.

29/01/2020

JOINT CHIEF ENVIRONMENTAL ENGINEER (FAC)

To
M/s. Sri Rama Engineering Constructions,
Sy.No.141/Part (141/1 to 141/7),
Vattinagulapally (V), Gandipet (M),
Rangareddy District.

ANNEXURE-XXVI

TELANGANA STATE POLLUTION CONTROL BOARD
ZONAL OFFICE: HYDERABAD

R. Ravinder Reddy
Joint Chief Environmental Engineer

H.No.6-3-1219, Sy.No.TS No.1 Part,
Block - C, Ward No.91,
Near Country Club, Uma Nagar,
Begumpet, Hyderabad
Email: jcee-zhyd-tspcb@telangana.gov.in

BY REGD. POST WITH ACK. DUE

CONSENT ORDER - ORANGE CATEGORY

Consent Order No: 1014-RR-I/TSPCB/ZOH/CFO/2018- 103 **Date:16.04.2018**

(Consent Order for Existing/New or altered discharge of sewage and/or trade effluents/outlet under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof and Operation of the plant under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and amendments thereof).

CONSENT is hereby granted under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act 1981 (hereinafter referred to as 'the Acts') and the rules and orders made thereunder to

M/s. GMR Stone Crusher
(Formerly M/s. Progressive Construction Company),
Sy.No. 270 & 271, Vattinagulapally (V),
Gandipet (M), Rangareddy District

(hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant, to discharge the effluents from the outlets and the quantity of Emissions per hour from the chimneys as detailed below.

i) Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge	Point of Disposal
1	Domestic Effluents	1.0 KLD	Septic Tank followed by soak pit

ii) Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow	Emissions standards
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This order is subject to the provisions of 'the Acts' and 'the Rules' and orders made thereunder and further subject to the terms and conditions incorporated in the schedule A & B enclosed to this order.

This Consent is valid for manufacture the following products along with quantities only

S. No.	Product & By product	Capacity
1.	Stone Chips (40mm, 20mm, 12mm & 6mm)	200 TPH

This Consent Order shall be valid for a period ending with the 31.03.2023

16/4/2018

JOINT CHIEF ENVIRONMENTAL ENGINEER

Encl: Schedules A & B

To
M/s. GMR Stone Crusher
(Formerly M/s. Progressive Construction Company),
Sy.No. 270 & 271, Vattinagulapally (V),
Gandipet (M), Rangareddy District

Copy submitted to the Member Secretary, TSPCB, Board Office, Hyderabad for information.
Copy to the Environmental Engineer, TSPCB, RO-I, Rangareddy District for information.
The EE, RO-I, Rangareddy District is hereby directed to inspect the industry after 3 months and submit the compliance report.

SCHEDULE – A

1. The applicant shall make applications **through online** for renewal of consent (under Water and Air Acts) and Authorization under HWM Rules **atleast 120 days before the date of expiry of this order,** along with prescribed fee under Water and Air Acts for obtaining consent of the Board **along with detailed compliance to the conditions stipulated in the CFO.**

2. The industry shall immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions etc.

3. a) All the fugitive emissions shall be controlled with proper measures.
b) The applicant shall also install the equipment such as wind speed recorder and wind direction recorder.

4. The applicant shall not change or alter either the quality or the quantity or the rate of the discharge or the route of discharge and shall not change or alter either the prescribed quality or the rate of emission without the previous written permission of the Board.

5. The applicant shall, not later than 30 days from the date of issue of this consent order, certify in writing to the Board that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent. In absence of alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent, production shall be stopped.

6. Any up-set condition in any plant/plants of the industry, which result in, increased effluent discharge and/ or violation of standards stipulated in this order or the emission of any Air Pollutant into the environment in excess of the standards laid down by the Board, occurs or is apprehended to occur due to accident, or other unforeseen act or event, the person-in-charge of the premises, from where such discharge / emission occurs or is apprehended to occur shall forthwith intimate the fact of such occurrence or the apprehension of such occurrence to this Board, by fax / email under intimation to the Collector and District Magistrate.

7. In case of such episodal discharges / emissions mentioned in item 6 above, the industry should take immediate action to bring down the discharge / emission below the limits prescribed in this order.

8. A good house keeping shall be maintained both within the factory and in the premises. All hoods, pipes, valves, sewers and drains shall be leak proof. Floor washings shall be admitted into the effluent collection system only and shall not be allowed to find their way into storm drains or open areas.

9. a) The industry shall carryout analysis of waste water discharges or emissions through chimneys, for the parameters mentioned in Schedule – B of this order at regular intervals.
b) The industry shall maintain following records to accessible to the Board, whenever required.
   1. Analysis reports of waste water/ emissions.
   2. Log book for operation of pollution control systems.
   3. Inspection book.

10. The applicant shall set up Ambient Air Quality Monitoring Stations for continuous recording of relevant critical parameters mentioned in Schedule - B as per the CPCB guidelines and submit monthly reports.

11. Separate power connection with energy meter shall be provided for the Pollution Control Equipments and record of power consumption and chemicals consumption for the operation of pollution control equipment shall be maintained separately.

12. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E (P) Rules, 1986 & its amendments thereof.

13. The applicant shall comply with the directives/orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. The applicant shall be liable for such legal action against him as per provisions of the Law/Act in case if non-compliance of any order/directive issued at any time and/or violation of the terms and conditions of this consent order.

14. The applicant shall furnish to the visiting officer and / or the Board any information regarding the construction, installation or operation of the effluent treatment system/ air pollution control equipment and such other particulars as may be pertinent for preventing and controlling pollution.

15. The industry is liable to pay compensation for any environmental damage caused by it, as fixed by the Collector and District Magistrate as Civil liability.

16. All the rules & regulations notified by Ministry of Environment and Forests, Government of India in respect of management, handling, transportation and storage of hazardous chemicals and wastes shall be followed.

17. All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 shall be followed.

18. The applicant shall exhibit the consent order of the Board in the factory premises at a prominent place for the information of the inspecting officers of the different departments.

19. Not withstanding anything contained in this conditional letter or consent, the Board hereby reserves to it the right and powers under Section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and its amendments thereof and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and its amendments thereof to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.

20. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Telangana State Water rules, 1976 and Air Rules 1982, to such authority (herein after referred to as the Appellate Authority) constituted under Section 28 of the Water (prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

SCHEDULE - B

Special Conditions

1. The industry shall take steps to reduce water consumption to the extent possible and consumption shall NOT exceed the quantities mentioned below

S. No.	Consumption	Total quantity (KLD)
1.	Process (for Sprinkling)	8.0 KLD
2.	Domestic	2.0 KLD
	Total	**10.0 KLD**

2. The industry shall file the water Cess returns in Form-I as required under section (5) of Water (Prevention and Control of Pollution) Cess Act, 1977 on or before the 5th of every calendar month, showing the quantity of water consumed in the previous month along with water meter readings. The industry shall remit water Cess as per the assessment orders as and when issued by Board.

3. The industry should comply with the National ambient air quality standards as per MoEF, GoI notification dated. 18.11.2009 along the premises of the factory as prescribed below.

S. No.	Parameters	Standards in $\mu g/m^3$
1	Particulate Matter(PM_{10})	100
2	Particulate Matter ($PM_{2.5}$)	60
3	SO_2	80
4	NOx	80

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A).

4. The industry shall not manufacture new products / increase the capacity beyond the permitted capacity mentioned in this consent order, without obtaining CFE/CFO of the Board.

5. The industry shall provide cladding to the vibrating screen so as to arrest the dust emissions.

6. The industry shall cover the screen with M.S. Sheets and a fan connected with motor to extract the dust generated during screening operations, should be installed. Dust should be vented out into a chamber wherein water sprinklers shall be permitted for dust suppression.
7. The industry shall provide elevated closed bunker should be constructed for collection of dust and the dust conveyor should be fully covered with M.S. Sheets. The loading of dust should be directly done into the trucks, which should be brought below the bunker bins.
8. The industry shall provide temporary water sprinklers at the time of un-loading of the raw material from the truck / tipper.
9. The industry shall provide water sprinklers on the conveyor carrying raw materials from bunker/ bin to the crusher. The water should be sprayed in the form of mist with the help of a motor. The industry shall provide water meter with recording facility to record the water used for sprinkler system.
10. The industry shall construct wind breaking walls around the crusher to prevent dust spreading to the surrounding areas.
11. The industry shall construct BT road from quarry to stone crushing unit.
12. The industry shall construct metal roads within the premises.
13. The industry shall carryout regular cleaning and wetting of the ground within the premises.
14. The industry shall develop 5 mtrs width of green belt along the boundary of the site in the 50 mtrs width buffer zone of the stone-crushing unit. This green belt shall be developed on outer side of the buffer zone so as to act as a barrier.
15. The suspended particulate matter measured between 3mtrs and 10mtrs from any processes equipment of a stone crushing unit shall not exceed 600 micrograms/m^3.
16. The industry shall not cause any air pollution / dust nuisance to the surrounding environment.
17. The industry shall submit Environmental Statement in Form V before 30th September every year as per Rule No.14 of Environmental (Protection) Act, 1986.
18. The industry shall take necessary measures to control fugitive emissions.
19. The industry shall take all precautionary and safety measures during process operations.
20. The industry shall comply with all the directions issued by the Board from time to time.
21. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts.
22. The Board reserves its right to modify above conditions or stipulate any further conditions in the interest of environment protection.
23. This Order is issued to the industry without prejudice to the action taken by the Task Force of the Board.

SCHEDULE - C
(See Rule 6(2))

(Conditions of Authorization for occupier or operator handling hazardous wastes)

1. The industry shall give top priority for waste minimization and cleaner production practices.
2. The industry shall not store hazardous waste for more than 90 days as per the Hazardous & other wastes (Management and Transboundary Movement) Rules, 2016.
3. The industry shall store Used / Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal.
4. The industry shall not dispose Waste oils to the traders and the same shall be disposed to the authorized Reprocessors/ Recyclers.
5. The industry shall dispose Used Lead Acid Batteries to the manufacturers / dealers on buyback basis.

6. The industry shall take necessary practical steps for prevention of oil spillages and carry over of oil from the premises.
7. The industry shall maintain 6 copy manifest system for transportation of waste generated and a copy shall be submitted to Board Office and concerned Regional Office.
8. The industry shall maintain good housekeeping & maintain proper records for Hazardous Wastes stated in Authorisation.
9. The industry shall maintain proper records for Hazardous Wastes stated in Authorisation in FORM-3 and file annual returns in Form- 4 Rules 6(5), 13(8), 16(6) and 20(2) as per of the Hazardous & other wastes (Management Transboundary Movement) Rules, 2016.
10. The industry shall submit the condition wise compliance report of the conditions stipulated in Schedule B & C of this Order on half yearly basis to Board Office, Hyderabad and concerned Regional Office.
11. The industry shall dispose the e-waste to authorised recyclers / re-processors only.

16/4/2024

JOINT CHIEF ENVIRONMENTAL ENGINEER

To
M/s. GMR Stone Crusher
(Formerly M/s. Progressive Construction Company),
Sy.No. 270 & 271, Vattinagulapally (V),
Gandipet (M), Rangareddy District.

ANNEXURE – XXVII

TELANGANA STATE POLLUTION CONTROL BOARD
ZONAL OFFICE: HYDERABAD

R. Ravinder Reddy
Joint Chief Environmental Engineer

H.No.6-3-1219, Sy.No.TS No.1 Part,
Block - C, Ward No.91,
Near Country Club, Uma Nagar,
Begumpet, Hyderabad
Email: jeee-zhyd-tspcb@telangana.gov.in

BY REGD. POST WITH ACK. DUE

CONSENT & AUTHORIZATION ORDER – ORANGE CATEGORY

Consent Order No: 1032-RR-I/TSPCB/ZOH/CFO/2018- 849 Date:31.07.2018

(Consent Order for Existing/New or altered discharge of sewage and/or trade effluents/outlet under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof and Operation of the plant under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and amendments thereof) and Authorization / Renewal of Authorization under Rule 6 of the Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016.

CONSENT is hereby granted under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 (hereinafter referred to as 'the Acts') and Authorization under the provisions of HW (M & TM) Rules (herein after referred to as 'the Acts' 'the Rules') the rules and orders made thereunder to

M/s. Sri Srinivasa & Co.,
(Formerly M/s. P. Srinivas Stone Crushing Industry),
Sy. No. 452/1, Puppalaguda (V),
Gandipet (M), Rangareddy District

(hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant, to discharge the effluents from the outlets and the quantity of Emissions per hour from the chimneys as detailed below.

i) Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge	Point of Disposal
1	Domestic Effluents	0.5 KLD	Septic Tank followed by soak pit

ii) Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow	Emissions standards
--	--	--	--

iii) Hazardous Waste Authorization: (Form – 2) [See Rule 6(2)]:

M/s. Azeez Stone Crusher,Sy.No.172 & 190,Mallemadugu Revenue, Kaikondaigudem (V), Khammam Rural (M), Khammam District is hereby granted an authorization to operate a facility for collection, reception, storage, transport and disposal of the following wastes with quantities as mentioned below:

Sl. No.	Name of the Hazardous Waste	Stream	Quantity of Hazardous waste	Disposal Option
1	Stone dust	--	1 TPD	Shall be disposed to brick manufactures.

This order is subject to the provisions of 'the Acts' and 'the Rules' and orders made thereunder and further subject to the terms and conditions incorporated in the schedule A & B enclosed to this order.

This Consent is valid for manufacture the following products along with quantities only

S. No.	Product & By product		Capacity
1.	Stone Chips	20 mm	15 TPD
		12 mm	8 TPD
		6 mm	6 TPD

This Consent Order shall be valid for a period ending with the 31.03.2023

JOINT CHIEF ENVIRONMENTAL ENGINEER

Encl: Schedules A & B

To
M/s. Sri Srinivasa & Co.,
(Formerly M/s. P. Srinivas Stone Crushing Industry),
Sy. No. 452/1, Puppalaguda (V),
Gandipet (M), Rangareddy District.

Copy submitted to the Member Secretary, TSPCB, Board Office, Hyderabad for information.
Copy to the Environmental Engineer, TSPCB, RO-I, Rangareddy District for information. The EE, RO-I, Rangareddy District is hereby directed to inspect the industry after 3 months and submit the compliance report.

SCHEDULE – A

1. The applicant shall make applications **through online** for renewal of consent (under Water and Air Acts) and Authorization under HWM Rules **atleast 120 days before the date of expiry of this order**, along with prescribed fee under Water and Air Acts for obtaining consent of the Board **along with detailed compliance to the conditions stipulated in the CFO.**
2. The industry shall immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions etc.
3. a) All the fugitive emissions shall be controlled with proper measures.
   b) The applicant shall also install the equipment such as wind speed recorder and wind direction recorder.
4. The applicant shall not change or alter either the quality or the quantity or the rate of the discharge or the route of discharge and shall not change or alter either the prescribed quality or the rate of emission without the previous written permission of the Board.
5. The applicant shall, not later than 30 days from the date of issue of this consent order, certify in writing to the Board that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent. In absence of alternative electric power source sufficient to operate all facilities installed by the applicant, to comply with the terms and conditions of this consent, production shall be stopped.
6. Any up-set condition in any plant/plants of the industry, which result in, increased effluent discharge and/ or violation of standards stipulated in this order or the emission of any Air Pollutant into the environment in excess of the standards laid down by the Board, occurs or is apprehended to occur due to accident, or other unforeseen act or event, the person-in-charge of the premises, from where such discharge / emission occurs or is apprehended to occur shall forthwith intimate the fact of such occurrence or the apprehension of such occurrence to this Board, by fax / email under intimation to the Collector and District Magistrate.
7. In case of such episodal discharges / emissions mentioned in item 6 above, the industry should take immediate action to bring down the discharge / emission below the limits prescribed in this order.
8. A good house keeping shall be maintained both within the factory and in the premises. All hoods, pipes, valves, sewers and drains shall be leak proof. Floor washings shall be admitted into the effluent collection system only and shall not be allowed to find their way into storm drains or open areas.
9. a) The industry shall carryout analysis of waste water discharges or emissions through chimneys, for the parameters mentioned in Schedule – B of this order at regular intervals.
   b) The industry shall maintain following records to accessible to the Board, whenever required.
      1. Analysis reports of waste water/ emissions.
      2. Log book for operation of pollution control systems.
      3. Inspection book
10. The applicant shall set up THREE Ambient Air Quality Monitoring Stations for continuous recording of relevant critical parameters mentioned in Schedule - B as per the CPCB guidelines and submit monthly reports.
11. Separate power connection with energy meter shall be provided for the Pollution Control Equipment and record of power consumption and chemicals consumption for the operation of pollution control equipment shall be maintained separately.
12. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E (P) Rules, 1986 & its amendments thereof.
13. The applicant shall comply with the directives/orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. The applicant shall be liable for such legal action against him as per provisions of the Law/Act in case if non-compliance of any order/directive issued at any time and/or violation of the terms and conditions of this consent order.

14. The applicant shall furnish to the visiting officer and / or the Board any information regarding the construction, installation or operation of the effluent treatment system/ air pollution control equipment and such other particulars as may be pertinent for preventing and controlling pollution.

15. The industry is liable to pay compensation for any environmental damage caused by it, as fixed by the Collector and District Magistrate as Civil liability.

16. All the rules & regulations notified by Ministry of Environment and Forests, Government of India in respect of management, handling, transportation and storage of hazardous chemicals and wastes shall be followed.

17. All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 shall be followed.

18. The occupier shall educate the workers and nearby public of possible accidents and remedial measures.

19. For any accident or spillage of hazardous wastes causing damage to the Environment, the occupier or the transporter as the case shall be held responsible.

20. In case of closure of industry, the un-used/not consumed raw materials falling under the category of Hazardous Chemicals and mentioned in Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and Amendment Rules, 2003 shall be removed and sold to other units within 90 days from the date of closure to prevent any possibility of occurrence of an accident. In case the above hazardous chemicals have lost their properties originally acquired, then they shall be treated as Hazardous Waste and they should be disposed off only to the authorized agencies of TSPCB in a safe manner.

21. The occupier shall prepare / update an emergency preparedness plan for safe handling of hazardous waste from time to time and submit the same to TSPCB. Emergency preparedness plan must be implemented immediately whenever there is fire, explosion or release of hazardous waste or hazardous waste constituents, which could endanger to human health or environment.

22. Packaging, labeling and transportation of Hazardous Wastes shall be in accordance with the provisions of the rules issued by the Central Govt. under the Motor Vehicles Act, 1988 and other guidelines issued from time to time. The packaging and labeling shall be based on the composition and hazardous constituent of the waste, however all Hazardous Waste containers should be provided with a general label.

23. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter shall carry a Transport Emergency (TREM) card (as given in the guidelines for management and handling of hazardous wastes) duly filled by the Hazardous Waste generator.

24. Containers / Container Liners of Hazardous Chemicals and Hazardous Wastes should be thoroughly detoxified before selling to agencies authorized by TSPCB. Proper records, specific to each Hazardous Chemical / Hazardous Waste Containers / container Liners should be maintained in the following way:

    i. Number of containers received.
    ii. Date and method of detoxification.
    iii. Name of agencies to whom containers were sold with quantities.
    iv. Transportation particulars.

25. No Hazardous Wastes shall be mixed with any other waste or shall be discharged to a common, other internal, external sewerage or other drainage system without prior approval of TSPCB.

26. If HDPE bags are used for storing Hazardous Wastes, it should be ensured that they are perfectly sealed mechanically or double hot sealed. If MS / HDPE bags or drums are used for Hazardous Wastes, these drums / bags should be ensured that they are perfectly sealed.

27. The person authorized shall not rent, lend, sell, transfer their industrial premises without obtaining prior permission of State Pollution Control Board.

28. Any Unauthorized change in personnel, equipment and working condition as mentioned in the application by the person authorized shall constitute a breach of this authorization.

29. The industry shall comply with the provisions of Batteries (Management and Handling) Rules, 2001.

30. The applicant shall put up two black boards of size 6 ft by 4 ft. at the main entrance to their plant. One board shall contain the specific CFE and CFO conditions, in sufficiently large font size so that it can be read easily from a distance of 10 ft to a normal eye, and other board shall carry, again in sufficiently large font size so as to be able to read from a distance of 10 ft, the latest Water, Air, Noise and solid waste monitoring data as well as the maximum vulnerable zone.

31. The applicant shall exhibit the Consent & HW Authorization order of the Board in the factory premises at a prominent place for the information of the inspecting officers of the different departments.

32. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves to it the right and powers under Section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and its amendments thereof and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and its amendments thereof to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.

33. The authorization issued under Hazardous and other wastes (Management and Transboundary Movement) Rules, 2016, shall comply with the provision of the Environment (Protection) act, 1986.

34. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Telangana State Water rules, 1976 and Air Rules 1982, to such authority (herein after referred to as the Appellate Authority) constituted under Section 28 of the Water (prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

SCHEDULE - B

Special Conditions:

1. The industry shall take steps to reduce water consumption to the extent possible and consumption shall NOT exceed the quantities mentioned below

S. No.	Consumption	Total quantity (KLD)
1.	Process (for Sprinkling)	0.4 KLD
2.	Domestic	0.6 KLD
	Total	**1.0 KLD**

2. The industry shall file the water Cess returns in Form-I as required under section (5) of Water (Prevention and Control of Pollution) Cess Act, 1977 on or before the 5th of every calendar month, showing the quantity of water consumed in the previous month along with water meter readings. The industry shall remit water Cess as per the assessment orders as and when issued by Board.

3. The industry should comply with the National ambient air quality standards as per MoEF, GoI notification dated. 18.11.2009 along the premises of the factory as prescribed below.

S. No.	Parameters	Standards in µg/m³
1	Particulate Matter(PM_{10})	100
2	Particulate Matter ($PM_{2.5}$)	60
3	SO_2	80
4	NOx	80

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A).

4. The industry shall not manufacture new products / increase the capacity beyond the permitted capacity mentioned in this consent order, without obtaining CFE/CFO of the Board.

5. **As committed vide undertaking dated 13.07.2018, the industry shall comply the following conditions in 3 months period:**

i. The industry shall shift outside the 10 km radius, as and when the state government so directs.

ii. The industry shall maintain a minimum set back distance of 500 mtrs from the human habitation towards northern, western and south eastern side to the boundary of the industry. Further, the industry shall provide Kirby sheets at the boundary of the unit towards the Northern side with a minimum height of 20 feet.

iii. The industry shall develop 5mtrs width of thick green belt at the boundary of the unit towards the village side with tall growing trees and wide leaf area.

iv. The industry shall provide the cladding to the crushers within 3 months.

v. The industry shall provide bunker for storage of stone metals / dust collectors within 3 months.

vi. The industry shall provide wind breaking walls and lay metal roads within 3 months.

6. As Committed vide Bank Guarantee dated 13.07.2018, the industry shall comply all the conditions mentioned in the CFO order. Failure to comply with any of the above conditions will compel the Board to forfeit the Bank Guarantee of Rs. 1.0 lakh without any further notice.

7. The industry shall provide cladding to the vibrating screen so as to arrest the dust emissions.

8. The industry shall cover the screen with M.S. Sheets and a fan connected with motor to extract the dust generated during screening operations, should be installed. Dust should be vented out into a chamber wherein water sprinklers shall be permitted for dust suppression.

9. The industry shall provide elevated closed bunker should be constructed for collection of dust and the dust conveyor should be fully covered with M.S. Sheets. The loading of dust should be directly done into the trucks, which should be brought below the bunker bins.

10. The industry shall provide temporary water sprinklers at the time of un-loading of the raw material from the truck / tipper.

11. The industry shall provide water sprinklers on the conveyor carrying raw materials from bunker/ bin to the crusher. The water should be sprayed in the form of mist with the help of a motor. The industry shall provide water meter with recording facility to record the water used for sprinkler system.

12. The industry shall construct wind breaking walls around the crusher to prevent dust spreading to the surrounding areas.

13. The industry shall construct BT road from quarry to stone crushing unit.

14. The industry shall construct metal roads within the premises.

15. The industry shall carryout regular cleaning and wetting of the ground within the premises.

16. The industry shall develop 5 mtrs width of green belt along the boundary of the site in the 50 mtrs width buffer zone of the stone-crushing unit. This green belt shall be developed on outer side of the buffer zone so as to act as a barrier.

17. The suspended particulate matter measured between 3mtrs and 10mtrs from any processes equipment of a stone crushing unit shall not exceed 600 micrograms/m^3.

18. The industry shall not cause any air pollution / dust nuisance to the surrounding environment.

19. The industry shall submit Environmental Statement in Form V before 30th September every year as per Rule No.14 of Environmental (Protection) Act, 1986.

20. The industry shall take necessary measures to control fugitive emissions.

21. The industry shall take all precautionary and safety measures during process operations.

22. The industry shall comply with all the directions issued by the Board from time to time.

23. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in

withdrawal of this order and attract action under the provisions of relevant pollution control Acts.

24. The Board reserves its right to modify above conditions or stipulate any further conditions in the interest of environment protection.

25. This Order is issued to the industry without prejudice to the action taken by the Task Force of the Board.

SCHEDULE - C
(See Rule 6(2))

(Conditions of Authorization for occupier or operator handling hazardous wastes)

1. The industry shall give top priority for waste minimization and cleaner production practices.
2. The industry shall not store hazardous waste for more than 90 days as per the Hazardous & other wastes (Management and Transboundary Movement) Rules, 2016.
3. The industry shall store Used / Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal.
4. The industry shall not dispose Waste oils to the traders and the same shall be disposed to the authorized Reprocessors/ Recyclers.
5. The industry shall dispose Used Lead Acid Batteries to the manufacturers / dealers on buyback basis.
6. The industry shall take necessary practical steps for prevention of oil spillages and carry over of oil from the premises.
7. The industry shall maintain 6 copy manifest system for transportation of waste generated and a copy shall be submitted to Board Office and concerned Regional Office.
8. The industry shall maintain good housekeeping & maintain proper records for Hazardous Wastes stated in Authorisation.
9. The industry shall maintain proper records for Hazardous Wastes stated in Authorisation in FORM-3 and file annual returns in Form- 4 Rules 6(5), 13(8), 16(6) and 20(2) as per of the Hazardous & other wastes (Management Transboundary Movement) Rules, 2016.
10. The industry shall submit the condition wise compliance report of the conditions stipulated in Schedule B & C of this Order on half yearly basis to Board Office. Hyderabad and concerned Regional Office.
11. The industry shall dispose the e-waste to authorised recyclers / re-processors only.

31/7/2018

JOINT CHIEF ENVIRONMENTAL ENGINEER

To
M/s. Sri Srinivasa & Co.,
(Formerly M/s. P. Srinivas Stone Crushing Industry),
Sy. No. 452/1, Puppalaguda (V),
Gandipet (M), Rangareddy District.

ANNEXURE – XXVIII

TS-iPASS COMMON APPLICATION FORM

UID No:	SML006058322656
NAME OF INDUSTRIAL UNDERTAKING	Aadeshwar Aggregates Private Limited
NAME OF PROMOTER	D Sumanth kumar Reddy
S/o. D/o. W/o	D Subramanyam Reddy

PROPOSED LOCATION OF UNIT ADDRESS

Location of Factory	Rangareddy

Survey No	246/1 246/2	Nameof District Grampanchayat/IE/IDA/SEZ	Vattinagulapalli
Village/Town	Vattinagulapally	Mandal	Gandipet
District	Rangareddy	PinCode	500075
Email-ID	vessellaaggregates@gmail.com	Telephone	
Total extent of site area as per document(in Sq.mts)	14163.98	Proposed area for development(in Sq mts)	4850.00
Total built-up area(in Sq.mts)	4850.00	Existing width of approach road(in feet)	40.00
Type of Approach Road	Black Top	Land comes under	DT&CP
Case type	Pvt Ltd	Category of Industry	Orange
Caste	OC	Building Approval	New

ADDRESS OF THE ENTREPRENUER

Door No.	21 Vessella C	Street Name	Sri Ram Nagar Colony
Village/Town	KONDAPUR	State	Telangana
District	Rangareddy	PinCode	500084
Cell No	9652973456	Mandal	Serilingampally
Email-ID	vessellaaggregates@gmail.com	Telephone	

PROPOSAL	
Proposal For	New
	Proposed Investment
Land Value(in Lakhs)	13.65
Building Value(in Lakhs)	3.00
Plant and Machinery Value (in Lakhs)	30.00
Total Value (in Lakhs)	46.65

PROBABLE EMPLOYMENT POTENTIAL(In NO. of persons to be employed)

	Male	**Female**
DIRECT	20	5
INDIRECT	70	10
TOTAL	90	15

Category of Registration :

Registration No	674884615351	Date	18-09-2017

LINE OF ACTIVITY

Line of Activity	Stone crushers

LINE OF MANUFACTURE

S No	Item	Quantity	Units	Quantity Per
1	STONE CHIPS OF VARIOUS SIZES	7200	Tone	Day

RAW MATERIALS USED IN PROCESS

S No	Item	Quantity	Units	Quantity Per
1	Aggregate	7200	Tonne	Day

Power			
Contracted maximum demand in KVA :	801	Connected load in KW/HP:	0/1014
Aggregate Installed Capacity OF The transformer to be installed by the Entreprenuer:	0	Required Voltage Level:	11 KV

Any other services existing in the same premises:	No

Proposed maximum working hours:			
Per day		24	
Per month		720	
Expected month and year of trial production:	01-03-2020	Probable date of requirement of power supply:	01-02-2020

Water			
Water supply from :		Water requirement	
Drinking water (in KL/Day):		Water for processing(Industrial use) (in KL/Day):	
Source of water:		Requirement of water (in KL/Day):	
Quantity of water water required for consumptive use (in KL/Day)		Quantity of required for non-consumptive use (in KL/Day):	

PCB
PCB OCMMS Common Application Form

Labour Department	
Address of the Manager or person responsible for the Supervision and control of the Establishment:	
Category of Establishment	OTHERS
Full name	D Sumanth Kumar Reddy

Father's Name	D Subramanyam Reddy
Designation	Director
Address of the Manager	
Nature of work / is to be carried on in the establishment	Stone crushers
Estimated date of commencement of building or other construction work	
Maximum number of building workers to be employed on any day	
Estimated date of completion of building or other construction work	
Full name and address of the Principal Employer:	
Name	D Sumanth Kumar Reddy
Father's Name	D Subramanyam Reddy
Designation	Director
Age	30
Email	vessellaaggregates@gmail.com
Mobile No	9652973456
Address	
Name and address of the Director / Partners (in case of companies/firm)	
Full Name	
Door No.	
District	
Mandal	
Village/Town	
Particulars of Contractors and migrant workmen	

Print HOME

ANNEXURE – XXIX

TELANGANA STATE POLLUTION CONTROL BOARD
Paryavarana Bhavan, A-III, Industrial Estate, Sanathnagar,
Hyderabad-500 018
Phone : 040-23887500

Regd. Post with Ack. Due

Order No. 161 /TSPCB/CFE/RRD/RO-RR1 /HO/2022 2189 **Date:09.03.2022**

Sub: TSPCB – CFE - **M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapalli (V), Gandipet (M), Rangareddy District** – Application for CFE – Rejected– Reg.

Ref:
1. CFE Application of the industry dated 10.12.2021.
2. GO Ms No. 111, MA dated 08.03.1996 issued by MA&UD Dept.,
3. Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371/1999 and CA Nos. 372-373 of 1999.
4. DO letter no. 7769/ELV/2000, dated 30.03.2001.
5. Memo No. CA No.368-373/1999/PCB/Legal/2000-975, dated 16.08.2001.
6. Closure Order issued by the Board vide Order No.15-RR-I-TSPCB/ZO-HYD/2019-327, dated 22.08.2019.
7. Disconnection of Power Supply Order issued by the Board vide Order No.15-RR-I-TSPCB/ZO-HYD/2019-328, dated 22.08.2019.
8. TSPCB letters dated 02.12.2019, 08.10.2020, 01.11.2021, 23.12.2021, 21.01.2022 issued to Tahsildar, Gandipet, RR District.
9. TSPCB letter dated 18-11-2020 issued to RDO, Rajendranagar Division, RR District.
10. WP (PIL) No. 233 of 2020 filed by P. Sharath Kumar Reddy, RR District.
11. WP (PIL) No. 170 of 2020 filed by M. Gopal Reddy, RR District.
12. WP No. 12022 of 2020 filed by Vislawath Sangameshwar, R/o.Hyderabad.
13. WP No. 17554 of 2020 filed by M/s. Chiranjeeva Excavations Infrastructure Pvt Ltd.,and M/s.Aadeeshwar Aggregates Pvt Ltd.,
14. Hon'ble High Court Order dated 07.06.2021 in WP (PIL) No. 170 of 2020.
15. Hon'ble High Court Order dated 20.10.2021 in WP (PIL) No. 233 of 2020.
16. Hon'ble High Court Order dated 23.11.2021 in WP No. 17554 of 2020.
17. Hon'ble High Court Order dated 18.01.2021 in WP No. 12022 of 2020.
18. OA No. 6 of 2022 filed by P.V.Subramanya Verma before Hon'ble NGT, SZ, Chennai.
19. Hon'ble NGT, Order dated 17.01.2022 in OA No. 6 of 2022.
20. TSPCB RO's report dated 22.12.2021.
21. CFE Committee Meeting held on 13.01.2022
22. TSPCB RO's report dated 17.01.2022.
23. CFE Committee Meeting held on 19.02.2022.

***

M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapally (V), Gandipet (M), Rangareddy District, is involved in stone crushing activity.

The Board, vide reference 6th cited, issued Closure Order to M/s. Aadeshwar Aggregates Pvt. Ltd., for operating without CFE and CFO of the Board and located within the 10 km radius of Osmansagar & Himayatsagar lakes.

Subsequently, M/s. Aadeshwar Aggregates Pvt. Ltd. applied for CFE on 27.12.2019. The Board raised clarification on 31.12.2019 stating the following:

"The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area".

The industry re-submitted the application on 16.03.2020. The application was rejected as per the provisions of the GO Ms. No. 111, regarding prohibition of polluting industries within 10 km radius (i.e. both on upstream and downstream side of the Osmansagar & Himayatsagar lakes). The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area

Subsequently, the industry, vide reference 13th cited, filed Writ Petition No. 17554 of 2020 before the Hon'ble High Court. The Hon'ble High Court, vide order dated 23.11.2021 disposed the case with the following direction:

"Resultantly, without adverting to the merits of the case, the writ petition is disposed of with a direction to the Telangana State Pollution Control Board to decide the applications of the petitioners in accordance with law, within a period of 45 days from the date of receipt of such applications. The petitioners shall be free to submit hard copies to the Telangana State Pollution Control Board.

Pending miscellaneous applications, if any, shall stand closed."

Accordingly, the industry submitted CFE Application vide reference 1st cited on 10.12.2021. The EE, RO, RR-I submitted report vide reference 20th cited.

The application was examined in the CFE-CFO Committee virtual meeting held on 13.01.2022. The industry representatives attended the virtual meeting and raised the following points in support of their application:

i. The stone crusher is located in Vattinagulapally Village which is downstream of the Gandipet Lake.Their unit is established under Survey No.246/1 & 246/2 of Vattinagulapally Village, Gandipet Mandal, Rangareddy District. These Survey Numbers are notified as "conservation zone", pursuant to G.O.Ms.No.288.

ii. The Shilparamam at Hi-tech city near Madhapur, the entire Hitech City and Financial District comprising of all IT companies and other Residential and Commercial activities fall within the 10 Kms radius of G.O.Ms.111.

iii. Three stone crushers, viz., GMR Stone Crusher, Sri Rama Engineering Constructions and Pullur Constructions which are located in the Vattinagulapally Village are permitted by the Board. They request to treat them on parity with these three crushers and issued CFE and CFO.

iv. Their Unit has partnered with M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., who excavates rocks and boulders from the cellars of various infra company sites. The said unit is established under Rule 9(iii) & (iv) of the Telangana State Mines & Minerals Concession Rules, 1966. The said unit is regularly paying crores of revenue as 'royalty' to the Telangana State exchequer.

v. They have submitted all the details in the application and requested to examine the same and issue CFE and CFO to the stone crusher.

The CFE-CFO Committee after detailed discussions, directed the EE, TSPCB, RO, Rangareddy-I to submit detailed report on the representation submitted by the industry for further examination.

During the pendency of the CFE application before the Committee, there was a judicial development wherein an Original Application (OA) No. 6 of 2022 was filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against establishment and operation of illegal and unauthorised stone crushing units. The applicant industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee to inspect the area in question and submit a factual as well as action taken report, if there is any violation found. The CFE-CFO Committee has to take this development into consideration.

As per the directions of the CFE-CFO Committee, the EE, TSPCB, RO, Rangareddy-I submitted report vide reference 22nd cited.

The issue was examined in the CTE-CFO Committee meeting held on 19.02.2022. The Committee observed the following:

S. No	Industry's representation	Observation
1.	Their Company is an MSME Unit. It is stone crusher established, to crush the excavated stones / boulders from construction sites as a part of recycling the waste excavated material. Basically, their Unit's activity is an eco-friendly activity, which is a statutory mandate under Section 132 of the Municipalities Act, 2019.	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10kms radius of Osmansagar and Himayatsagar lakes. The vattinagulapally village is listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996, wherein the Board is not accepting applications of any industry. The crushing activity falls under orange category at Sl.No.64 as per CPCB categorization and stone crusher is a air pollution potential industry. The Applicant Industry Aadeshwar Aggregates was operating illegally without obtaining any required Consents from the Board as mandated by the law. As the Industry was indulging in illegal operations the Board has issued Closure Orders to the industry on 22.08.2019. Even after the issuance of closure order, the unit continued its ilegal operations, the Board was constrained to direct the SE (Operations), Telangana State Southern Power Distribution Company Limited (TSSPDCL) to disconnect the power supply. Even inspite of the disconnection of the power supply, the industry started to continue its illegal operations using Diesel Generators in violation of the laws. As such, the Board was constrained to addressed letter on 02.12.2019 to Tahsildhar, Gandipet Mandal to cease the Generator of the industry. After this series of events when illegal operations were closed the industry has applied for Consent for Establishment (CFE) to TSPCB through TS-iPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating the following:"The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area". The industry re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration, rejected the CFE application on 20.03.2020 i.e., after 4 days of application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited. That even inspite of the rejection of its application, the Industry continued its illegal operations and the Board again had to address letters on 08.10.2020, 01.11.2021, 23.12.2021, 21.01.2022 to Tahsildhar, Gandipet Mandal and a letter dated 18.11.2020 to Revenue Divisional Officer (RDO), Rajendranagar Division, RR District, requesting to seize the D.G.Sets of the petitioner industry, as the industry was operating in violation of the Closure Orders issued by the Board.
2.	Their unit is established under Survey No.246/1 & 246/2 of Vattinagulapally Village, Gandipet Mandal, Rangareddy District. These Survey Numbers	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10kms radius of Osmansagar and Himayatsagar lakes. The Vattinagulapally village is listed in the 84 villages

	are notified as *"conservation zone"*, pursuant to G.O.Ms.No.288.	within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 wherein the Board is not accepting applications of any industry. The reliance of the industry on G.O.Ms.No.288 is unfounded as the said G.O. while defining activities which can take place in Conservation Zone clearly mandates in column No.II that activities mentioned in Col.I are not allowed in the prohibited areas as mentioned in G.O.111 MA.
3.	Their Unit has partnered with M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., who excavates rocks and boulders from the cellars of various infra company sites. The said unit is established under Rule 9(iii) & (iv) of the Telangana State Mines & Minerals Concession Rules, 1966. The said unit is regularly paying crores of revenue as 'royalty' to the Telangana State exchequer.	There is no relevance or role of M/s. Chiranjeeva Excavation and Infrastructure Pvt. Ltd., which is involved in the job of Excavation for construction companies, so as to enable multi-storied/highrise buildings to have their respective footings and cellars dug-out from appropriate base level depths. Whereas the M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity which is categorized under Orange Category, as per Central Pollution Control Board (CPCB) Classification of Industrial Sectors. Further the Agreement dated 07-09-2018 filed by the Applicant Industry before the Hon'ble High Court clearly shows that the business relation between M/s. Chiranjeeva Excavation and M/s. Aadeshwar Aggregates is clearly of a seller and customer and not of a partner unit. The crusher is located far away from the construction activity sites.
4.	Section 132 of the Municipalities Act, 2019 mandates that the material excavated from the construction sites shall be recycled in order to preserve the environment. Pursuant to the same, M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., has partnered with M/s. Aadeshwar Aggregates Pvt. Ltd., to implement the object envisaged under "Section 132" of the Municipalities Act, 2019. Such a partnering is a win-win situation for both the State and the environment. The State gets its revenue in the form of Royalties and GST accruing to the State Exchequer and at the same time, when the State Pollution Control Board has no means and ways conceived for disposal of construction material, M/s. Aadeshwar Aggregates Pvt. Ltd., is established for the purpose of recycling. Therefore, establishment of M/s. Aadeshwar Aggregates Pvt. Ltd., is an eco-friendly activity where the waste materials are recycled an reused.	There are many no. of stone crushers operating with valid CFO of the Board. Hence, M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., can dispose boulders to the crushers which are having CFO of the Board. Whereas, M/s. Aadeshwar Aggregates Pvt. Ltd., is operating crusher without CFE and CFO of the Board. The permissions granted by the State Govt. in relation to its nature of the work to M/s. Chiranjeeva Excavation, cannot grant legitimacy of industrial operations to Aadeshwar Aggregates. The work orders and royalty payments made to the Govt is restricted to the nature of the work of the M/s. Chiranjeeva Excavation, and not at all covered or concerned with the industrial operations of the Aadeshwar Aggregates.

5.	Without considering the above mentioned eco-friendly activity, the application of M/s. Aadeshwar Aggregates Pvt. Ltd., for CFE was rejected by a cryptic and non-speaking order. Aggrieved whereby, we initially approached NGT, Chennai which had relegated us to the High Court of Hyderabad. Therefore, we filed W.P.No.17554 / 2020. The same was disposed-of on 23.11.2021 permitting us to file the present application.	The Applicant Industry Aadeshwar Aggregates was operating illegally without obtaining any required Consents from the Board as mandated by the law. The Applicant industry falls within the 10 kms radius of Osmansagar and Himayatsagar lakes and is located in Vattinagulapally (V) which is one of the village falling within 10 Kms catchment area of Osmansagar & Himayatsagar as per the GO Ms No. 111, MA, dated 18.03.1996. As such operations of the Industry is prohibited within 10 Kms of Himayatsagar and Osmansagar Lake area. The para no. 3 (i) (e) & (f) states as follows: - "(e) To prohibit polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution. (f) There shall be total prohibition of location of industries in the prohibited zone" The crushing activity falls under orange category at Sl.No.64 as per CPCB categorization and stone crusher is a air pollution potential industry. The crusher is causing air pollution in the surrounding area and located adjacent to the ORR and also within the 10 kms radius of Himayatsagar and Osmansagar lakes.
6.	According to the cryptic, non-speaking order, by this PCB, our application was rejected merely, on the ground that the said Vattinagulapally Village to be the falling under G.O.M.S.No.111.	After the series of events when illegal operations were closed, the industry applied for Consent for Establishment (CFE) to TSPCB through TS-iPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating the following:"The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area". The industry has re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration rejected the CFE application on 20.03.2020 i.e., after 4 days of application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited.
7.	To our astonishment, from the perusal of the CFE orders of other stone crushers, they are permitted by PCB by, granting CFE & CFO in the same Vattinagulapally Village and neighboring Puppalaguda Village and Kokapet Villages. In fact, the Puppalaguda and Kokapet Villages are much closer to Gandipet Lake. When those units are permitted to carry-out stone crushing activities, the same yardstick shall be applied to our unit, on the ground of 'Doctrine of Parity' under "Article 14" of the Constitution of India; whereunder, equals cannot be	The details of permitted crushers are submitted below:

	treated as un-equals. Therefore, our unit, shall also be grated CFE and consequential CFO on-par with the above companies referred to hereinabove.	

M/s. Hyma Developers Pvt. Ltd., (Earlier M/s. Pullur Constructions & M/s. Sri Laxmi Narsimha Stone Crusher were existing at that place), Kokapet (V), Gandipet (M), Ranga Reddy District

- M/s. Hyma Developers Pvt. Ltd., is located at Sy. No. 239(P), 240(P), 48, 49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District and is involved in construction project.
- The proponent has obtained Environmental Clearance (EC) for the construction project from SEIAA, vide Order Dated 13.10.2020 for Commercial Office Complex construction project.
- The Board is permitting construction projects within the 10 Km radius down stream of the Osmansagar and Himayatsagar lakes and in the villages which are not listed in the 84 villages mentioned in the G.O.Ms.No.111, Kokapet (V) is not listed in the 84 villages mentioned in the GO Ms. No.111.
- The CFE-CFO Committee recommended to issue CFE and CFO of the Board to M/s. Hyma Developers Pvt. Ltd., Sy.No. 239(P), 240(P), 48, 49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District.
- Accordingly, the Board issued CFE vide order dated 31.12.2020 for "Commercial Office Complex, Captive RMC units – 2 x 60 m^3/hr &Captive Stone Crushers – 2 x 250 TPH & 1 x 300 TPH", duly stipulating the following condition:
  "The proponent shall operate the stone crushers for and only during the period of construction of Commercial Office Complex, purely on temporary basis and this limited purpose as a captive unit."
- Subsequently, the Board issued CFO for Captive Stone Crushers – 2 x 250 TPH & 1 x 300 TPH only within the premises of the Construction site for which Environmental Clearance is obtained.

M/s. GMR Stone Crusher, (Formerly M/s. Progressive Construction Company), Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy District

- M/s. GMR Stone Crusher (formerly M/s. Progressive Construction Company) is located at Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy and involved in stone crushing activity.
- The industry is located within the 10 Km radius of Himayatsagar and Osmansagar Lakes.
- The industry was established on 17.06.1998 and obtained CFO of the Board vide order dated 04.07.2000 for Stone chips, with a validity period upto 31.01.2001
- The industry applied for renewal of CFO of the Board on 16.04.2008 and the same was returned as the industry located within the 10 kms radius of Himatyatsagar and Osmansagar lakes.
- Subsequently, the Board issued circular dated 15.02.2018 regarding renewal of the Consents of the existing industries located within the 10 km radius of Osmansagar and Himayatsagar lakes, prior to the Hon'ble Supreme Court's order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following:
  - No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes.
  - The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure.
  - Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs.
- Accordingly, the industry applied for renewal of CFO of the Board for Stone Metal (40mm, 20mm, 12mm & 6mm) - 200 TPH.
- The application was examined in the CFO Committee Meeting at the TSPCB, ZO, Hyderabad. After detailed discussions, the Committee recommended to consider the

CFO as per Board Circular dated 15.02.2018.

- The Board issued CFO to the industry vide order dated 16.04.2018 for Stone Chips (40mm, 20mm, 12mm & 6mm) - 200 TPH, which is valid upto 31.03.2023.

M/s. Sri Rama Engineering Constructions, Sy.No.203, Vattinagulapally (V), Gandipet (M), Rangareddy District

- M/s. Sri Rama Engineering Constructions is located at Sy.No.203, Vattinagulapally (V), Gandipet (M), Rangareddy District and involved in stone crushing activity.
- The industry is located within the 10 Kms radius of Himayatsagar and Osmansagar Lakes.
- The industry was established in the year 1996 and obtained CFE of the Board vide order dated 21.03.1996 for the following products:

S.No	Products / Line of Activity	Consented capacity as per CFE order dt.21.03.1996
1	40mm HBG Chips	400 cum/day
2	20 mm HBG Chips	20 um/day
3	10 mm HBG Chips	20 cum/day

- The industry earlier applied for CFO several times but the same was not considered as the crusher is located in 10 Kms radius of Himaythsagar and Osmansagar lakes.
- The industry applied for CFO on 14.12.2001 and the same was returned to the industry on 01.01.2002 stating that, the industry is located in 10 Kms radius of Himaythsagar and Osmansagar lakes.
- The Board vide Memo No.C.A.Nos 368-373/99/PCB/Legal/2000-975 issued directions for processing the applications of the industries located within 10 Km radius of Osmansagar and Himayath sagar lakes and to return the consent applications of Red and Orange categories of industries established after 08.03.1996.
- A complaint dated 31.08.2017 was received from Sri K.Satish Kumar regarding un-authorized stone crushers operating in Greater Hyderabad Municipal Limits / HMDA / 111 GO area / FTL of different tanks.
- The Board issued Closure Orders to the industry vide order dated 27.09.2017 for operating the stone crusher without having CFO of the Board and causing air pollution in the area and for the following reasons:
  a) The stone crusher is operating without valid CFO of the Board as required under Section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under Section 21/22 of Air (Prevention & Control of Pollution) Act, 1981.
  b) The stone crusher is situated within 10 Kms radius of Himayatsagar and Osmansagar lakes.
  c) The stone crusher is not having adequate Air pollution control equipment thereby causing air pollution in the surrounding area.
  d) The Hon'ble NGT has directed the TSPCB to take action against the unauthorized stone crushers operating in GO 111 area.
- Subsequently, the Board issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following:
  - No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes.
  - The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure.
  - Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs.
- Accordingly, the industry applied for CFO of the Board for Stone Metal (40mm, 20mm, 12mm & 6mm).
- The application was examined in the CFO Committee Meeting at the TSPCB, ZO, Hyderabad. After detailed discussions, the Committee recommended to consider the CFO as per Board Circular dated 15.02.2018.

	• The Board issued CFO to the industry vide order dated 29.01.2020 for Stone Chips (40mm, 20mm, 12mm & 6mm) - 200 TPH valid upto 31.01.2021. Subsequently, the Board renewed the CFO vide order dated 20.03.2021, which is valid upto 31.01.2024.	
8.	The classification, sought to be projected by PCB, that, all the above named four stone crushing units, are operating prior to G.O.Ms.No.111 Dt. 08/03/1996, coming into force, is an untenable classification. The said classification is unreasonable in so far as the PCB's role of controlling the pollution is concerned. The PCB's interpretation that G.O.Ms.No.111 cannot operate retrospectively for earlier stone crushing units is also unreasonable and untenable. The said stand of PCB is directly infringing Article 14 of the Constitution of India. Therefore, our company – M/s. Aadeshwar Aggregates Pvt. Ltd., shall also be granted CFE and consequential CFO, for operating its stone crushing unit, as its activity is more eco-friendly, as it promotes recycling and reusing of natural resources in a more efficient manner.	The contention of the Industry that actions of the Board violated its fundamental rights is untenable, as the fundamental rights are subjected to reasonable restrictions and one of the basic restriction is the action should not be in contravention of the rule of law. The claim of the Applicant Industry that the Board is acting in a pick choose method and it should be granted CFE on par with other similar units, is contrary to facts. The fact is that the Board issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes with compliance to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following: i. No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes. ii. The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure. iii. Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs. The above circular was issued after due consultation and obtaining the legal opinion from the office of the Addtl Advocate General vide Opinion No.6/2018 dated 30-01-2018. The legal opinion of the learned Addtl Advocate General stands on clear footing that industries generating pollutions in the catchment area of lakes upto 10 km.s from FTL, shall be prohibited and only the existing industries whom are complying with all the rules and regulations may be permitted subjected to the conditions. The fact is some other Crushers has obtained CFE and CFO ie., prior to the Hon'ble Supreme Court's Order dated 01.12.2000. But whereas, the applicant industry was established in the year 2019, subsequent to the Hon'ble Supreme Court dated 01.12.2000. The Vattinagulapally village is listed in the 84 villages (Annexure-I) of G.O.Ms.No.111 which are located in catchment of the lakes upto 10 kms. The Board is not permitting any activity in these 84 villages, as per the provisions of the GO Ms. No. 111.Hence, the CFE application made by the industry was rejected by the Board.

9.	Our Company stands on a higher pedestal in so far as its above mentioned eco-friendly activity is concerned. It is exactly doing what Ramky Enviro is doing by partnering with GHMC. Therefore, the Doctrine of Parity even gets triggered in this case and the equity tilts in our favour.	That M/s. Ramky-enviro has established a Construction and Demolition waste Recycling unit located in Jeedimetla as per the provisions of the Construction & Demolition Waste Mangement Rules, 2016. Whereas, the applicant industry is a stone crushing unit and not a Construction and Demolition waste Recycling unit. The Board has consented to establish and to operate Ramky-Enviro industry, as the Jeedimetla village does not fall under the G.O.Ms. No. 111, whereas, M/s. Aadeeshwar Aggregates is located in Vattinagulapally village which is listed in the 84 villages in G.O.Ms.No.111. Hence there is no comparison.
10.	The Vattinagulapally Village falls under the downstream of Gandipet Lake, therefore, our recycling activity, being an eco-friendly activity, does not in any way cause pollution or acidification of both the lakes, viz., Gandipet and Himayatsagar lakes.	The claim of the Applicant Industry that the it is located in the downstream of the protected lakes, is a frail argument as the law as it stands in all clear terms has prohibited polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution. In fact the stone crusher industry is operating in eco sensitive and critical zone, as it is located in closest of proximity i.e. just 1.89 k.m. from the FTL of Osman Sagar Lake. The Vattinagulapally village is listed in the 84 villages of G.O.Ms.No.111 where the Board is not accepting applications of any new industry. M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity. The crushing activity falls under orange category at S.No.64 as per CPCB categorization and stone crusher is an air pollution potential industry.
11.	When the HMDA zoning regulations under G.O.Ms.288, permits establishment of stone crushing unit in Vattinagulapally Village, the later G.O. of year 2008, will naturally supersede the earlier G.O. of the year 1996. Therefore, rejecting our application citing G.O.Ms.No.111, shall not be done mechanically without application of mind and without considering the Doctrine of Parity.	The reliance of the industry on G.O.Ms.No.288 is unfounded as the said G.O. while defining activities which can take place in Conservation Zone clearly mandates in column No.II that activities mentioned in Col.I are not allowed in the prohibited areas as mentioned in G.O.111 MA. Further, the Hon'ble Supreme Court, in its Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 has held up the G.O.Ms.No.111. Hence, G.O.Ms.No.111 is still in force.
12.	In addition to the above, the State Government appointed expert committee consisting of scientists from EPTRI, had already recommended the State Government, that Vattinagulapally Village shall be deleted from the notified list of villages under G.O.Ms.111. This report is a part and parcel of your PCB records. Therefore, please consider granting CFE and consequential CFO, to their company's stone crushing unit.	The Board has not received any direction from the State Government regarding deletion of Vattinagulapally Village from the notified list of 84 villages under G.O.Ms. 111. Further the validity of the G.O.111 and prohibition of polluting industrial activity in the 10 k.m. buffer zone was already been upheld by the Hon'ble Supreme Court of India in the case of A.P. Pollution Control Board Vs Prof.M.V. Nayudu (Retd.) Case No.Civil Appeal Nos. 368-371 of 1999, Civil Appeal No. 372 of 1999, Civil Appeal No. 373 of 1999. By its judgment dated 01-12-2000, the Hon'ble Supreme Court has settled the rule which has attained finality. The Hon'ble Supreme Court while upholding the order of refusal of permission by PCB to the applicant

		industry and by setting aside the order of the Hon'ble High Court and the Hon'ble Appellate Authority has held that, *".....The State of Andhra Pradesh is therefore directed hereby to identify these industries located within 10 K.M. radius of these two lakes and to take action in consultation with the A.P.Pollution Control Board to prevent pollution to the drinking water in these two reservoirs. The State and the Board shall not permit any polluting industries within the 10 k.m radius."* After the above decision of the Hon'ble Supreme Court, the Principal Secretary to the Govt., EFST Dept. issued direction to the State PCB vide D.O.Lr.No.7769/Env./2000 dated 30-03-2001 that no new polluting industry shall be allowed within the 10 km. radius of Osmansagar and Himayathsagar lakes.
13.	It may not be out of place to mention, above the radius length from Gandipet Lake, to be extending upon Shilparamam at Hi-tech city near Madhapur. If this aspect be considered, the entire Hitech City and Financial District comprising of all IT companies and other Residential and Commercial activities fall within the 10 Kms radius of G.O.ms.111. Therefore, the logic of PCB that it is not accepting any applications in 111 G.O. villages is ex-facie illogical and untenable. Therefore, we request this PCB to take an objective and progressive approach, which will enrich the State coffers considering the eco-friendly recycling and reusable activity of M/s. Aadeshwar Aggregates Pvt. Ltd., in the interest of justice and also considering the "fundamental right to livelihood" of the entrepreneurs of M/s. Aadeshwar Aggregates Pvt. Ltd. PC shall also consider the minimal impact on environment that may be caused by allowing establishment of M/s. Aadeshwar Aggregates Pvt. Ltd., which is clearly part of the sustainable development concept. PCB shall consider the mitigating factors while considering our application.	The Shilparamam, Hi-tech city, Madhapur etc all falls under 10 km radius of Osmansagar and Himayatsagar lakes. However, not listed in the 84 villages notified under G.O.Ms.No.111. The Board is permitting construction activities located in the areas which are not listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 and which have obtained environmental clearance. Whereas, M/s. Aadeshwar Aggregates Pvt. Ltd., is a stone crushing industries and is located in Vattinagulapally Village which is listed in 84 villages at Sl.No. 67.
14.	M/s. Aadeshwar Aggregates Pvt. Ltd., ensures PCB, that it will abide by any of the conditions that may be imposed by PCB while granting CFE and the consequential CFO, to curtail the probable dust pollution. M/s. Aadeshwar Aggregates Pvt. Ltd., undertakes to install sprinklers as mandated by the PCB guidelines/rules. It	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10 kms radius of Osmansagar and Himayatsagar lakes. The Vattinagulapally village is listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 wherein the Board is not accepting applications of any new industry.

	also states that its unit is not located in the residential vicinity; therefore, the question of sound pollution, air pollution and acidification of the lakes do not arise at all.	
15.	Therefore, in view of all the above facts and circumstances, we request PCB to grant us CFE and the consequential CFO by imposing any conditions as the PCB may deem fit and proper in the interest of justice.	The Hon'ble High Court is already seized of the matter in similar Writ Petitions i.e., (i) WP (PIL) No. 233 of 2020 filed by Sri T. Sharath Kumar Reddy, R/o. Rangareddy District; (ii) WP (PIL) No. 170 of 2020 filed by Sri M. Gopal Reddy and (iii) WP No. 12022 of 2020 filed by Sri. Vislavath Sangameshwar, R/o. Hyderabad, against the stone crushers operating illegally within the 10 kms radius of Osmansagar and Himayatsagar lakes. The Hon'ble High Court disposed the WP(PIL) No. 170 of 2020 vide order dt. 07.06.2021, taking on record the report filed by the Board, stating that the TSPCB has issued closure orders to all the illegal stone crushing units, Electricity Department was requested to disconnect the power supply to the stone crushing units, which was complied and the Revenue Department was asked to seize the machinery lying in the stone crushing units. The Hon'ble High Court disposed the WP(PIL) No. 233 of 2020 vide order dt. 20.10.2021, ordering as follows: ***"....Resultantly, the Writ Petition stands disposed of with the direction to the Tahsildar, Gandipet Mandal, Ranga Reddy District to give effect to the closure orders passed by the Pollution Control Board and to report compliance within ten (10) days to the Registrar General of this Court...."*** The Hon'ble High Court in its disposal order dt: 18.01.2022 in WP No. 12022 of 2020 filed by Vislavath Sangameshwar Ordered as follows: ***"....Resultantly, the present Writ Petition is disposed of with a direction the State Government to ensure that the orders passed by the Board are implemented and no mining/ crushing activity takes place in respect of the area in question. It is made clear that in case the orders passed by the Board are not implemented by the revenue authorities, this Court shall be taking suo motu contempt proceedings against the Revenue authorities.*** ***Let a compliance report be filed before the Registrar general of this Court positively within a period of six weeks.*** ***The miscellaneous applications pending, if any, shall stand closed. There shall be no order as to costs."*** The Board also received complaints from Sri R. Rambabu and Sri P.V.Subramanya Varma against the crushers and Ready Mix Plants operating in G.O.Ms.No.111 area (within 10 km radius of Himayatsagar and Osmansagar lakes) in spite of

		issuing closure order by the Pollution Control Board and causing air pollution in the surrounding areas. An OA No. 6 of 2022 is filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against Establishment and operation of illegal and unauthorized stone crushing units. The present industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee comprising of (i) a Senior Officer from the Ministry of Environment, Forests & Climate Change (MoEF&CC), Regional Office, Hyderabad, (ii) a Senior Officer from the Telangana State Pollution Control Board, (iii) District Collectors of Ranga Reddy District and Sanga Reddy District or his/her nominee not below the rank of Assistant Collector/Sub Divisional Magistrate as deputed by them and (iv) a Senior Officer from the Department of Mines and Geology, Hyderabad to inspect the area in question and submit a factual as well as action taken report, if there is any violation found. The Joint Committee is also directed to ascertain as to whether the stone crusher units arrayed in the application or any other stone crusher units functioning in that area are without obtaining necessary permission under the environmental laws, whether on account of the operation, any pollution has been caused in the nearby areas affecting air, sound as well as water, as alleged by the applicant and if they are operating without obtaining consent or other permissions required under the environmental laws and other respective laws, what is the nature of action taken against them. If they are having necessary permission/consent but the pollution control mechanism provided is not sufficient, then suggest the remedial measures to mitigate the same. The Joint Committee is also directed to impose environmental compensation for the violations committed by them if any, apart from assessing compensation for the damage caused to the environment, including cost required for restoration of the same. The Department of Mines and Geology, Hyderabad will be the nodal agency for co-ordination and also for providing necessary logistics for this purpose. In compliance of the Hon'ble High Court Order dated 18.01.2022 in WP No. 12022 of 2020, the Revenue Officials along with Mining Department Officials & TSPCB Officials have conducted joint inspection on 28.01.2022 on the illegal operational units. During the inspection, it was found that applicant industry is one of the illegal units operating with diesel generators ever after the closure order issued by the TSPCB. On the account of the illegalities committed by the applicant industry, Aadeshwar Aggregators Pvt. Ltd, the DG set was seized by the Revenue Officials and the operational jaw crusher was also locked and sealed. The same has been officially communicated to the TSPCB, Regional Office-I, R.R. District by the Tahsildar of Gandipet Mandal vide Lr.No.B/1961/2019 Dated 03-02-2022.

		An inspection of stone crushers illegally operating in G.O.111 area was conducted by the Joint Committee formed by the Hon'ble NGT in O.A.No.06 of 2022 on 14.02.2022. The Officials of TSPCB, RO, RR-I accompanied the Joint Committee. During the inspection, it was observed that the applicant industry, Aadeshwar Aggregators Private Limited has tampered the lock and seal put on the DG set and jaw crusher machine. The presence of raw material and crushed metal stone in the site of the unit shows that the industry has conducted production operations even after the seizure by the Revenue Officials.

The CFE-CFO Committee after careful examination of the CFE Application of the industry, grounds raised in the application, reports of the EE, TSPCB, Regional Office, Rangareddy-I, Action Taken by the Board, Hon'ble High Court Orders and Hon'ble NGT Order, recommended to reject the CFE application for the following reasons:

1. M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in stone crushing activity and is located Sy.No.246/1, 246/2, Vattinagulapalli (V), Gandipet (M), Rangareddy District. The stone crushing activity falls under Orange Category as per CPCB categorization and stone crusher is an air pollution potential industry.
   The village, Vattinagulapally falls within 10 km catchment area of Osmansagar & Himayatsagar lakes and is also listed in the 84 Villages mentioned in the GO Ms No. 111, MA, dated 18.03.1996, wherein the Board is not permitting any industry.

2. The Board has issued Closure Orders to M/s. Aadeshwar Aggregates Pvt. Ltd., on 22.08.2019 for operating without CFE / CFO of the Board and located within the 10 km radius of Osmansagar & Himayatsagar lakes.

3. The industry earlier applied for CFE on 27.12.2019 and re-submitted the application on 16.03.2020. The application was rejected as per the provisions of the GO Ms. No. 111, i.e., prohibition of polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the Osmansagar & Himayatsagar lakes).

4. Earlier M/s. Aadeshwar Aggregates Pvt. Ltd., made a representation to the Hon'ble Chief Minister, wherein it is stated that they have obtained Mineral Dealer License (MDL), Factory License, Micro Small & Medium Entrepreneur (MSME) Certificate, Trade License and all other statutory license required. They are transporting the excavated raw stone / boulders from their construction site i.e., M/s. Vessella Woods and crushing at their crusher. They have applied for Consent for Establishment (CFE) to the Board and informed that the Board has issued CFE for captive crushers to M/s. Hyma Developers Pvt. Ltd., which is a similar activity of M/s. Aadeshwar Aggregates. They further mentioned that they have obtained Environmental Clearance and CFE of the Board for construction activity i.e., "Residential Villas" of M/s. Vessella Woods, Survey Nos. 51 (P), Madinaguda, Serilingampally, Ranga Reddy District. They have requested to issue CFE / CFO of the Board. The TSPCB, RR-I, RO has submitted a report on the above representation to the Board Office on 28.03.2021. However, the representation was not considered as the location of the industry falls within 84 catchment villages of Himayatsagar & Osmansagar, as per GO Ms No.111 dt: 18.03.1996.

5. The GO Ms No. 111, MA, dated 18.03.1996 was issued by the State Govt. to protect and preserve Himayatsagar and Osmansagar Lakes. The relevant provisions of the G.O. are as follows.
   The para no. 3 (i) (e) & (f) states as follows: -

   "(e) To prohibit polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution.
   (f) There shall be total prohibition of location of industries in the prohibited zone"

6. The validity of the G.O.111 and prohibition of polluting industrial activity in the 10 k.m. buffer zone was already been upheld by the Hon'ble Supreme Court of India in the case of A.P. Pollution Control Board Vs Prof.M.V. Nayudu (Retd.) Case No. Civil Appeal 368-371 of 1999, Civil Appeal 372 of 1999, Civil Appeal 373 of 1999. By its judgment dated 01-12-2000, the Hon'ble Supreme Court has settled the rule which has attained finality. The Hon'ble Supreme Court while upholding the order of refusal of permission by PCB to the applicant industry and by setting aside the order of the Hon'ble High Court and the Hon'ble Appellate Authority has held that,

   "The State of Andhra Pradesh is therefore directed hereby to identify these industries located within 10 K.M. radius of these two lakes and to take action in consultation with the A.P.Pollution Control Board to prevent pollution to the drinking water in these two reservoirs. The State and the Board shall not permit any polluting industries within the 10 k.m radius."

7. After the above decision of the Hon'ble Supreme Court, the Principal Secretary to the Govt. EFST Dept. issued a direction to the State PCB vide D.O.Lr.No.7769/Env./2000 dated 30-03-2001 that no new polluting industry shall be allowed within the 10 km. radius of Osmansagar and Himayathsagar lakes.

8. The Industry M/s. Aadeshwar Aggregates Pvt Ltd was operating illegally without obtaining any required Consents from the Board as mandated by the law. The Applicant Industry M/s. Aadeshwar Aggregates Pvt. Ltd. falls within the 10 kms radius of Osmansagar and Himayatsagar lakes, and is located in Vattinagulapally (V), which is one of the village falling within 10 Kms catchment area of Osmansagar & Himayatsagar as per the GO Ms No. 111, MA, dated 18.03.1996. As such operations of the Industry is prohibited within 10 Kms of Himayatsagar and Osmansagar Lake area.

9. The Industry was indulging in illegal operations, as such the Board has issued Closure Orders to the industry on 22.08.2019, but even after the issuance of closure order, the industry continued its illegal operations. The Board issued direction to the SE (Operations), Telangana State Southern Power Distribution Company Limited (TSSPDCL) dated 22-08-2019 to disconnect the power supply. Even inspite of the disconnection of the power supply, the industry started to continue its illegal operations using Diesel Generators in violation of the laws. As such the Board was constrained to address letter on 02.12.2019, to Tahsildhar, Gandipet Mandal to cease the Generator of the industry. After this series of events when illegal operations were closed, the industry has applied for Consent for Establishment (CFE) to TSPCB through TS-iPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating that the location of the industry comes under G.O.Ms.No.111 and the Board is not accepting any application in this area. The industry re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration rejected the CFE application on 20.03.2020 i.e., after 4 days of application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited. That even inspite of the rejection of its application, the Industry continued its illegal operations and the Board again addressed letters on 08.10.2020, 01.11.2021, 23.12.2021, 21.01.2022 to Tahsildhar, Gandipet Mandal and a letter dated 18.11.2020 to Revenue Divisional Officer (RDO), Rajendranagar Division, RR District, requesting to seize the D.G.Sets of the industry, as the industry was operating in violation of the Closure Orders issued by the Board.

10. The claim of the Industry that the Board is acting in a pick choose method and it should be granted CFE on par with other similar units, is contrary to facts. The fact is the Board Office has issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes in compliance to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following:

i. No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes.
ii. The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure.
iii. Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 372-373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs.

11. The above circular was issued after due consultation and obtaining the legal opinion from the office of the Addtl Advocate General vide Opinion No.6/2018 dated 30-01-2018. The legal opinion of the learned Addtl Advocate General stands on clear footing that industries generating pollution in the catchment area of lakes upto 10 km.s from FTL, shall be prohibited and only the existing industries who are complying with all the rules and regulations may be permitted subjected to the conditions.

12. Some of the Crushers have obtained CFE and CFO prior to the Hon'ble Supreme Court's Order dated 01.12.2000. But the applicant industry was established in the year 2019, subsequent to the Hon'ble Supreme Court dated 01.12.2000.

13. The claim of the Applicant Industry that the it is located in the downstream of the protected lakes, could not be considered as the location of the crusher of the applicant i.e., Vattinagulapally Village is covered under 84 list of catchment Villages as per GO Ms. No.111 dt:18.03.1996.

14. Contention of the Industry that M/s. Ramky-enviro has established a Construction and Demolition waste recycling unit located in Jeedimetla, under the Construction & Demolition Waste Management Rules 2016. Whereas, the applicant industry is a stone crushing unit and not a Construction and Demolition waste recycling unit. The Board has consented to establish and to operate the Ramky-Enviro industry, as the Jeedimetla village does not fall under the G.O.Ms. No. 111, whereas, M/s. Aadeeshwar Aggregates is located in Vattinagulapally village which is listed in the 84 villages in G.O.Ms.No.111.

15. There is no relevance or role of M/s. Chiranjeeva Excavation and Infrastructure Pvt. Ltd., which is involved in the job of Excavation for construction companies, so as to enable multi-storied/highrise buildings to have their respective footings and cellars dug-out from appropriate base level depths. Whereas M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity which is categorized under Orange Category, as per Central Pollution Control Board (CPCB) Classification of Industrial Sectors. The permissions granted by the State Govt. in relation to its nature of the work to M/s. Chiranjeeva Excavation, cannot grant legitimacy of industrial operations to Aadeshwar Aggregates. The work orders and royalty payments made to the Govt is restricted to the nature of the work of the M/s. Chiranjeeva Excavation, and not at all covered or concerned with the industrial operations of the Aadeshwar Aggregates.Further the Agreement dated 07-09-2018 filed by the Applicant Industry before the Hon'ble High Court clearly shows that the business relation between M/s. Chiranjeeva Excavation andM/s. Aadeshwar Aggregates is clearly of a seller and customer and not of a partner unit.

16. The Hon'ble High Court is already seized of the matter in similar Writ Petitions i.e., (i) WP (PIL) No. 233 of 2020 filed by Sri T. Sharath Kumar Reddy, R/o. Rangareddy District; (ii) WP (PIL) No. 170 of 2020 filed by Sri M. Gopal Reddy and (iii) WP No. 12022 of 2020 filed by Sri. Vislavath Sangameshwar, R/o. Hyderabad, against the stone crushers operating illegally within the 10 kms radius of Osmansagar and Himayatsagar lakes.

17. The Hon'ble High Court disposed the WP(PIL) No. 170 of 2020 vide order dt. 07.06.2021, taking on record the report filed by the Board, stating that the TSPCB

has issued closure orders to all the illegal stone crushing units, Electricity Department was requested to disconnect the power supply to the stone crushing units, which was complied and the Revenue Department was asked to seize the machinery lying in the stone crushing units.

18. The Hon'ble High Court disposed the WP(PIL) No. 233 of 2020 vide order dt. 20.10.2021, ordering as follows:

"....Resultantly, the Writ Petition stands disposed of with the direction to the Tahsildar, Gandipet Mandal, Ranga Reddy District to give effect to the closure orders passed by the Pollution Control Board and to report compliance within ten (10) days to the Registrar General of this Court...."

19. The Hon'ble High Court in its disposal order dt: 18.01.2022 in WP No. 12022 of 2020 filed by Vislavath Sangameshwar Ordered as follows:

"....Resultantly, the present Writ Petition is disposed of with a direction the State Government to ensure that the orders passed by the Board are implemented and no mining/ crushing activity takes place in respect of the area in question. It is made clear that in case the orders passed by the Board are not implemented by the revenue authorities, this Court shall be taking suo motu contempt proceedings against the Revenue authorities.
Let a compliance report be filed before the Registrar general of this Court positively within a period of six weeks.
The miscellaneous applications pending, if any, shall stand closed. There shall be no order as to costs."

20. During the pendency of the application, another judicial development has occurred wherein an Original Application (OA) No. 6 of 2022 is filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against establishment and operation of illegal and unauthorised stone crushing units. The applicant industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee comprising of (i) a Senior Officer from the Ministry of Environment, Forests & Climate Change (MoEF&CC), Regional Office, Hyderabad, (ii) a Senior Officer from the Telangana State Pollution Control Board, (iii) District Collectors of Ranga Reddy District and Sanga Reddy District or his/her nominee not below the rank of Assistant Collector/Sub Divisional Magistrate as deputed by them and (iv) a Senior Officer from the Department of Mines and Geology, Hyderabad to inspect the area in question and submit a factual as well as action taken report, if there is any violation found.

The Joint Committee is also directed to ascertain as to whether the stone crusher units arrayed in the application or any other stone crusher units functioning in that area are without obtaining necessary permission under the environmental laws, whether on account of the operation, any pollution has been caused in the nearby areas affecting air, sound as well as water, as alleged by the applicant and if they are operating without obtaining consent or other permissions required under the environmental laws and other respective laws, what is the nature of action taken against them. If they are having necessary permission/consent but the pollution control mechanism provided is not sufficient, then suggest the remedial measures to mitigate the same. The Joint Committee is also directed to impose environmental compensation for the violations committed by them if any, apart from assessing compensation for the damage caused to the environment, including cost required for restoration of the same. The Department of Mines and Geology, Hyderabad will be the nodal agency for co-ordination and also for providing necessary logistics for this purpose.

21. In compliance of the Hon'ble High Court Order dated 18.01.2022 in WP No. 12022 of 2020, the Revenue Officials along with Mining Department Officials & TSPCB Officials have conducted joint inspection on 28.01.2022 on the illegal operational units. During the inspection, it was found that applicant industry is one of the illegal units operating with diesel generators ever after the closure order issued by the TSPCB. On the account of the illegalities committed by the applicant industry,

Aadeshwar Aggregators Pvt. Ltd. The DG set was seized by the Revenue Officials and the operational jaw crusher was also locked and sealed. The same has been officially communicated to the TSPCB, Regional Office-I, R.R. District by the Tahsildar of Gandipet Mandal vide Lr.No.B/1961/2019 Dated 03-02-2022.

22. Inspection of stone crushers illegally operating in G.O.111 area was conducted by the Joint Committee formed by the Hon'ble NGT in O.A.No.06 of 2022 on 14.02.2022. The Officials of TSPCB, RO, RR-I accompanied the Joint Committee. During the inspection, it was observed that the applicant industry, Aadeshwar Aggregators Private Limited has tampered the lock and seal put on the DG set and jaw crusher machine. The presence of raw material and crushed metal stone in the site of the unit shows that the unit has conducted production operations even after the seizure by the Revenue Officials.

23. M/s. Aadeshwar Aggregators Private Limited has consistently violated the law by conducting industrial operations even after the closure notice issued by the Board and even in spite of the seizure of the Machinery/ Equipment of the unit by the Revenue Officials.

In view of the above, the CFE application of the industry is not considered and rejected for the above mentioned reasons.

This order is issued as per the powers vested under section 27 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control Pollution) Act, 1981.

No industrial activity shall be carried out without obtaining Consent for Establishment (CFE) and Consent for Operation (CFO) as per the provisions of Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981.

Sd/-
MEMBER SECRETARY

To
M/s. Aadeshwar Aggregates Pvt. Ltd.,
Sy.No.246/1, 246/2, Vattinagulapalli (V),
Gandipet (M), Rangareddy District.

Address for communication:

M/s. Aadeshwar Aggregates Pvt. Ltd.,
Door No. 21 Vessella C, Sai Ram Nagar Colony,
Kondapur (V), Serilingampally (M),
Rangareddy District – 500084
Cell No. 9652973456.

// T.C.F.B.O.//

Chief Environmental Engineer

ANNEXURE - XXX

BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

Appeal No. 35 of 2022

BETWEEN:

M/s. Aadeshwar Aggregates Pvt. Ltd,
Situated at Sy.No.246/1, 246/2, Vattinagulapalli
Village, Gandipet Mandal, Rangareddy District.
Represented by its Authorized Signatory,
Sri. D. Sumanth, S/o. D Subrahmanyam Reddy,
aged about 30 Years, Designation: Director;
R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar,
Block C, Kondapur, Kothaguda Post,
Hyderabad – 500 084, Cell No. 9652973456
Email ID - sumanthreddy1989@gmail.com ....Appellant

AND

1. The State Government of T. S.,
   E F S & T Department,
   T. S. Secretariat, Hyderabad.
   Represented by its Secretary

2. T. S. Pollution Control Board,
   Paryavaran Bhavan, A-3,
   Industrial Estate, Opp. Police Station,
   Sanathnagar, Hyderabad – 500 018.
   Represented by its Member Secretary, ...Respondents

PARTICULARS

1. Name of the Appellant	:M/s. Aadeshwar Aggregates Pvt. Ltd, Represented by Its Authorized Signatory, Sri. D. Sumanth
2. Date of Impugned Order	:09/03/2022
3. Date of receipt of the Impugned Order	:11/03/2022

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy
Director

4. Details of Appeal fee : (Demand Draft for Rs. 500/- should be drawn in favour of Member Secretary, T.S. Pollution Control Board, payable at Hyderabad)

FACTS OF THE CASE

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084; humbly submit as under;

1. I am the Appellant herein and I am well acquainted with the facts of the case. I am one of the Director of the Company and I am authorized to file this Appeal on behalf of the Appellant Company.

2. I humbly submit that I established a stone crushing unit in Sy. Nos. 246/1 and 246/2 of Vattinagulapally Village, Gandipet Mandal, Ranga Reddy District. My Company is registered as a MSME unit. Our Company also obtained GST Registration. My Company also took the Trade license from the Local body, GHMC, thus all statutory compliances for establishing a stone crushing unit are obtained by us. We also require Consent for Establishment (CFE) and Consent for Operation (CFO) for operating/commencing business activity from the TSPCB, as stone crushing activity is categorized as 'Orange' category unit by the CPCB and TSPCB. This permission is now denied by the TSPCB on 09/03/2022, vide its order No.161/TSPCB/CFE/RRD/RO-RR1/HO/2022-2189. Aggrieved by the said rejection the present Appeal is filed.

3. There is no quarry or quarrying activity for running our stone crushing unit. Our unit is predominantly established as a ***re-cycling*** and ***re-using*** unit for crushing the excavated stone debris from the construction sites. Our unit's activity is explained in the following paragraphs:

For AADESHWAR AGGREGATES PVT. LTD.

D. S. K. Reddy

Director

a) Hyderabad and Ranga Reddy Districts are situated in Deccan Plateau where we find rocks on the surface of the earth and also in the sub-soil of the earth.

b) Under the Building Permission Rules *in vogue*, in the State of Telangana, parking places up to 40% in any construction site shall be mandatorily provided. For this purpose the Building Rules mandate that such parking spaces be created in the cellar portion of the proposed construction sites. At the same time for laying foundation for multi-storied buildings, the builders have to dig the sub-soil, nearly upto 70-100 feet in some cases, based on the height of the tower. During this laying of foundation, lot of rocks and boulders are being excavated, and there is no policy in place nor there is any regulation regulating the disposing of these excavated rocks and boulders.

c) For the creation of those parking places and foundations in all construction sites, mining leases are given to excavation companies to excavate the sub-soil rocky Deccan terrain. In this process the company holding the mining leases engages all heavy earth moving machinery and digs the cellars by removing the rocky boulders from the sub-soil. The so excavated rocks / boulders can be moved out of the construction sites by paying a royalty to the Telangana State Mining Department. After payment of this royalty, the rocks / boulders can be transported to any other place. But there is no law governing disposal of these excavated rocky boulders. This is a 'grey' area and the said activity is unregulated. Handling of these rocks / boulders / debris is a big menace and also a big 'Environmental concern'.

d) Exactly to address this larger societal environmental concern, our unit is established for crushing the said rocks / boulders excavated from construction sites, for which there is no law regulating disposal of these rocky

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

boulders. Our unit converts the said rocky waste boulders/debris as reusable construction material such as gravel, stone chips and robo sand to be reused in all construction sites. Thus the waste debris instead of being dumped out unauthorizedly in different locations. Our unit reuses them in the above said manner. Therefore our unit's activity is an eco- friendly activity and it does not spoil the environment, rather it protects and enhances the ecology. Therefore, our stone crushing activity cannot be equated to that of a regular stone quarrying and crushing unit. Our unit's activity is differentiable; it does not stand on the same footing as that of the other stone quarrying units.

e) While crushing the rocks / boulders in our unit air pollution may be caused but the said air pollution is within the permitted parameters under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. Our unit will comply with the parameters and standards prescribed under The Environment (Protection) Rules, 1986. According to the Central Pollution Control Board (CPCB) Revised Classification of Industrial Sectors, this stone crushing unit is categorized as 'Orange Category' and it is recognized to cause only Air Pollution. The said CPCB Guidelines are *mutatis mutandis'* adopted by the Telangana State Pollution Control Board (TSPCB) and the *Siting* criteria for establishing this stone crushing unit by the TSPCB is that the said unit shall be 100 meters away from boundary of the National Highway and also that the said unit shall be 800 meters away from human habitation (boundary of a town, village etc.). Our unit is strictly complying with the above statutory parameters. The remaining criteria of developing a 5 meters width Green Belt, will be undertaken by us.

f) Keeping all these Statutory Mandatory Rules and Regulations *in vogue*, passed by the CPCB and TSPCB, we applied for Consent for Establishment (CFE) and Consent for Operation (CFO) from

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

the Telangana State Pollution Control Board (TSPCB). The TSPCB had mechanically rejected our application on 09/03/2022 as stated supra without application of mind the reasons cited for such rejections are untenable and are in gross violation of Article 14, 19 and 21 of Constitution of India.

4. Details of permission from Gram Panchayat, Municipality / LOI from Govt. of India, if any - copies enclosed

5. ETP proposals submitted, cost of ETP - Not applicable.

6. Green belt area - Provided

7. If there is any violation from TSPCB in non-issuance of NOC / Issuance of Closure Order - Yes, closure order is already passed behind our back without notice to us which is gross violation of Principles of Natural Justice.

8. Correspondence made to TSPCB / Ministry of Environment, EFS & T Dept., if any - Yes, copies are enclosed in the material papers.

GROUNDS OF THE APPEAL

1. Under the Air (Prevention and Control of Pollution) Act, 1981, under section 31, the present Appeal is filed on the following among other grounds:-

   A. Based on the 'Principles of Sustainable Development' as envisaged under Section 20 of the National Green Tribunal Act, 2010 our unit is established to promote eco-friendly activity by ***re-cycling*** and ***re-using*** waste stone boulders /debris. Therefore there is no violation of any of the provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 or the Environment (Protection)

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy

Director

Rules, 1986. Our unit rather promotes and protects the ecosystem by doing recycling and reusing the excavated rock boulders from construction sites.

B. Our unit is not endangering the environment but it is aiding Eco-friendly activity by recycling and reusing the excavated rock boulders from construction sites.

C. The only concern or objection in regards to our unit is that it will cause Air Pollution. When that Air Pollution is within the permissible parameters and standards as per the CPCB and TSPCB Rules, the same cannot be disallowed. Therefore, we are entitled for the Consent for Establishment (CFE) and Consent for Operation (CFO) from the TS Pollution Control Board, but the TSPCB, with an unreasonable ground it rejected our application stating that, even if our unit is not there also the said excavated will be crushed by other units, this reasoning directly infringes Article 19(1)(g) and 21 of the Constitution of India. In other words the TSPCB states that the other existing stone crushing units can do this activity but our unit is denied such right to business under Article 19 (1)(g). Therefore the impugned order is liable to be set aside.

D. The other reason cited for rejecting our application is that our unit is located within the 10 kms radius of Osman Sagar and Himayat Sagar Lakes Full Tank Level (FTL) and therefore the Consent for Establishment (CFE) and Consent for Operation (CFO) cannot be granted, this 10 Kms prohibition is taken from a redundant G.O.MS.No.111, Dt. 08/03/1996. The said reasoning is not based on sound legal principles. Admittedly, our unit is located in the downstream area of both Lakes as contemplated in G.O.MS. No.111 stated supra. In this regards the then Government of Andhra Pradesh had procured an expert opinion from the Environment Protection Training and Research Institute (EPTRI)

For AADESHWAR AGGREGATES PVT. LTD.

D. S. K. Reddy

Director

in regards to the possibility of downstream area industries causing pollution to the lakes situated in the higher altitudes. The experts in the said report clearly opined that there is no possibility of the downstream industries causing pollution of the said lakes. Thus they recommended establishment of Orange and Green category industries in the downstream area.

E. Our stone crushing unit is categorized as 'Orange Category' unit, it is willing to follow the Parameters and Standards set out in Sl. Nos. 11 and 37 of the Environment (Protection) Rules, 1986.

F. The Government of Telangana in principle as a policy matter accepted the recommendations made by the experts of the Environment Protection Training and Research Institute (EPTRI). Therefore the Principal Secretary MA& UD sought for deletion of our and other survey numbers of Vattinagulapally Village from the notified area of 10 Kms radius as contemplated in G.O.MS.No.111, Dt.08/03/1996. From this it is very clear that the location of our unit in Sy. Nos. 246/1 and 246/2 is not a prohibited zone and therefore this Appellate authority shall set aside the impugned order on this ground also.

G. The Lake Protection Committee of Hyderabad Metro Development Authority (HMDA) in its 4th meeting held on 29/03/2011 expressed its concern about the disposal of debris/stone boulders excavated from construction sites from being dumped into lakes and their Buffer Zones. Therefore, it wanted a proper mechanism for safe disposal of construction waste debris to be monitored by GHMC and the Hyderabad City Police. By establishing our unit as an eco-friendly recycling and reusing unit we are exactly carrying out the intent and purport of HMDA in handling the construction waste debris. Therefore this Appellate authority shall set aside the impugned order on this ground also.

For AADESHWAR AGGREGATES PVT. LTD.

Director

H. According to the CPCB parameters, stone crushing units can be established within 100 meters of Residential/Public Buildings, inhabited sites as and when blasting activity is not involved, and if blasting is involved it should be 200 meters, in our case there is no blasting activity. Therefore, 100 meters distance from the above stated locations is sufficient. In fact none of the above stated Residential/Public Buildings, inhabited sites are not in the vicinity of our unit. Therefore there cannot be any prohibition for establishing our unit in the above said Survey Numbers as of now. Hence the impugned order is liable to be set aside.

I. Our recycled and reusable material is being contemplated to be supplied to the local State contractors who are laying public roads for the development of the entire vicinity and to have proper connectivity to the commuters. Thereby the recycled material from our unit will be used for laying roads for the State. Thereby it is reducing burden on other natural mineral resources which are being excavated from the quarrying activity. Hence the impugned order is liable to be set aside.

J. Our unit is almost 6 Kms away from Osman Sagar Lake and located in the downstream area and a big ridge is blocking the entire visibility of the said Osman Sagar Lake. Himayat Sagar Lake is more than 15 Kms away. Therefore, the dust that will emanate from our stone crushing unit will not and cannot pollute the above said lakes. Therefore, denying the Consent for Establishment (CFE) and Consent for Operation (CFO) to our unit by the 2nd respondent is illegal, arbitrary and in gross violation of the Principles of Natural Justice. Thereby our Fundamental Rights under Articles 14, 19 and 21 are grossly violated. Hence the impugned order is liable to be set aside.

K. Yet another facet in our case is there is a gross violation of Principle of *parity,* as the 2nd Respondent TSPCB had already granted the Consent for Establishment (CFE) and Consent for

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K. Reddy
Director

Operation (CFO) to 4 different stone crushers in Vattinagulapally, Puppalaguda and Kokapet villages, the other 2 villages also within the 10 Kms radius as notified under G.O.MS. No. 111. The said stone crushers are:

a. GMR Stone Crusher situated in Sy. Nos. 270 and 271 of Vattanagulapally Village.
b. M/s Sri Rama Engineering Constructions situated in Sy. Nos 141/Part and 145/1 Part of Vattanagulapally Village.
c. M/s. Hyma Developers Private Limited in Sy. Nos 239, 240, 248, 249 and 250 of Kokapet Village.
d. M/s. Srinivasa & Co. in Sy. No 452/1 of Puppalaguda Village.

L. All the 4 units are within 10 Kms radius as prescribed under G.O.MS.No.111 Dt. 08/03/1996. The same parameters are not being applied by TSPCB in so far as our unit is concerned. This discrimination against our unit is directly infringing Article 14 of the Constitution of India. On the principle of *'parity'* we are also entitled for grant of CFE and CFO to run our unit, in the interest of justice.

M. The unreasonable justification sought to be made out by the 2nd Respondent for granting CFE and CFO to the above named units is based on two self-styled reasons:-

a. The first reason is that these units or their predecessors had established these units prior to 01/12/2000 and that these industries fall under the category of pre-existing industries prior to the Supreme Court judgment in *Dr. M.V Nayudu's case reported in (2001) 2 SCC 62.*

b. The second reason is that two of the said units are established as captive units and that they are having State

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy
Director

Level Environmental Impact Assessment Authorities Permission.

N. The above two reasons cited by the 2nd Respondent to justify issuance of CFE and CFO to those four (4) units in the same vicinity and within the same 10 Kms Radius squarely and equally applies to our unit also. Our unit is also entitled to CFE and CFO, on par with the above said 4 units, for the following reasons:-

a. Whether it is an old stone cruising unit or new stone crushing unit the same causes, some Air Pollution. So therefore, the differentiation sought to be projected by the TSPCB between old and new stone crushing units is unreasonable and it is directly infringing the Principle of *parity,* thereby Article 14 of the Constitution of India is violated. For this discrimination the shelter that is sought to be taken by the TSPCB is the Supreme Court decision in *Dr. M.V Nayudu's case reported in (2001) 2 SCC 62,* the said decision is wrongly being interpreted. In the said decision the Supreme Court was dealing with industries which were already existing in the upstream of the both above said Lakes notified in G.O.MS.No.111. It never dealt with downstream industries/stone crushing units. In addition to the above the State procured an expert report from EPTRI, the said report said that, downstream stone crushing units can never cause Air & Water Pollutions and also does not cause acidification of both the Lakes for which the above said G.O has been brought. Later on the Telangana State as a matter of policy had accepted the said recommendations of the said report and sought of deletion of the Appellant's and other survey numbers in Vattinagulapally Village from the purview of G.O.MS.No.111. When that be so the 2nd Respondent TSPCB cannot say that the decision of the State has not been communicated to them.

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

b. In regards to the second reason cited by the TSPCB that two (2) of the units are captive units. The same Principle shall apply to our unit also because we also intend to use the recycled material for our captive use in our sister concern residential project M/s. Vessella Woods, where residential villas are being constructed in Sy. No. 51/P of Madinaguda Village, Serilingampally Mandal, Rangareddy District. For which our partnering construction company had obtained State Level Environmental Impact Assessment Authorities Permission (SEIAA) from the Ministry of Environment Forest and Climate change. It also obtained CFE from the TSPCB under 'Orange' Category, even though the TSPCB had mentioned about the documents showing captive utilization by our company, still the CFE and CFO are denied to our unit. On the other hand, to justify the permission granted to other 2 captive units, it relies upon the State Level Environmental Impact Assessment Authorities Permission (SEIAA) in their favour. Thus, the second reason cited by the TSPCB is directly infringing Article 14 of The Constitution of India whereunder equals are treated unequals

O. Ours is a genuine case, in view of the facts and activities that is sought to be carried out by our unit. Anticipating the Consent for Establishment (CFE) and Consent for Operation (CFO), we had stockpiled rock boulders/construction debris nearly 3,00,000(Three Lakh) tonne are already dumped and stocked in our leased out land. For Erection and establishment of the plant we spent a huge capital amount of Nine (9) crores.

MAIN PRAYER:

For all the above stated reasons this appellate authority shall set aside the proceeding No.161/TSPCB/CFE/RRD/RO-RR1/HO/2022-2189, Dt. 09/03/2022 passed by the 2nd respondent rejecting the Appellant's application for CFE to be illegal, arbitrary and high handed, and also in

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

gross violation of Principles of Natural Justice, it is also in gross violation of Article 14, 19 and 21 of Constitution of India, and to pass such other order or orders as this Hon'ble Appellate authority may deem fit and proper in the circumstances of the case.

INTERIM PRAYER:

Pending disposal of the main Appeal, this appellate authority may be pleased to temporarily permit the appellant to operate its stone crushing unit situated in Sy. Nos. 246/1 & 246/2 of Vattinagulapally Village, Serilingampally Mandal, Rangareddy District, on par with the other 4 stone crushing units which are operating in Vattinagulapally, Puppalaguda and Kokapet Villages, with CFE and CFO in their favor issued by the 2nd Respondent, while doing so this Hon'ble Appellate Authority may impose any conditions to curb the Air Pollution as per the CPCB guidelines or as per the Guidelines of the TSPCB, in the interest of Justice and to pass such other order or order (s) as this Hon'ble Appellate Authority may deem fit and proper in the circumstances of the case.

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

Counsel for Appellant

Appellant

VERIFICATION

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084 do hereby verify that the contents of Paragraph No. 1 to 8 are true and correct to my personal knowledge and grounds Paragraph No. 'A' to 'O' are believed to be true on legal advice and hence verified on ____ day of March 2022 at Hyderabad.

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

Counsel for Appellant

Appellant

List of Enclosures :

1. Original Impugned Order - Copy enclosed.
2. Correspondence made in this regard - Copies filed as material papers.
3. Copy of consent application submitted - Yes, Copies filed as material papers.
4. If there is any status report regarding Environment where the industry is proposed - Yes, EPTRI report copies filed as material papers.
5. D. D. for Rs. 500/- in favour of Member Secretary, T.S. Pollution Control Board- Yes, DD enclosed vide D.D No. _____ drawn on_____ Bank, Dt._____.

BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

Appeal No. 35 of 2022

BETWEEN:

M/s. Aadeshwar Aggregates Pvt.Ltd,Represented by its Authorized Signatory, Sri. D. Sumanth

....Petitioner/Appellant

AND

The State Government of T.S.,& another

....Respondents/Respondents

APPEAL

Filed on:

Filed by:

SMT. G. THANE, (6164)
Adv
Counsel for Appellant

BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

I.A.No. of 2022
In
Appeal No. of 2022

BETWEEN:
M/s. Aadeshwar Aggregates Pvt. Ltd,
Represented by its Authorized Signatory,
Sri. D. Sumanth ....Petitioner/Appellant

AND

The State Government of T. S., & another
....Respondent s/Respondents

AFFIDAVIT

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084, depose as under –

1. I am the deponent herein and I am well acquainted with the facts of the case. I am one of the Director of the Appellant Company and I am authorized to file the present Affidavit on behalf of the Appellant Company.

2. I humbly submit that I established a stone crushing unit in Sy. Nos. 246/1 and 246/2 of Vattinagulapally Village, Gandipet Mandal, Ranga Reddy District. My Company is registered as a MSME unit. My Company also obtained GST Registration. My Company also took the Trade license from the Local body, GHMC, thus all statutory compliances for establishing a stone crushing unit are obtained by me. I also require Consent for Establishment (CFE) and Consent for Operation (CFO) for operating/commencing business activity from the TSPCB, as stone crushing activity is categorized as 'Orange' category unit by the CPCB and TSPCB. This permission is now denied by the TSPCB on

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy
Director

09/03/2022, vide its order No.161/TSPCB/CFE/RRD/RO-RR1/HO/2022-2189. Aggrieved by the said rejection the present Appeal is filed.

3. There is no quarry or quarrying activity for running my stone cruising unit. My unit is predominantly established as a ***re-cycling*** and ***re-using*** unit for crushing the excavated stone debris from the construction sites. My unit's activity is explained in the following paragraphs:-

   a) Hyderabad and Ranga Reddy Districts are situated in Deccan Plateau where we find rocks on the surface of the earth and also in the sub-soil of the earth.

   b) Under the Building Permission Rules in vogue, in the State of Telangana, parking places up to 40% in any construction site shall be mandatorily provided. For this purpose the Building Rules mandate that such parking spaces be created in the cellar portion of the proposed construction sites. At the same time for laying foundation for multi-storied buildings, the builders have to dig the sub-soil, nearly up to 70-100 feet in some cases, based on the height of the tower. During this laying of foundation, lot of rock boulder are being excavated, and there is no policy in place nor there is any regulation regulating disposing of these excavated rocky boulders.

   c) For the creation of those parking places and foundations in all construction sites, mining leases are given to excavation companies to excavate the sub-soil rocky Deccan terrain. In this process the company holding the mining leases engages all heavy earth moving machinery and digs the cellars by removing the rocky boulders from the sub-soil. The so excavated rocks/boulders can be moved out of the construction sites by paying a royalty to the Telangana State Mining Department. After payment of this royalty, the rocks / boulders can be transported to any other place. But there is no law governing disposal of these excavated rocky

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

boulders. This is a 'grey' area and the said activity is unregulated. Handling of these rocks / boulder / debris is a big menace and also a big 'Environmental concern'.

d) Exactly to address this larger societal environmental concern, our unit is established for crushing the said rocks / boulders excavated from construction sites, for which there is no law regulating disposal of these rocky boulders. My unit converts the said rocky waste boulders/debris as reusable construction material such as gravel, stone chips and robo sand to be reused in all construction sites. Thus the waste debris instead of being dumped out unauthorizedly in different locations. My unit reuses them in the above said manner. Therefore my unit's activity is an eco- friendly activity and it does not spoil the environment, rather it protects and enhances the ecology. Therefore, my stone crushing activity cannot be equated to that of a regular stone quarrying and crushing unit. My unit's activity is differentiable, it does not stand on the same footing as that of the other stone quarrying units.

e) While crushing the rock boulders in my unit Air Pollution may be caused but the said Air Pollution is within the permitted parameters under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. My unit will comply with the parameters and standards prescribed under The Environment (Protection) Rules, 1986. According to the Central Pollution Control Board (CPCB) Revised Classification of Industrial Sectors, my stone crushing unit is categorized as 'Orange Category' and it is recognized to cause only Air Pollution. The said CPCB Guidelines are *mutatis mutandis'* adopted by the Telangana State Pollution Control Board (TSPCB) and the Siting criteria for establishing my stone crushing unit by the TSPCB is that the said unit shall be 100 meters away from boundary of the National Highway and also that the said unit shall be 800 meters away from human habitation (boundary of a town, village etc.).

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy.
Director

My unit is strictly complying with the above statutory parameters. The remaining criteria of developing a 5 meters width Green Belt, will be undertaken by me.

f) Keeping all these Statutory Mandatory Rules and Regulations in vogue, passed by the CPCB and TSPCB we applied for Consent for Establishment (CFE) and Consent for Operation (CFO) from the Telangana State Pollution Control Board (TSPCB). The TSPCB had mechanically rejected my application on 09/03/2022 as stated supra without application of mind the reasons cited for such rejection are untenable and are in gross violation of Article 14, 19 and 21 of Constitution of India.

4. I submit that, based on the 'Principles of Sustainable Development' as envisaged under Section 20 of the National Green Tribunal Act, 2010 my unit is established to promote eco-friendly activity by ***re-cycling*** and ***re-using*** waste stone boulders /debris. Therefore there is no violation of any of the provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 or the Environment (Protection) Rules, 1986. My unit rather promotes and protects the ecosystem by doing recycling and reusing the excavated rock boulders from construction sites.

5. I further submit that, my unit is not endangering the environment but it is aiding Eco-friendly activity by recycling and reusing the excavated rock boulders from construction sites.

6. I submit that, the only concern or objection in regards to my unit is that it will cause Air Pollution. When that Air Pollution is within the permissible parameters and standards as per the CPCB and TSPCB Rules, the same cannot be disallowed. Therefore I am entitled for the Consent for Establishment (CFE) and Consent for Operation (CFO) from the Telangana State Pollution Control Board, but the TSPCB, with an unreasonable ground it rejected our application stating that, even if my

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy

Director

unit is not there also the said excavated will be crushed by other units, this reasoning directly infringes Article 19(1)(g) and 21 of the Constitution of India. In other words the TSPCB states that the other existing stone crushing units can do this activity but my unit is denied such right to business under Article 19 (1)(g). Therefore the impugned order is liable to be set aside.

7. I submit that, the other reason cited for rejecting my application is that my unit is located within the 10 kms radius of Osman Sagar and Himayat Sagar Lakes Full Tank Level (FTL) and therefore the Consent for Establishment (CFE) and Consent for Operation (CFO) cannot be granted, this 10 Kms prohibition is taken from a redundant G.O.MS.No.111, Dt. 08/03/1996. The said reasoning is not based on sound legal principles. Admittedly, my unit is located in the downstream area of both Lakes as contemplated in G.O.MS. No.111 stated supra. In this regards the then Government of Andhra Pradesh had procured an expert opinion from the Environment Protection Training and Research Institute (EPTRI) in regards to the possibility of downstream area industries causing pollution to the lakes situated in the higher altitudes. The experts in the said report clearly opined that there is no possibility of the downstream industries causing pollution of the said lakes. Thus they recommended establishment of 'Orange' and 'Green' category industries in the downstream area.

8. I submit that, my stone crushing unit is categorized as 'Orange Category' unit, it is willing to follow the Parameters and Standards set out in Sl. Nos. 11 and 37 of the Environment (Protection) Rules, 1986.

9. I submit that, the Government of Telangana in principle as a policy matter accepted the recommendations made by the experts of the Environment Protection Training and Research Institute (EPTRI). Therefore the Principal Secretary MA& UD sought for deletion of my and other survey numbers of Vattinagulapally Village from the notified area of 10 Kms radius as contemplated in G.O.MS.No.111,

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy

Director

Dt.08/03/1996. From this it is very clear that the location of my unit in Sy. Nos. 246/1 and 246/2 is not a prohibited zone and therefore this Appellate authority shall set aside the impugned order on this ground also.

10.I submit that, the Lake Protection Committee of Hyderabad Metro Development Authority (HMDA) in its 4th meeting held on 29/03/2011 expressed its concern about the disposal of debris/stone boulders excavated from construction sites from being dumped into lakes and their Buffer Zones. Therefore, it wanted a proper mechanism for safe disposal of construction waste debris to be monitored by GHMC and the Hyderabad City Police. By establishing my unit as an eco-friendly recycling and reusing unit I am exactly carrying out the intent and purport of HMDA in handling the construction waste debris. Therefore this Appellate authority shall set aside the impugned order on this ground also.

11.I submit that, according to the CPCB parameters, stone crushing units can be established within 100 meters of Residential/Public Buildings, inhabited sites as and when blasting activity is not involved, and if blasting is involved it should be 200 meters, in my unit's case there is no blasting activity. Therefore, 100 meters distance from the above stated locations is sufficient. In fact none of the above stated Residential/Public Buildings, inhabited sites are not in the vicinity of our unit. Therefore there cannot be any prohibition for establishing my unit in the above said Survey Numbers as of now. Hence the impugned order is liable to be set aside.

12.I submit that, my unit's recycled and reusable material is being contemplated to be supplied to the local State contractors who are laying public roads for the development of the entire vicinity and to have proper connectivity to the commuters. Thereby the recycled material from my unit will be used for laying roads for the State. Thereby it is reducing burden on other natural mineral resources which are being excavated

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

from the quarrying activity. Hence the impugned order is liable to be set aside.

13.I further submit that, my unit is almost 6 Kms away from Osman Sagar Lake and located in the downstream area and a big ridge is blocking the entire visibility of the said Osman Sagar Lake. Himayat Sagar Lake is more than 15 Kms away. Therefore, the dust that will emanate from my stone crushing unit will not and cannot pollute the above said lakes. Therefore, denying the Consent for Establishment (CFE) and Consent for Operation (CFO) to my unit by the 2nd respondent is illegal, arbitrary and in gross violation of the Principles of Natural Justice. Thereby my Fundamental Rights under Articles 14, 19 and 21 are grossly violated. Hence the impugned order is liable to be set aside.

14.I submit that, yet another facet in my case is there is a gross violation of Principle of *parity,* as the 2nd Respondent TSPCB had already granted the Consent for Establishment (CFE) and Consent for Operation (CFO) to 4 different stone crushers in Vattinagulapally, Puppalaguda and Kokapet villages, the other 2 villages also within the 10 Kms radius as notified under G.O.MS. No. 111. The said stone crushers are:

a. GMR Stone Crusher situated in Sy. Nos. 270 and 271 of Vattanagulapally Village.

b. M/s Sri Rama Engineering Constructions situated in Sy. Nos 141/Part and 145/1 Part of Vattanagulapally Village.

c. M/s. Hyma Developers Private Limited in Sy. Nos 239, 240, 248, 249 and 250 of Kokapet Village.

d. M/s. Srinivasa & Co. in Sy. No 452/1 of Puppalaguda Village.

15.I submit that, all the other 4 units are within 10 Kms radius as prescribed under G.O.MS.No.111 Dt. 08/03/1996. The same parameters are not being applied by TSPCB in so far as my unit is concerned. This discrimination against my unit is directly infringing Article 14 of the

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy
Director

Constitution of India. On the principle of *'parity'* I am also entitled for grant of CFE and CFO to run my unit, in the interest of justice.

16.I submit that, the unreasonable justification sought to be made out by the 2nd Respondent for granting CFE and CFO to the above named units is based on two self-styled reasons:-

a. The first reason is that these units or their predecessors had established these units prior to 01/12/2000 and that these industries fall under the category of pre-existing industries prior to the Supreme Court judgment in *Dr. M.V Nayudu's case reported in (2001) 2 SCC 62.*

b. The second reason is that two of the said units are established as captive units and that they are having State Level Environmental Impact Assessment Authorities Permission.

17.I submit that, the above two reasons cited by the 2nd Respondent to justify issuance of CFE and CFO to those four (4) units in the same vicinity and within the same 10 Kms Radius squarely and equally applies to my unit also. My unit is also entitled to CFE and CFO, on par with the above said 4 units, for the following reasons:-

a. Whether it is an old stone cruising unit or new stone crushing unit the same causes, same Air Pollution. So therefore, the differentiation sought to be projected by the TSPCB between old and new stone crushing units is unreasonable and it is directly infringing the Principle of *parity,* thereby Article 14 of the Constitution of India is violated. For this discrimination the shelter that is sought to be taken by the TSPCB is the Supreme Court decision in *Dr. M.V Nayudu's case reported in (2001) 2 SCC 62,* the said decision is wrongly being interpreted. In the said decision the Supreme Court was dealing with industries which were already

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy
Dir

existing in the upstream of the both above said Lakes notified in G.O.MS.No.111. It never dealt with downstream industries/stone crushing units. In addition to the above the State procured an expert report from EPTRI, the said report said that, downstream stone crushing units can never cause Air & Water Pollutions and also does not cause acidification of both the Lakes for which the above said G.O has been brought. Later on the Telangana State as a matter of policy had accepted the said recommendations of the said report and sought of deletion of the my and other survey numbers in Pattinagulapally Village from the purview of G.O.MS.No.111. When that be so the 2nd Respondent TSPCB cannot say that the decision of the State has not been communicated to them.

b. In regards to the second reason cited by the TSPCB that two (2) of the units are captive units. The same Principle shall apply to my unit also because I am also intend to use the recycled material for my captive use in my sister concern residential project M/s. Vessella Woods, where residential villas are being constructed in Sy. No. 51/P of Madinaguda Village, Serilingampally Mandal, Rangareddy District. For which my partnering construction company had obtained State Level Environmental Impact Assessment Authorities Permission (SEIAA) from the Ministry of Environment Forest and Climate change. It also obtained CFE from the TSPCB under 'Orange' Category, even though the TSPCB had mentioned about the documents showing captive utilization by my company, still the CFE and CFO are denied to my unit. On the other hand, to justify the permission granted to other 2 captive units, it relies upon the State Level Environmental Impact Assessment Authorities Permission (SEIAA) in their favour. Thus, the second reason cited by the TSPCB is directly infringing Article 14 of The Constitution of India whereunder equals are treated unequals

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy
Director

18.I submit that, mine is a genuine case, in view of the facts and activities that is sought to be carried out by my unit. Anticipating the Consent for Establishment (CFE) and Consent for Operation (CFO), I had stockpiled rock boulders/construction debris nearly 3,00,000(Three Lakh) tonne are already dumped and stocked in my leased out land. For Erection and establishment of the plant I spent a huge capital amount of Nine (9) crores. Therefore, I made out a *Primafacie* case and balance of convenience is in my favor, if I am not temporarily allowed to operate on par with the other 4 stone crushing units I will suffer irreparable loss and injury. Therefore, equities lie in my favor for exercising discretion in my favor and therefore I am entitled to invoke the equitable discretion or this Hon'ble Authority seeking *quia-timet* indulgence for grant of Interim order.

INTERIM PRAYER

Pending disposal of the main Appeal, this appellate authority may be pleased to temporarily permit the petitioner to operate its stone crushing unit situated in Sy. Nos. 246/1 & 246/2 of Vattinagulapally Village, Serilingampally Mandal, Rangareddy District, on par with the other 4 stone crushing units which are operating in Vattinagulapally, Puppalaguda and Kokapet Villages, with CFE and CFO in their favor issued by the 2nd Respondent, while doing so this Hon'ble Appellate Authority may impose any conditions to curb the Air Pollution as per the CPCB guidelines or as per the Guidelines of the TSPCB, in the interest of Justice and to pass such other order or order (s) as this Hon'ble Appellate Authority may deem fit and proper in the circumstances of the case.

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

Director

Sworn and signed before me,
On this ___ day of March 2022

Deponent

Advocate/Hyderabad

VERIFICATION

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084 do hereby verify that the contents of Paragraph No. 1 to 18 are true and correct to my personal knowledge and belief hence verified on ____ day of March 2022 at Hyderabad.

For AADESHWAR AGGREGATES PVT. LTD.

D. S. K. Reddy

Director

Counsel for the Petitioner

Deponent

562

BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

I.A.No. of 2022
In
Appeal No. of 2022

BETWEEN:

M/s. Aadeshwar Aggregates Pvt. Ltd,
Situated at Sy.No.246/1, 246/2, Vattinagulapalli
Village, Gandipet Mandal, Rangareddy District.
Represented by its Authorized Signatory,
Sri. D. Sumanth, S/o. D Subrahmanyam Reddy,
aged about 30 Years, Designation: Director;
R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar,
Block C, Kondapur, Kothaguda Post,
Hyderabad – 500 084, Cell No. 9652973456
Email ID - sumanthreddy1989@gmail.com ....Petitioner/Appellant

AND

1. The State Government of T. S.,
   E F S & T Department,
   T. S. Secretariat, Hyderabad.
   Represented by its Secretary,

2. T. S. Pollution Control Board,
   Paryavaran Bhavan, A-3,
   Industrial Estate, Opp. Police Station,
   Sanathnagar, Hyderabad – 500 018.
   Represented by its Member Secretary, ...Respondents/Respondents

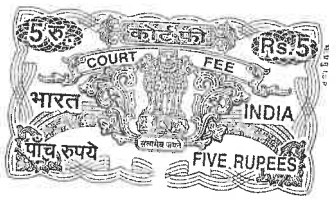
PETITION

For the reasons stated in the accompanying affidavit it is most humbly prayed that this Hon'ble Court may be pleased to pending disposal of the main Appeal, this appellate authority may be pleased to temporarily permit the petitioner to operate its stone crushing unit situated in Sy. Nos. 246/1 & 246/2 of Vattinagulapally Village, Serilingampally Mandal, Rangareddy District, on par with the other 4 stone crushing units which are operating in Vattinagulapally, Puppalaguda and Kokapet Villages, with CFE and CFO in their favor issued by the 2nd Respondent, while doing so this Hon'ble

Appellate Authority may impose any conditions to curb the Air Pollution as per the CPCB guidelines or as per the Guidelines of the TSPCB, in the interest of Justice and to pass such other order(s) as this Hon'ble Authority may deem fit and proper in the circumstances of the case.

Place: Hyderabad
Date:

Counsel for the Petitioner



BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

I.A No. of 2022

In

Appeal No. of 2022

BETWEEN:

M/s. Aadeshwar Aggregates Pvt.Ltd,Represented by its Authorized Signatory, Sri. D. Sumanth

....Petitioner/Appellant

AND

The State Government of T.S.,& another

....Respondents/Respondents

DIRECTION **PETITION**

Filed on:

Filed by:

SMT. G. JHANSI (6464)
Adv
Counsel for Petitioners

Item No.5:

ANNEXURE – XXXI

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

(Through Video Conference)

Original Application No. 06 of 2022 (SZ) &
I.A. No.65 of 2022 (SZ)

IN THE MATTER OF:

P.V. Subramanya Varma
S/o. P. Atchutha Rama Raju
Hyderabad.

...Applicant(s)

Versus

The State of Telangana,
Represented by its Principal Secretary,
Environment, Forests, Science and Technology Department,
Secretariat, Hyderabad and Ors.

...Respondent(s)

Date of hearing: 31.03.2022.

CORAM:

HON'BLE Mr. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER

HON'BLE Dr. SATYAGOPAL KORLAPATI, EXPERT MEMBER

For Applicant(s): Mr. V.B. Subrahmanyam.

For Respondent(s): Mrs. Renuka Devi represented
Mrs. H. Yasmeen Ali for R1 to R3, R6 to R12, R14.
Ms. J. Dayana represented
Mr. T. Sai Krishnan for R4.
Mrs. Revathi Manivannan for R5.
Mr. G.M. Syed Nurullah Sheriff for R13.
Mr. Unnam Muralidhar Rao for R21.

ORDER

1. The above case has been posted to today for return of notice on Respondents No.15, 16, 19 to 21, 23 to 25, 32 & 33, completion of pleadings and also for consideration of report.

2. The applicant has not taken further steps to serve notice on Respondents No.15, 16, 19 to 21, 23 to 25, 32 & 33. Most of these notices were returned as 'Insufficient Address'.

3. Mr. Unnam Muralidhar Rao represented M/s. Unnam Law Firm entered appearance for the 21st Respondent.

4. The 21st Respondent has filed their counter along with the documents.

5. The 21st Respondent also filed an interlocutory application as I.A. No.65 of 2022 (SZ) seeking reliefs to declare their unit as an environment friendly / eco-friendly unit, to declare their stone crushing unit is being set up for carrying out recycling of construction debris by manufacturing reusable gravel stone chips and robo sand, to be reused in the construction industry and also by interim relief, permit their unit to recycle excavated stone boulders and to manufacture reusable gravel, stone chips, and robo sand to be reused in nation building activity in most eco friendly manner on temporary basis on part with other existing four units in the same vicinity.

6. Even according to the Respondent No.21/Applicant in this interlocutory application, they have not obtained Consent to Establish and Consent to Operate. It is also mentioned in the interlocutory application itself that the application for Consent filed by them was rejected by the Telangana State Pollution Control Board and they intend to file an appeal against the same before the Appellate Authority.

7. If that be the case, it is not known as to how the prayer sought for in this application can be granted at this stage. Whether they are operating the unit without obtaining necessary Consent or other environmental permissions, is a matter to be considered in the main application. Without considering those aspects, none of the prayers made in the application can be considered at this stage, especially when they do not even have Consent to Establish and Consent to Operate which is the primary thing required under the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 for an industry of this nature to function.

8. So under such circumstances, we feel that the prayer in the application cannot be granted at this stage, and if they complied with

all the directions and if they are entitled to operate the unit, that can be considered in the main application.

9. We have not expressed any opinion regarding the conduct of 21st Respondent at present. If any appeal has been filed against the rejection order passed by the State Pollution Control Board, the Appellate Authority is at liberty to consider the same in accordance with law. **With the above observation, liberty and directions, this I.A.65 of 2022 (SZ) is disposed of.**

10. The learned counsel appearing for the MoEF&CC submitted that some more units are yet to be inspected and today, the Joint Committee members had gone for inspection of the remaining units and he wanted some more time to file the report as directed by this Tribunal.

11. The State Pollution Control Board has filed a status report dated 30.03.2022, e-filed today i.e. 31.03.2022 which reads as follows:-

> ***"Status report of the Telangana State Pollution Control Board (Respondent No. 4) in NGT OA No.6 of 2022 filed by Sri P.V.Subramanya Varma, R/o. Khairthabad, Hyderabad against unauthorized operation of respondent Stone Crushing units in Sangareddy and Rangareddy Districts:***
>
> *It is to submit that an application was filed before the Hon'ble NGT, Chennai in OA No. 6 of 2022 by Sri P.V.Subramanya Varma, R/o.*

Hyderabad, praying the Hon'ble Tribunal to declare the inaction of the Respondent Nos. 1 to 14 in preventing establishment and operation of the illegal and unauthorized stone crushing units of Respondent Nos. 15 to 33 in Rangareddy and Sangareddy Districts and consequently direct the respondents Nos. 1 to 14 to seize, dismantle and prevent the operation of the Respondent Nos. 15 to 33.

In this connection, it is to submit that there are six respondent stone crushing units in Sangareddy District and 12 respondent stone crushers (R17 is repeated at R21) in Rangareddy District. Further, there are 11 non-respondent stone crushers in GO 111 area of RR District. The status report of respondent stone crushers in the jurisdiction of Sangareddy & Rangareddy Districts and non-respondent Stone Crushers in GO 111 area of RR District is submitted as follows:

Sangareddy District:

There are following six respondent Stone Crushers:

1. M/s. Arkid Infra, Sy. No. 192, 193, 194, 195, 196, 197 & 198, Kollur (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 26):

2. M/s. Pulluri Mining & Logistics Pvt. Ltd., Unit-I, Sy. No. 196, 197 and 198, Kollur Village, Ramachandrapuram (M), Sangareddy District (Respondent No. 27):

3. M/s. Gold Dust Ventures LLP, Sy.No.192 to 198, Kollur (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 28):

4. M/s. Sri Sai Balaji Rock, Sy. No.193 &194, Kollur, Sangareddy District (Respondent No. 29):

5. M/s. Hitech Stone & Robos and Industry, Sy. No.193 &194, Kollur, Sangareddy District (Respondent No. 30):

6. M/s. Hanuma Enterprises, Sy. No. 12E, Osman Nagar (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 31):

The Board issued Closure Orders to the above six stone crushing units and orders for power disconnection to the SE (Operations), TSSPDCL, Sangareddy District in the year 2019 (R-26 to R-30) and in 2020 (R-31) for operating without having consent of the Board, not providing requisite air pollution control systems and causing pollution in the surrounding areas.

As power was not disconnected, the Board also addressed a letter to the Chairman and MD, TSSPDCL, Hyderabad requesting to instruct the concerned officers of TSSPDCL to disconnect the power supply of the above six stone crushers.

Subsequently, the District Collector, Sangareddy constituted a team consisting of Tahsildar, Ramachandrapuram Mandal; Environmental Engineer, TSPCB, Sangareddy; AD (Mines), Sangareddy and Officials of TSSPDCL to seize the crushers. The team inspected the industries and observed that all the above six stone crushers were not in operation. However, the Tahsildar, R.C.Puram Mandal, Sangareddy District seized the power transmission equipment of the above six stone crushers.

During the subsequent inspection of the Board Officials on 04.01.2021, the above six stone crushers were not in operation.

Further, during subsequent inspection of the Board Officials on 11.01.2022, Four Stone Crushers (R-26, R-27, R-30 & R-31) were dismantled. The other two stone crushers i.e., R-28 & R-29 were observed to be not in operation. The same was also observed during the visit on 08.03.2022 by the Joint Committee constituted by the Hon'ble NGT in OA No.6 of 2022.

The unit-wise status report with enclosures (closure orders, power disconnection orders to TSSPDCL, correspondence, letters & Hon'ble High Court orders) of Environmental Engineer, TSPCB, Regional Office, Sangareddy is enclosed as Annexure-A.

Rangareddy District:

There are total 23 stone crushing units (12 respondent & 11 Non respondent Stone Crushing units):

Respondent stone crushing units:

1. M/s. Sri Laxmi Narasimha Metal Industries), Vattinagulapally, Gandipet, RR District (Respondent No. 15):

2. M/s. Hyma Developers (formerly M/s. Pullur Constructions & My Home Constructions), Kokapet(V), Gandipet (M), Rangareddy District (Respondent No. 16)

3. M/s. Adeshwar Aggregates Pvt Ltd., (Vesella Aggregates), Sy.No.246/1 & 246/2, Vattinagulapalli, Gandipet, RR District (Respondent Nos. 17 Repeated at Respondent No. 21)

4. M/s. Kore Stone Minerals, Vattinagulapally(V), Gandipet (M), Rangareddy District. (Respondent Nos. 18)

5. M/s. Sri Laxmi Constructions (formerly Raghavendra Stone Crusher), Vattinagulapally (V), Gandipet (M), Rangareddy District (Respondent No. 19)

6. M/s. Sree Rama Engineering Constructions, Vattinagulapalli, Gandipet, RR District. (Respondent No. 20)

7. M/s. Hyderabad Rock Sand, Vattinagulapally (V), Gandipet (M), Rangareddy District (Respondent No. 22)

8. M/s. Sree Rock Sand Minerals, Sy.No.36, Gopanpalli, Serilingampally, RR District (Respondent No. 23)

9. M/s. Great India Mining (formerly Sebi Mining), Goulidoddi(V), Serilingampally(M), Rangareddy District (Respondent No. 24)

10.M/s. DBR Metal Industry, Kothwalguda, Shamshabad, RR District (Respondent No. 25)

11.M/s. SMI Stone Crusher (Shama Metal Industry), Kothwalguda, Shamshabad, RR District (Respondent No. 32)

12.M/S. AMI Stone Crushers (formerly AQI Metal Industries / Ahmed Metal Industries), Kothwalguda, Shamshabad, RR District (Respondent No. 33)

Non Respondent stone crushing units:

1. M/s. Shama Metal Supply, Sy.No.7 & 20, Dargha Khaleej Khan Village, Gandipet(M), Rangareddy District.

2. M/s. GMR Stone Crusher, (Formerly M/s. Progressive Construction Company), Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy District

3. M/s. Adeshwar Traders (formerly M/s. Vensai Metals / M/s.Prasad Metals), Vattinagulapally (V), Gandipet (M), Rangareddy District

4. M/s. Teja Reddy Crushers, Vattinagulapally (V), Gandipet (M), Rangareddy District

5. M/s. Sri Srinivasa & Co., Sy.No.452/1, Puppalaguda (V), Gandipet (M), Rangareddy District

6. M/s. Sree Sand Mineral(formerly Ganesh Metal Industries),

Gopanpalli, Serilingampally, RR District

7. M/s. Padmavathi Metal Industry, Kothwalguda, Shamshabad, RR District

8. M/s. JMI Stone Crushers (formerly M/s. Jagadamba Metal Industry), Kothwalguda, Shamshabad, RR District

9. M/s. ASR Metal Industry, Kothwalguda, Shamshabad, RR District

10.M/s. C5 Infra Pvt. Ltd, (Crusher), Vattinagulapally, Gandipet (M), RR District

11.M/s. Unnamed Stone Crusher, located beside Aadeeshwar Aggregates, Vattinagulapally, Gandipet (M), RR District

The Board issued Closure Orders to the above 23 stone crushing units (Respondent units-12 & Non Respondent units- 11) and orders for power disconnection to the SE (Operations), TSSPDCL, Rangareddy District in the year 2017 to 2022 for operating without having consent of the Board, not providing requisite air pollution control systems and causing pollution in the surrounding areas.

The TSSPDCL has disconnected power supply to all the above 23 units. However, complaints were received on operation of the units with DG sets. The Board addressed letters dated 02.12.2019, 08.10.2020 & 01.11.2021 to the Tahsildars requesting to seize the DG set to ensure that the stone crushers are not operated.

The Board addressed letter dated 18.11.2020 to the RDO, Rajendranagar Division, Rangareddy District to seize the DG sets (Annexure-B).

As the matters stood thus, the following Writ Petitions were filed before the Hon'ble High Court in similar matters:

(i) WP (PIL) No. 170 of 2020 filed by Sri.M.Gopal Reddy and (ii) WP No. 12022 of 2020 filed by Sri. Vislavath Sangameshwar, R/o. Hyderabad.

(i). The Hon'ble High Court in WP (PIL) No. 170 of 2020 in order dt. 20.10.2021, has taken on record that the Board has issued closure orders from time to time and directed the Tahsildars to seize the material and to ensure closure of industries. Further, the Hon'ble High court disposed the matter with the following directions (Annexure-C):

".... Resultantly, the Writ Petition stands disposed of with the direction to the Tahsildar, Gandipet Mandal, Ranga Reddy District to give effect to the closure orders passed by the Pollution Control Board and to report compliance within ten (10) days to the Registrar General of this Court...."

(ii). The Hon'ble High Court in its disposal order dated 18.01.2022 in WP No. 12022 of 2020 issued following directions (Annexure-D):

"....Resultantly, the present Writ Petition is disposed of with a direction the State Government to ensure that the orders passed by the Board are implemented and no mining/ crushing activity takes place in respect of the area in question. It is made clear that in case the orders passed by the Board are not implemented by the revenue authorities, this Court shall be taking suomotu contempt proceedings against the Revenue authorities. Let a compliance report be filed before the Registrar general of this Court positively within a period of six weeks.

The miscellaneous applications pending, if any, shall stand closed. There shall be no order as to costs."

Based on the above orders, the Board has addressed a letter to Tahsildars of Gandipet Mandal, Serlingampally Mandal & Shamshabad Mandal on 23.12.2021 and 21.01.2022 to implement the Hon'ble High court orders for seizure of DG sets and to confiscate the stone crusher units (Annexure-E).

A letter was also addressed to the District Collector, Rangareddy District on 17.01.2022 requesting to confiscate the stone crusher, as complaints have still being received that the stone crushing units clandestinely operating with DG sets inspite of power disconnection (Annexure-F).

The Collector & District Magistrate, Rangareddy District has addressed a letter dated 10.03.2022 to the RDO, Rajendranagar Division, RR District instructing to remove illegal stone crushing units (Annexure-G).

Subsequently, the RDO, Rajendranagar Division, Rangareddy District addressed a letter dated 23.03.2022 to the District Collector, Rangareddy District (Annexure-H) stating that the dismantle of stone crushing units requires huge amounts i.e., nearly 10 - 12 Lakhs per each

unit and the stone crushing units are located in Patta Lands & the provisions of Telangana Land Encroachment Act cannot be invoked for dismantling of the units located at Patta Lands.

The Board officials have inspected the above stone crushing units during the period from 23.03.2022 to 27.03.2022 and observed that the stone crushing units are not in operation

The unit-wise status report with enclosures (closure orders, power disconnection orders to TSSPDCL, correspondence letters etc.,) of the Environmental Engineer, TSPCB, Regional Office, Rangareddy is enclosed as Annexure-I.

The Abstract of the stone crushing units is as follows: -

➢	The total no. of Stone Crushing units (Respondent units – 18 Nos. and Non-respondent units – 11)	29
➢	No. of Stone Crusher units obtained CFO of the Board and complying.	3
➢	No. of Stone Crusher units issued with closure orders by the Board.	26
➢	No. of Stone Crusher units dismantled the equipment / sick and not in operation (Sangareddy – 4 and Rangareddy – 6)	10
➢	No. of Stone Crusher units in Sangareddy District issued with closure orders and not in operation.	2
➢	No. of Stone Crusher units in Rangareddy District issued with closure orders, complaints are received on illegal operation of the units using DG sets and Enforcement of closure orders to be affected by the Revenue Department as per the directions of the Hon'ble High Court in WP (PIL) No. 170 of 2020 and WP No. 12022 of 2020.	14

The directions issued by the Hon'ble NGT in this regard will be followed by TSPCB."

"Unit wise Status Report of the Environmental Engineer, Telangana State Pollution Control Board, Regional Office, Sangareddy, in O.A. No. 06 of 2022

1. M/s. Arkid Infra, Sy. No. 192, 193, 194, 195, 196, 197 & 198, Kollur (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 26):

2. M/s. Pulluri Mining & Logistics Pvt. Ltd., Unit-I, Sy. No. 196, 197 and 198, Kollur Village, Ramachandrapuram (M), Sangareddy District (Respondent No. 27):

3. M/s. Hitech Stone & Robos and Industry, Sy. No.193 &194, Kollur, Sangareddy District (Respondent No. 30):

a) The Board issued Closure Orders to the above stone crushers vide order dated 14.05.2019 for operating without having consent of the Board, not providing requisite air pollution control systems and causing pollution in the surrounding areas. (Annexure-I)

b) The Board also issued orders to the SE (Operations), TSSPDCL, Sangareddy District vide order dated 14.05.2019 directing to disconnect the power supply to above stone crushers. (Annexure-II)

c) Subsequently, the Board Officials inspected the industry and observed that the crushers were in operation.

d) Again a letter dt:19.07.2019 was also addressed by the Member Secretary, TSPCB to the Chairman and Managing Director, TSSPDCL, Corporate Office, Mint Compound, Near Secretariat, Hyderabad requesting to instruct the concerned officers of TSSPDCL to disconnect the power supply to the stone crushers. (Annexure-III).

e) The JCEE, TSPCB, Zonal Office-RC Puram vide lr.dt. 10.12.2019 addressed a letter to the District Collector & Magistrate, Sangareddy District requesting to direct the Tahsildar, RC Puram to confiscate the stone crushers under secc.133 of Code of Criminal Procedure (Cr.P.C.) as the stone crusher is operating with DG sets inspite of closure orders issued by the Board (Annexure-IV). Subsequently, the District Collector, Sangareddy vide Lr. dt. 20.12.2019 requested the Tahsildar, RC Puram to take necessary action in the matter (Annexure-V).

f) A reminder letter dated: 13.02.2020 was also addressed to the Tahsildar, RC Puram by the office of the District Collector, Sangareddy with a direction to submit the action taken report (Annexure-VI).

g) Further, this office has also addressed a reminder letter on 19.02.2020 to the Superintending Engineer (Operations), TSSPDCL, Sangareddy, Sangareddy District requesting to disconnect the power supply as per the directions issued by the Board (Annexure-VII).

h) As per instructions from District Collector, Sangareddy, the team consisting of Tahsildar, Ramachandrapuram Mandal, Environmental Engineer, TSPCB, Sangareddy, AD (Mines), Sangareddy and officials of TSSPDCL inspected the industry on the night of 16.12.2020. During

inspection, it was observed that the above stone crushers were not in operation and M/s. Arkid Infra & M/s. Hitech Stone & Robos and Industry are under dismantling. The Tahsildar, Ramachandrapuram Mandal seized the power transmission equipments of the above stone crusher.

i) The Board Officials again inspected the stone crushers on 04.01.2021 and observed that the stone crushers were not in operation and M/s. Arkid Infra & M/s. Hitech Stone & Robos and Industry are completely dismantled.

j) During inspection on 11.01.2022, it was observed that the above three stone crushers are already dismantled and removed machinery from the premises.

k) During latest inspection on 08.03.2022 by the Joint Committee constituted by the Hon'ble NGT vide order dt.17.01.2022 in O.A.No.06 of 2022, the above three stone crushers were observed already dismantled and removed.

4. M/s. Sri Sai Balaji Rock, Sy. No.193 &194, Kollur, Sangareddy District (Respondent No. 29):

a) Closure Order issued to the industry vide order dated 14.05.2019 for operating without having consent of the Board, not providing requisite air pollution control systems and causing pollution in the surrounding areas (Annexure-VIII).

b) The Board also issued orders to the SE (Operations), TSSPDCL, Sangareddy District vide order no. Gen-173/TSPCB/ZO/RCP/LH/2019-468, dated 14.05.2019 directing to disconnect the power supply to above stone crusher (Annexure-IX).

c) Subsequently, the Board Officials inspected the industry and observed that the crusher was in operation.

d) Again a letter dt:19.07.2019 was also addressed by the Member Secretary, TSPCB to the Chairman and Managing Director, TSSPDCL, Corporate Office, Mint Compound, Near Secretariat, Hyderabad requesting to instruct the concerned officers of TSSPDCL to disconnect the power supply to the stone crusher (Annexure-III).

e) In the meanwhile, M/s. D.S.R Educational Society, Office at Plot No. 901, IInd Floor, DSR Tranquil, Ayyappa Society, Madhupur, Hyderabad has filed a writ Petition No. 20561 of 2019 against M/s. Gold

Dust Ventures LLP Stone Crusher, Kollur (V), Ramachandrapuram (M), Sangareddy District and Writ Petition No. 15471 of 2019 against M/s. Sri Sai Balaji Stone Crusher, before the Hon'ble High Court. The Hon'ble High Court vide order dated 18.10.2019, has passed an interim direction directing the TSPCB to ensure that the M/s. (g) Gold Dust Ventures LLP Stone Crusher & M/s. Sri Sai Balaji Stone Crusher do not carry on crushing operation in the premises (Annexure-X & XI).

f) The JCEE, TSPCB, Zonal Office-RC Puram vide Ir.dt.10.12.2019 addressed a letter to the District Collector & Magistrate, Sangareddy District requesting to direct the Tahsildar, RC Pram to confiscate the stone crushers under secc. 133 of Code of Criminal Procedure (CrPC) as the stone crusher is operating with DG sets inspite of closure orders issued by the Board (Annexure-IV). Subsequently, the District Collector, Sangareddy vide Ir.dt. 20.12.2019 requested the Tahsildar, RC Puram to take necessary action in the matter (Annexure-V).

g) A reminder letter dated: 13.02.2020 was also addressed to the Tahsildar, RC Puram by the office of the District Collector, Sangareddy with a direction to submit the action taken report (Annexure-VI).

h) Further, this office has also addressed a reminder letter on 19.02.2020 to the Superintending Engineer (Operations), TSSPDCL, Sangareddy, Sangareddy District requesting to disconnect the power supply as per the directions issued by the Board (Annexure-VII).

i) Accordingly, as per instructions from District Collector, Sangareddy, the team consisting of Tahsildar, Ramachandrapuram Mandal, Environmental Engineer, TSPCB, Sangareddy, AD (Mines), Sangareddy and officials of TSSPDCL inspected the industry on the night of 16.12.2020. During inspection, it was observed that the above stone was not in operation. The Tahsildar, Ramachandrapuram Mandal seized the power transmission equipments of the above stone crusher.

j) The Board Officials again inspected the stone crusher on 04.01.2021 and observed that the stone crusher is not in operation.

l) During inspection on 11.01.2022, it was observed that the above stone crusher is not in operation and idle. However, storage of metal and dust observed within the premises.

m) During latest inspection on 08.03.2022 by the Joint Committee

constituted by the Hon'ble NGT vide order dt.17.01.2022 in O.A.No.06 of 2022, the above stone crusher was observed not in operation and idle. However, legacy storage of metal and dust was observed within the premises.

5. M/s. Gold Dust Ventures LLP, Sy.No.192 to 198, Kollur (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 28):

a) The Board vide order No:SRD/530/PCB/ZO/RCP/LH/2019-839, Dt:08.08.2019 issued directions to the industry to stop the erection activities immediately (if any) and the industry shall not start production activities till obtaining permissions from the Board.

b) In the meanwhile, M/s. D.S.R Educational Society, Office at Plot No. 901, IInd Floor, DSR Tranquil, Ayyappa Society, Madhupur, Hyderabad has filed a write Petition No. 20561 of 2019 against M/s. Gold Dust Ventures LLP Stone Crusher, Kollur (V), Ramachandrapuram (M), Sangareddy District and Writ Petition No. 15471 of 2019 against M/s. Sri Sai Balaji Stone Crusher, before the Hon'ble High Court. The Hon'ble High Court vide order dated 18.10.2019, has passed an interim direction directing the TSPCB to ensure that the M/s. Gold Dust Ventures LLP Stone Crusher & M/s. Sri Sai Balaji Stone Crusher do not carry on crushing operation in the premises (Annexure-X & XI).

c) The Board issued closure orders to the industry vide order no. SRD/530PCB/ZO/RCP/LH/2019-1212, dated 10.12.2019 for operating without having CFE & CFO of the Board and not taken any air pollution control measure causing air & water pollution problems (Annexure-XII).

d) The Board also issued orders to the SE (Operations), TSSPDCL, Sangareddy District vide order no. SRD/530PCB/ZO/RCP/LH/2019-1213, dated 10.12.2019 directing to disconnect the power supply to above stone crusher (Annexure XIII).

e) The Board vide Ir.dt.10.12.2019 addressed a letter to the District Collector & Magistrate, Sangareddy District requesting to direct the Tahsildar, RC Pram to confiscate the stone crushers under secc.133 of Code of Criminal Procedure (CrPC) as the stone crusher is operating with DG sets inspite of closure orders issued by the Board (Annexure-IV). Subsequently, the District Collector, Sangareddy vide Ir.dt. 20.12.2019 requested the Tahsildar, RC Puram to take necessary action in the matter

(Annexure-V).

f) A reminder letter dated: 13.02.2020 was also addressed to the Tahsildar, RC Puram by the office of the District Collector, Sangareddy with a direction to submit the action taken report (Annexure-VI).

g) Further, this office has also addressed a reminder letter on 19.02.2020 to the Superintending Engineer (Operations), TSSPDCL, Sangareddy, Sangareddy District requesting to disconnect the power supply as per the directions issued by the Board (Annexure-VII).

h) However, complaints were still received stating that the crushers are being operated clandestinely. Accordingly, as per instructions from District Collector, Sangareddy, the team consisting of Tahsildar, Ramachandrapuram Mandal, Environmental Engineer, TSPCB, Sangareddy, AD (Mines), Sangareddy and officials of TSSPDCL inspected the industry on the night of 16.12.2020. During inspection, it was observed that the above stone crushers was not in operation. The Tahsildar, Ramachandrapuram Mandal seized the power transmission equipments of the above stone crusher.

i) The Board Officials again inspected the stone crusher on 04.01.2021 and observed that the stone crusher is not in operation.

j) During inspection on 11.01.2022, it was observed that the above stone crusher is not in operation and idle.

k) During latest inspection on 08.03.2022 by the Joint Committee constituted by the Hon'ble NGT vide order dt.17.01.2022 in O.A.No.06 of 2022, the above stone crusher is observed not in operation and idle.

6. M/s. Hanuma Enterprises, Sy. No. 12, Osman Nagar (V), Ramachandrapuram (M), Sangareddy District (Respondent No. 31):

a) M/s. Hanuma Enterprises is located at Sy. No. 12, Osman Nagar (V), Ramachandrapuram (M), Sangareddy District and engaged in stone crushing activity.

b) The Board received a letter from District Collector, Sangareddy enclosing a copy of the complaint/legal notice received from Sri. Narasima Rao K.S.A, Advocate, R/o Jubilee Hills, Hyderabad regarding illegal operation of the 6 crushers in Kollur and Osman Nagar Villages without obtaining CFE/CFO of the Board including M/s Hanuma Enterprises.

c) The Board officials inspected the crusher and surroundings on

01.07.2020 and observed that the crusher is operating without obtaining CFE/CFO of the Board, located within the 10 kms. radius of Osman Sagar and Himayat Sagar Lakes, crusher has not taken Air Pollution Control measures, etc..

d) The Board issued closure orders to the industry vide order no. SRD/TSPCB/ZO/RCP/LH/2020-724, dated 24.07.2020 for operating without having CFE & CFO of the Board and not taken any air pollution control measure causing air & water pollution problems (Annexure-XIV).

e) The Board also issued orders to the SE (Operations), TSSPDCL, Sangareddy District vide order dated 24.07.2020 directing to disconnect the power supply to above stone crusher (Annexure-XV).

f) Accordingly, as per instructions from District Collector, Sangareddy, the team consisting of Tahsildar, Ramachandrapuram Mandal, Environmental Engineer, TSPCB, Sangareddy, AD (Mines), Sangareddy and officials of TSSPDCL inspected the industry on the night of 16.12.2020. During inspection, it was observed that the above stone was not in operation. The Tahsildar, Ramachandrapuram Mandal seized the power transmission equipments of the above stone crusher.

g) The Board Officials again inspected the stone crusher on 04.01.2021 and observed that the stone crusher is not in operation.

h) During inspection on 11.01.2022, it was observed that the above stone crusher was already dismantled and removed machinery from the premises.

i) During latest inspection on 08.03.2022 by the Joint Committee constituted by the Hon'ble NGT vide order dt.17.01.2022 in O.A.No.06 of 2022, the above stone crusher was observed already dismantled and removed the machinery.

It is kindly submitted that the Board has issued Closure orders to the above stone crushers for operating without having consents of the Board, not providing requisite air pollution control systems and causing pollution in the surrounding areas. The Board also issued orders to the Superintending Engineer (Operations), TSSPDCL, Sangareddy for disconnection of power supply to the above stone crushers. The District Collector, Sangareddy vide Irs. dt. 20.12.2019 & 13.02.2020 requested the Tahsildar, RC Puram to take necessary action against the stone crushers.

Accordingly, as per instructions from District Collector, Sangareddy, the team consisting of Tahsildar, Ramachandrapuram Mandal, Environmental Engineer, TSPCB, Sangareddy, AD (Mines), Sangareddy and officials of TSSPDCL inspected the above stone crushers on the night of 16.12.2020. During inspection, it was observed that the above stone was not in operation. The Tahsildar, Ramachandrapuram Mandal seized the power transmission equipments of the above stone crusher.

During inspections by the Board Officials and inspection on 08.03.2022 by Joint Committee constituted by the Hon'ble NGT vide order dt.17.01.2022 in O.A.No.06 of 2022, it was observed that two stone crushers viz., M/s. Gold Dust Ventures LLP (Respondent No. 28) and M/s. Sri Sai Balaji Rock (Respondent No. 29) were not in operation and idle. However, legacy storage of metal and dust was observed within the premises of M/s. Sri Sai Balaji Rock. The other four stone crushers viz., M/s. Arkid Infra (Respondent No. 26), M/s. Pulluri Mining & Logistics Pvt. Ltd., Unit-I (Respondent No. 27), M/s. Hitech Stone & Robos and Industry (Respondent No. 30) & M/s. Hanuma Enterprises (Respondent No. 31) were already dismantled and removed the machinery."

12. The Applicant is also directed to produce necessary requisite along with postal covers and postal stamps before this Tribunal within a week so as to enable this Tribunal to send notice to the respondents who have not entered appearance or whom notices have not been properly served through Tribunal to ensure service on them and proceed against them, if they did not appear in their absence in accordance with law.

13. As and when the necessary requisites are received, the office is directed to issue notice to the respondents (whose notice have been

returned without service). In addition, the applicant is also permitted to take out notice by himself and produce proof of service on those respondents along with the endorsement of service and filing proper proof affidavit as per Rules.

14. The official respondents are directed to file their independent statement regarding the allegations made in the application and also action (if any) taken for the violation (if any) found.

15. The District Collectors are also expected to file their independent reports regarding the allegations made in the application in respect of violation of the environmental laws and causing pollution and nuisance in that area.

16. The Committee as well as the official respondents who have not filed their independent response are directed to file the report and independent statement respectively on or before **29.04.2022** by e-filing in the form of Searchable PDF/OCR Supportable PDF and not in the form of Image PDF along with necessary hardcopies to be produced as per Rules.

17. The Registry is directed to communicate this order to the members of the Joint Committee and also to the official respondents by e-mail immediately for their information and compliance of directions.

18. For return of notice on Respondents No.15, 16, 19, 20, 23 to 25, 32 & 33, filing independent response and also for consideration of the report, post on 29.04.2022.

Sd/-
Justice K. Ramakrishnan, JM

Sd/-
Dr. Satyagopal Korlapati, EM

O.A. No.06/2022 (SZ)
I.A. No.65/2022 (SZ)
31st March 2022. Mn.

ANNEXURE – XXXII

Status report of the Telangana State Pollution Control Board (Respondent No. 2) in Appeal No. 35 of 2022 filed by M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapally (V), Gandipet (M), Rangareddy District

It is to submit that an Appeal No. 35of 2022 filed by M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapally (V), Gandipet (M), Rangareddy District against the CFE Rejection Order dated 09.03.2022 issued by the Board.

In this connection, the status report of M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapally (V), Gandipet (M), Rangareddy District is submitted: -

1. M/s. Aadeshwar Aggregates Pvt. Ltd., Sy.No.246/1, 246/2, Vattinagulapally (V), Gandipet (M), Rangareddy District, is involved in stone crushing activity.
2. The Board issued Closure Order to M/s. Aadeshwar Aggregates Pvt. Ltd., for operating without CFE and CFO of the Board and located within the 10 km radius of Osmansagar & Himayatsagar lakes. **(Annexure-I)**
3. Subsequently, M/s. Aadeshwar Aggregates Pvt. Ltd. applied for CFE on 27.12.2019. The Board raised clarification on 31.12.2019 stating the following:

   "The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area".
4. The industry re-submitted the application on 16.03.2020. The application was rejected as per the provisions of the GO Ms. No. 111, regarding prohibition of polluting industries within 10 km radius (i.e. both on upstream and downstream side of the Osmansagar & Himayatsagar lakes). The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area. **(Annexure-II)**
5. The industry filed Writ Petition No. 17554 of 2020 before the Hon'ble High Court. The Hon'ble High Court, vide order dated 23.11.2021 disposed the case with the following direction: **(Annexure-III)**

   "Resultantly, without adverting to the merits of the case, the writ petition is disposed of with a direction to the Telangana State Pollution Control Board to decide the applications of the petitioners in accordance with law, within a period of 45 days from the date of receipt of such applications. The petitioners shall be free to submit hard copies to the Telangana State Pollution Control Board.

   Pending miscellaneous applications, if any, shall stand closed."
6. Accordingly, the industry submitted CFE Application on 10.12.2021. The EE, RO, RR-I submitted report to Board Office.
7. The application was examined in the CFE-CFO Committee virtual meeting held on 13.01.2022. The industry representatives attended the virtual meeting and raised the following points in support of their application:
   i. The stone crusher is located in Vattinagulapally Village which is downstream of the Gandipet Lake.Their unit is established under Survey No.246/1 & 246/2 of

Vattinagulapally Village, Gandipet Mandal, Rangareddy District. These Survey Numbers are notified as "conservation zone", pursuant to G.O.Ms.No.288.

ii. The Shilparamam at Hi-tech city near Madhapur, the entire Hitech City and Financial District comprising of all IT companies and other Residential and Commercial activities fall within the 10 Kms radius of G.O.Ms.111.

iii. Three stone crushers, viz., GMR Stone Crusher, Sri Rama Engineering Constructions and Pullur Constructions which are located in the Vattinagulapally Village are permitted by the Board. They request to treat them on parity with these three crushers and issued CFE and CFO.

iv. Their Unit has partnered with M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., who excavates rocks and boulders from the cellars of various Infra company sites. The said unit is established under Rule 9(iii) & (iv) of the Telangana State Mines & Minerals Concession Rules, 1966. The said unit is regularly paying crores of revenue as 'royalty' to the Telangana State exchequer.

v. They have submitted all the details in the application and requested to examine the same and issue CFE and CFO to the stone crusher.

8. The CFE-CFO Committee after detailed discussions, directed the EE, TSPCB, RO, Rangareddy-I to submit detailed report on the representation submitted by the industry for further examination.

9. During the pendency of the CFE application before the Committee, there was a judicial development wherein an Original Application (OA) No. 6 of 2022 was filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against establishment and operation of illegal and unauthorised stone crushing units. The applicant industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee to inspect the area in question and submit a factual as well as action taken report, if there is any violation found. The CFE-CFO Committee has to take this development into consideration.

10. As per the directions of the CFE-CFO Committee, the EE, TSPCB, RO, Rangareddy-I submitted report.

11. The issue was examined in the CFE-CFO Committee meeting held on 19.02.2022. The Committee observed the following:

S. No	Industry's representation	Observation
1.	Their Company is an MSME Unit. It is stone crusher established, to crush the excavated stones / boulders from construction sites as a part of recycling the waste excavated material. Basically, their Unit's activity is an eco-friendly activity, which is a statutory	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10kms radius of Osmansagar and Himayatsagar lakes. The vattinagulapally village is listed in the 84 villages within 10 km catchment area of Osmansagar and

	mandate under Section 132 of the Municipalities Act, 2019.	Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996, wherein the Board is not accepting applications of any industry. The crushing activity falls under orange category at Sl.No.64 as per CPCB categorization and stone crusher is a air pollution potential industry. The Applicant Industry Aadeshwar Aggregates was operating illegally without obtaining any required Consents from the Board as mandated by the law. As the Industry was indulging in illegal operations the Board has issued Closure Orders to the industry on 22.08.2019. Even after the issuance of closure order, the unit continued its ilegal operations, the Board was constrained to direct the SE (Operations), Telangana State Southern Power Distribution Company Limited (TSSPDCL) to disconnect the power supply. Even inspite of the disconnection of the power supply, the industry started to continue its illegal operations using Diesel Generators in violation of the laws. As such, the Board was constrained to addressed letter on 02.12.2019 to Tahsildhar, Gandipet Mandal to cease the Generator of the industry. After this series of events when illegal operations were closed the industry has applied for Consent for Establishment (CFE) to TSPCB through TS-IPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating the following:"The location of the industry comes under G.O.Ms.No.111. The Board is not accepting any application in this area". The industry re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration, rejected the CFE application on 20.03.2020 i.e., after 4 days of

		application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited. That even inspite of the rejection of its application, the Industry continued its illegal operations and the Board again had to address letters on 08.10.2020, 01.11.2021, 23.12.2021, 21.01.2022 to Tahsildhar, Gandipet Mandal and a letter dated 18.11.2020 to Revenue Divisional Officer (RDO), Rajendranagar Division, RR District, requesting to seize the D.G.Sets of the petitioner industry, as the industry was operating in violation of the Closure Orders issued by the Board.
2.	Their unit is established under Survey No.246/1 & 246/2 of Vattinagulapally Village, Gandipet Mandal, Rangareddy District. These Survey Numbers are notified as *"conservation zone"*, pursuant to G.O.Ms.No.288.	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10kms radius of Osmansagar and Himayatsagar lakes. The Vattinagulapally village is listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 wherein the Board is not accepting applications of any industry. The reliance of the industry on G.O.Ms.No.288 is unfounded as the said G.O. while defining activities which can take place in Conservation Zone clearly mandates in column No.II that activities mentioned in Col.I are not allowed in the prohibited areas as mentioned in G.O.111 MA.
3.	Their Unit has partnered with M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., who excavates rocks and boulders from the cellars of various infra company sites. The said unit is established under Rule 9(iii) & (iv) of the	There is no relevance or role of M/s. Chiranjeeva Excavation and Infrastructure Pvt. Ltd., which is involved in the job of Excavation for construction companies, so as to enable multi-stories/highrise buildings to have their respective footings and cellars dug-out from appropriate base level depths.

	Telangana State Mines & Minerals Concession Rules, 1966. The said unit is regularly paying crores of revenue as 'royalty' to the Telangana State exchequer.	Whereas the M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity which is categorized under Orange Category, as per Central Pollution Control Board (CPCB) Classification of Industrial Sectors. Further the Agreement dated 07-09-2018 filed by the Applicant Industry before the Hon'ble High Court clearly shows that the business relation between M/s. Chiranjeeva Excavation and M/s. Aadeshwar Aggregates is clearly of a seller and customer and not of a partner unit. The crusher is located far away from the construction activity sites.
4.	Section 132 of the Municipalities Act, 2019 mandates that the material excavated from the construction sites shall be recycled in order to preserve the environment. Pursuant to the same, M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., has partnered with M/s. Aadeshwar Aggregates Pvt. Ltd., to implement the object envisaged under "Section 132" of the Municipalities Act, 2019. Such a partnering is a win-win situation for both the State and the environment. The State gets its revenue in the form of Royalties and GST accruing to the State Exchequer and at the same time, when the State Pollution Control Board has no means and ways conceived for disposal of construction material, M/s. Aadeshwar Aggregates Pvt. Ltd., is established for the purpose of recycling. Therefore, establishment of M/s. Aadeshwar Aggregates Pvt. Ltd., is an eco-	There are many no. of stone crushers operating with valid CFO of the Board. Hence, M/s. Chiranjeeva Excavation & Infrastructure Pvt. Ltd., can dispose boulders to the crushers which are having CFO of the Board. Whereas, M/s. Aadeshwar Aggregates Pvt. Ltd., is operating crusher without CFE and CFO of the Board. The permissions granted by the State Govt. in relation to its nature of the work to M/s. Chiranjeeva Excavation, cannot grant legitimacy of industrial operations to Aadeshwar Aggregates. The work orders and royalty payments made to the Govt is restricted to the nature of the work of the M/s. Chiranjeeva Excavation, and not at all covered or concerned with the industrial operations of the Aadeshwar Aggregates.

	friendly activity where the waste materials are recycled an reused.	
5.	Without considering the above mentioned eco-friendly activity, the application of M/s. Aadeshwar Aggregates Pvt. Ltd., for CFE was rejected by a cryptic and non-speaking order. Aggrieved whereby, we initially approached NGT, Chennai which had relegated us to the High Court of Hyderabad. Therefore, we filed W.P.No.17554 / 2020. The same was disposed-of on 23.11.2021 permitting us to file the present application.	The Applicant Industry Aadeshwar Aggregates was operating illegally without obtaining any required Consents from the Board as mandated by the law. The Applicant industry falls within the 10 kms radius of Osmansagar and Himayatsagar lakes and is located in Vattinagulapally (V) which is one of the village falling within 10 Kms catchment area of Osmansagar & Himayatsagar as per the GO Ms No. 111, MA, dated 18.03.1996. As such operations of the Industry is prohibited within 10 Kms of Himayatsagar and Osmansagar Lake area. The para no. 3 (i) (e) & (f) states as follows: - "(e) To prohibit polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution. (f) There shall be total prohibition of location of industries in the prohibited zone" The crushing activity falls under orange category at Sl.No.64 as per CPCB categorization and stone crusher is a air pollution potential industry. The crusher is causing air pollution in the surrounding area and located adjacent to the ORR and also within the 10 kms radius of Himayatsagar and Osmansagar lakes.
6.	According to the cryptic, non-speaking order, by this PCB, our application was rejected merely, on the ground that the said Vattinagulapally Village to be the falling under G.O.M.S.No.111.	After the series of events when illegal operations were closed, the industry applied for Consent for Establishment (CFE) to TSPCB through TS-iPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating the following: "The location of the industry comes under G.O.Ms.No.111. The Board is not accepting

		any application in this area". The industry has re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration rejected the CFE application on 20.03.2020 i.e., after 4 days of application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited.
7.	To our astonishment, from the perusal of the CFE orders of other stone crushers, they are permitted by PCB by, granting CFE & CFO in the same Vattinagulapally Village and neighboring Puppalaguda Village and Kokapet Villages. In fact, the Puppalaguda and Kokapet Villages are much closer to Gandipet Lake. When those units are permitted to carry-out stone crushing activities, the same yardstick shall be applied to our unit, on the ground of 'Doctrine of Parity' under "Article 14" of the Constitution of India; whereunder, equals cannot be treated as un-equals. Therefore, our unit, shall also be grated CFE and consequential CFO on-par with the above companies referred to hereinabove.	The details of permitted crushers are submitted below:
	M/s. Hyma Developers Pvt. Ltd., (Earlier M/s. Pullur Constructions & M/s. Sri Laxmi Narsimha Stone Crusher were existing at that place), Kokapet (V), Gandipet (M), Ranga Reddy District • M/s. Hyma Developers Pvt. Ltd., is located at Sy. No. 239(P), 240(P), 48, 49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District and is involved in construction project. • The proponent has obtained Environmental Clearance (EC) for the construction project from SEIAA, vide Order Dated 13.10.2020 for	

Commercial Office Complex construction project.

- The Board is permitting construction projects within the 10 Km radius down stream of the Osmansagar and Himayatsagar lakes and in the villages which are not listed in the 84 villages mentioned in the G.O.Ms.No.111, Kokapet (V) is not listed in the 84 villages mentioned in the GO Ms. No.111.
- The CFE-CFO Committee recommended to issue CFE and CFO of the Board to M/s. Hyma Developers Pvt. Ltd., Sy.No. 239(P), 240(P), 48, 49 & 50, Kokapet (V), Gandipet (M), Ranga Reddy District.
- Accordingly, the Board issued CFE vide order dated 31.12.2020 for "Commercial Office Complex, Captive RMC units – 2 x 60 m^3/hr &Captive Stone Crushers – 2 x 250 TPH & 1 x 300 TPH", duly stipulating the following condition:

  "The proponent shall operate the stone crushers for and only during the period of construction of Commercial Office Complex, purely on temporary basis and this limited purpose as a captive unit."
- Subsequently, the Board issued CFO for Captive Stone Crushers – 2 x 250 TPH & 1 x 300 TPH only within the premises of the Construction site for which Environmental Clearance is obtained.

M/s. GMR Stone Crusher, (Formerly M/s. Progressive Construction Company), Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy District

- M/s. GMR Stone Crusher (formerly M/s. Progressive Construction Company) is located at Sy.No. 270 & 271, Vattinagulapally (V), Gandipet (M), Rangareddy and involved in stone crushing activity.
- The industry is located within the 10 Km radius of Himayatsagar and Osmansagar Lakes.
- The industry was established on 17.06.1998 and obtained CFO of the Board vide order dated 04.07.2000 for Stone chips, with a validity period upto 31.01.2001.
- The industry applied for renewal of CFO of the Board on 16.04.2008 and the same was returned as the industry located within the 10 kms radius of Himatyatsagar and Osmansagar lakes.
- Subsequently, the Board issued circular dated 15.02.2018 regarding renewal of the Consents of the existing industries located within the 10 km radius of Osmansagar and Himayatsagar lakes, prior to the Hon'ble Supreme Court's order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following:
  - No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes.
  - The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure.

- Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs.

- Accordingly, the industry applied for renewal of CFO of the Board for Stone Metal (40mm, 20mm, 12mm & 6mm) - 200 TPH.
- The application was examined in the CFO Committee Meeting at the TSPCB, ZO, Hyderabad. After detailed discussions, the Committee recommended to consider the CFO as per Board Circular dated 15.02.2018.
- The Board issued CFO to the industry vide order dated 16.04.2018 for Stone Chips (40mm, 20mm, 12mm & 6mm) - 200 TPH, which is valid upto 31.03.2023.

M/s. Sri Rama Engineering Constructions, Sy.No.203, Vattinagulapally (V), Gandipet (M), Rangareddy District

- M/s. Sri Rama Engineering Constructions is located at Sy.No.203, Vattinagulapally (V), Gandipet (M), Rangareddy District and involved in stone crushing activity.
- The industry is located within the 10 Kms radius of Himayatsagar and Osmansagar Lakes.
- The industry was established in the year 1996 and obtained CFE of the Board vide order dated 21.03.1996 for the following products:

S.No	Products / Line of Activity	Consented capacity as order dt.21.03.19
1	40mm HBG Chips	400 cum/day
2	20 mm HBG Chips	20 um/day
3	10 mm HBG Chips	20 cum/da

- The industry earlier applied for CFO several times but the same was not considered as the crusher is located in 10 Kms radius of Himaythsagar and Osmansagar lakes.
- The industry applied for CFO on 14.12.2001 and the same was returned to the industry on 01.01.2002 stating that, the industry is located in 10 Kms radius of Himaythsagar and Osmansagar lakes.
- The Board vide Memo No.C.A.Nos 368-373/99/PCB/Legal/2000-975 issued directions for processing the applications of the industries located within 10 Km radius of Osmansagar and Himayath sagar lakes and to return the consent applications of Red and Orange categories of industries established after 08.03.1996.
- A complaint dated 31.08.2017 was received from Sri K.Satish Kumar regarding un-authorized stone crushers operating in Greater Hyderabad Municipal Limits / HMDA / 111 GO area / FTL of different tanks.
- The Board issued Closure Orders to the industry vide order dated

	27.09.2017 for operating the stone crusher without having CFO of the Board and causing air pollution in the area and for the following reasons: a) The stone crusher is operating without valid CFO of the Board as required under Section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under Section 21/22 of Air (Prevention & Control of Pollution) Act, 1981. b) The stone crusher is situated within 10 Kms radius of Himayatsaga and Osmansagar lakes. c) The stone crusher is not having adequate Air pollution contro equipments thereby causing air pollution in the surrounding area. d) The Hon'ble NGT has directed the TSPCB to take action against th unauthorized stone crushers operating in GO 111 area. • Subsequently, the Board issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following: ➢ No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes. ➢ The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure. ➢ Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs. • Accordingly, the industry applied for CFO of the Board for Stone Metal (40mm, 20mm, 12mm & 6mm). • The application was examined in the CFO Committee Meeting at the TSPCB, ZO, Hyderabad. After detailed discussions, the Committee recommended to consider the CFO as per Board Circular dated 15.02.2018. • The Board issued CFO to the industry vide order dated 29.01.2020 for Stone Chips (40mm, 20mm, 12mm & 6mm) - 200 TPH valid upto 31.01.2021. Subsequently, the Board renewed the CFO vide order dated 20.03.2021, which is valid upto 31.01.2024.	
8.	The classification, sought to be projected by PCB, that, all the above named four stone crushing units, are operating prior to G.O.Ms.No.111 Dt.	The contention of the Industry that actions of the Board violated its fundamental rights is untenable, as the fundamental rights are subjected to

	08/03/1996, coming into force, is an untenable classification. The said classification is unreasonable in so far as the PCB's role of controlling the pollution is concerned. The PCB's interpretation that G.O.Ms.No.111 cannot operate retrospectively for earlier stone crushing units is also unreasonable and untenable. The said stand of PCB is directly infringing Article 14 of the Constitution of India. Therefore, our company – M/s. Aadeshwar Aggregates Pvt. Ltd., shall also be granted CFE and consequential CFO, for operating its stone crushing unit, as its activity is more eco-friendly, as it promotes recycling and reusing of natural resources in a more efficient manner.	reasonable restrictions and one of the basic restriction is the action should not be in contravention of the rule of law. The claim of the Applicant Industry that the Board is acting in a pick choose method and it should be granted CFE on par with other similar units, is contrary to facts. The fact is that the Board issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes with compliance to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following: i. No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes. ii. The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure. iii. Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs. The above circular was issued after due

		consultation and obtaining the legal opinion from the office of the Addtl Advocate General vide Opinion No.6/2018 dated 30-01-2018. The legal opinion of the learned Addl Advocate General stands on clear footing that industries generating pollutions in the catchment area of lakes upto 10 km.s from FTL, shall be prohibited and only the existing industries whom are complying with all the rules and regulations may be permitted subjected to the conditions. The fact is some other Crushers has obtained CFE and CFO ie., prior to the Hon'ble Supreme Court's Order dated 01.12.2000. But whereas, the applicant industry was established in the year 2019, subsequent to the Hon'ble Supreme Court dated 01.12.2000. The Vattinagulapally village is listed in the 84 villages (Annexure-I) of G.O.Ms.No.111 which are located in catchment of the lakes upto 10 kms. The Board is not permitting any activity in these 84 villages, as per the provisions of the GO Ms. No. 111.Hence, the CFE application made by the industry was rejected by the Board.
9.	Our Company stands on a higher pedestal in so far as its above mentioned eco-friendly activity is concerned. It is exactly doing what Ramky Enviro is doing by partnering with GHMC. Therefore, the Doctrine of Parity even gets triggered in this case and the equity tilts in our favour.	That M/s. Ramky-enviro has established a Construction and Demolition waste Recycling unit located in Jeedimetla as per the provisions of the Construction & Demolition Waste Mangement Rules, 2016. Whereas, the applicant industry is a stone crushing unit and not a Construction and Demolition waste Recycling unit. The Board has consented to establish and to operate Ramky-Enviro industry, as the Jeedimetla village does not fall under the G.O.Ms. No. 111, whereas, M/s. Aadeeshwar Aggregates is located in Vattinagulapally village which is listed in the 84 villages in G.O.Ms.No.111.

		Hence there is no comparison.
10.	The Vattinagulapally Village falls under the downstream of Gandipet Lake, therefore, our recycling activity, being an eco-friendly activity, does not in any way cause pollution or acidification of both the lakes, viz., Gandipet and Himayatsagar lakes.	The claim of the Applicant Industry that the it is located in the downstream of the protected lakes, is a frail argument as the law as it stands in all clear terms has prohibited polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution. In fact the stone crusher industry is operating in eco sensitive and critical zone, as it is located in closest of proximity i.e. just 1.89 k.m. from the FTL of Osman Sagar Lake. The Vattinagulapally village is listed in the 84 villages of G.O.Ms.No.111 where the Board is not accepting applications of any new industry. M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity. The crushing activity falls under orange category at S.No.64 as per CPCB categorization and stone crusher is an air pollution potential industry.
11.	When the HMDA zoning regulations under G.O.Ms.288, permits establishment of stone crushing unit in Vattinagulapally Village, the later G.O. of year 2008, will naturally supersede the earlier G.O. of the year 1996. Therefore, rejecting our application citing G.O.Ms.No.111, shall not be done mechanically without application of mind and without considering the Doctrine of Parity.	The reliance of the industry on G.O.Ms.No.288 is unfounded as the said G.O. while defining activities which can take place in Conservation Zone clearly mandates in column No.II that activities mentioned in Col.I are not allowed in the prohibited areas as mentioned in G.O.111 MA. Further, the Hon'ble Supreme Court, in its Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 has held up the G.O.Ms.No.111. Hence, G.O.Ms.No.111 is still in force.
12.	In addition to the above, the State Government appointed expert committee consisting of scientists	The Board has not received any direction from the State Government regarding deletion of Vattinagulapally Village from

	from EPTRI, had already recommended the State Government, that Vattinagulapally Village shall be deleted from the notified list of villages under G.O.Ms.111. This report is a part and parcel of your PCB records. Therefore, please consider granting CFE and consequantial CFO, to their company's stone crushing unit.	the notified list of 84 villages under G.O.Ms. 111. Further the validity of the G.O.111 and prohibition of polluting industrial activity in the 10 k.m. buffer zone was already been upheld by the Hon'ble Supreme Court of India in the case of A.P. Pollution Control Board Vs Prof.M.V. Nayudu (Retd.) Case No.Civil Appeal Nos. 368-371 of 1999, Civil Appeal No. 372 of 1999, Civil Appeal No. 373 of 1999. By its judgment dated 01-12-2000, the Hon'ble Supreme Court has settled the rule which has attained finality. The Hon'ble Supreme Court while upholding the order of refusal of permission by PCB to the applicant industry and by setting aside the order of the Hon'ble High Court and the Hon'ble Appellate Authority has held that, *".....The State of Andhra Pradesh is therefore directed hereby to identify these industries located within 10 K.M. radius of these two lakes and to take action in consultation with the A.P.Pollution Control Board to prevent pollution to the drinking water in these two reservoirs. The State and the Board shall not permit any polluting industries within the 10 k.m radius."* After the above decision of the Hon'ble Supreme Court, the Principal Secretary to the Govt., EFST Dept. issued direction to the State PCB vide D.O.Lr.No.7769/Env./2000 dated 30-03-2001 that no new polluting industry shall be allowed within the 10 km. radius of Osmansagar and Himayathsagar lakes.
13.	It may not be out of place to mention, above the radius length from Gandipet Lake, to be extending upon	The Shilparamam, Hi-tech city, Madhapur etc all fails under 10 km radius of Osmansagar and Himayatsagar lakes.

	Shilparamam at Hi-tech city near Madhapur. If this aspect be considered, the entire Hitech City and Financial District comprising of all IT companies and other Residential and Commercial activities fall within the 10 Kms radius of G.O.ms.111. Therefore, the logic of PCB that it is not accepting any applications in 111 G.O. villages is ex-facie illogical and untenable. Therefore, we request this PCB to take an objective and progressive approach, which will enrich the State coffers considering the eco-friendly recycling and reusable activity of M/s. Aadeshwar Aggregates Pvt. Ltd., in the interest of justice and also considering the "fundamental right to livelihood" of the entrepreneurs of M/s. Aadeshwar Aggregates Pvt. Ltd. PC shall also consider the minimal impact on environment that may be caused by allowing establishment of M/s. Aadeshwar Aggregates Pvt. Ltd., which is clearly part of the sustainable development concept. PCB shall consider the mitigating factors while considering our application.	However, not listed in the 84 villages notified under G.O.Ms.No.111. The Board is permitting construction activities located in the areas which are not listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 and which have obtained environmental clearance. Whereas, M/s. Aadeshwar Aggregates Pvt. Ltd., is a stone crushing industries and is located in Vattinagulapally Village which is listed in 84 villages at Sl.No. 67.
14.	M/s. Aadeshwar Aggregates Pvt. Ltd., ensures PCB, that it will abide by any of the conditions that may be imposed by PCB while granting CFE and the consequential CFO, to curtail the probable dust pollution. M/s. Aadeshwar Aggregates Pvt. Ltd., undertakes to install sprinklers as mandated by the PCB guidelines/rules. It also states that its unit is not located in the residential vicinity; therefore, the question of sound pollution, air pollution and acidification of the lakes do not arise at all.	M/s. Aadeshwar Aggregates Pvt. Ltd., has established and operating stone crusher using boulders excavated from the construction sites and is located within the 10 kms radius of Osmansagar and Himayatsagar lakes. The Vattinagulapally village is listed in the 84 villages within 10 km catchment area of Osmansagar and Himayatsagar lakes as mentioned in G.O.Ms.No.111 dt: 18.03.1996 wherein the Board is not accepting applications of any new industry.

15.	Therefcre, in view of all the above facts and circumstances, we request PCB to grant us CFE and the consequential CFO by imposing any conditions as the PCB may deem fit and proper in the interest of justice.	The Hon'ble High Court is already seized of the matter in similar Writ Petitions i.e., (i) WP (PIL) No. 233 of 2020 filed by Sri T. Sharath Kumar Reddy, R/o. Rangareddy District; (ii) WP (PIL) No. 170 of 2020 filed by Sri M. Gopal Reddy and (iii) WP No. 12022 of 2020 filed by Sri. Vislavath Sangameshwar, R/o. Hyderabad, against the stone crushers operating illegally within the 10 kms radius of Osmansagar and Himayatsagar lakes. The Hon'ble High Court disposed the WP(PIL) No. 170 of 2020 vide order dt. 07.06.2021, taking on record the report filed by the Board, stating that the TSPCB has issued closure orcers to all the illegal stone crushing units, Electricity Department was requestec to disconnect the power supply to the stone crushing units, which was complied and the Revenue Department was asked to seize the machinery ying in the stone crushing units. The Hon'ble High Court disposed the WP(PIL) No. 233 of 2020 vide order dt. 20.10.2021, ordering as follows: ***"....Resultantly, the Writ Petition stands disposed of with the direction to the Tahsildar, Gandipet Mandal, Ranga Reddy District to give effect to the closure orders passed by the Pollution Control Board and to report compliance within ten (10) days to the Registrar General of this Court...."*** The Hon'ble High Court in its disposal order dt: 18.01.2022 in WP No. 12022 of 2020 filed by Vislavath Sangameshwar

		Ordered as follows: ***"....Resultantly, the present Writ Petition is disposed of with a direction the State Government to ensure that the orders passed by the Board are implemented and no mining/ crushing activity takes place in respect of the area in question. It is made clear that in case the orders passed by the Board are not implemented by the revenue authorities, this Court shall be taking suo motu contempt proceedings against the Revenue authorities.*** ***Let a compliance report be filed before the Registrar general of this Court positively within a period of six weeks.*** ***The miscellaneous applications pending, if any, shall stand closed. There shall be no order as to costs."*** The Board also received complaints from Sri R. Rambabu and Sri P.V.Subramanya Varma against the crushers and Ready Mix Plants operating in G.O.Ms.No.111 area (within 10 km radius of Himayatsagar and Osmansagar lakes) in spite of issuing closure order by the Pollution Control Board and causing air pollution in the surrounding areas. An OA No. 6 of 2022 is filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against Establishment and operation of illegal and unauthorized stone crushing units. The present industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee comprising of (i) a Senior Officer from the Ministry of

		Environment, Forests & Climate Change (MoEF&CC), Regional Office, Hyderabad, (ii) a Senior Officer from the Telangana State Pollution Control Board, (iii) District Collectors of Ranga Reddy District and Sanga Reddy District or his/her nominee not below the rank of Assistant Collector/Sub Divisional Magistrate as deputed by them and (iv) a Senior Officer from the Department of Mines and Geology, Hyderabad to inspect the area in question and submit a factual as well as action taken report, if there is any violation found. The Joint Committee is also directed to ascertain as to whether the stone crusher units arrayed in the application or any other stone crusher units functioning in that area are without obtaining necessary permission under the environmental laws, whether on account of the operation, any pollution has been caused in the nearby areas affecting air, sound as well as water, as alleged by the applicant and if they are operating without obtaining consent or other permissions required under the environmental laws and other respective laws, what is the nature of action taken against them. If they are having necessary permission/consent but the pollution control mechanism provided is not sufficient, then suggest the remedial measures to mitigate the same. The Joint Committee is also directed to impose environmental compensation for the violations committed by them if any, apart from assessing compensation for the damage caused to the environment, including cost required for restoration of the same. The Department of Mines and Geology, Hyderabad will be the nodal agency for

		co-ordination and also for providing necessary logistics for this purpose. In compliance of the Hon'ble High Court Order dated 18.01.2022 in WP No. 12022 of 2020, the Revenue Officials along with Mining Department Officials & TSPCB Officials have conducted joint inspection on 28.01.2022 on the illegal operational units. During the inspection, it was found that applicant industry is one of the illegal units operating with diesel generators ever after the closure order issued by the TSPCB. On the account of the illegalities committed by the applicant industry, Aadeshwar Aggregators Pvt. Ltd, the DG set was seized by the Revenue Officials and the operational jaw crusher was also locked and sealed. The same has been officially communicated to the TSPCB, Regional Office-I, R.R. District by the Tahsildar of Gandipet Mandal vide Lr.No.B/1961/2019 Dated 03-02-2022. Another inspection of stone crushers illegally operating in G.O.111 area was conducted by the Joint Committee formed by the Hon'ble NGT in O.A.No.06 of 2022 on 14.02.2022. The Officials of TSPCB, RO, RR-I accompanied the Joint Committee. During the inspection, it was observed that the applicant industry, Aadeshwar Aggregators Private Limited has tampered the lock and seal put on the DG set and jaw crusher machine. The presence of raw material and crushed metal stone in the site of the unit shows that the industry has conducted production operations even after the seizure by the Revenue Officials.

12. The CFE-CFO Committee after careful examination of the CFE Application of the industry, grounds raised in the application, reports of the EE, TSPCB, Regional Office, Rangareddy-I, Action Taken by the Board, Hon'ble High Court Orders and Hon'ble NGT Order, recommended to reject the CFE application for the following reasons:

- M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in stone crushing activity and is located Sy.No.246/1, 246/2, Vattinagulapalli (V), Gandipet (M), Rangareddy District.
- The stone crushing activity falls under Orange Category as per CPCB categorization and stone crusher is an air pollution potential industry.
- The village, Vattinagulapally falls within 10 km catchment area of Osmansagar & Himayatsagar lakes and is also listed in the 84 Villages mentioned in the GO Ms No. 111, MA, dated 18.03.1996, wherein the Board is not permitting any industry.

- The Board has issued Closure Orders to M/s. Aadeshwar Aggregates Pvt. Ltd., on 22.08.2019 for operating without CFE / CFO of the Board and located within the 10 km racius of Osmansagar & Himayatsagar lakes.

- The industry earlier applied for CFE on 27.12.2019 and re-submitted the application on 16.03.2020. The application was rejected as per the provisions of the GO Ms. No. 111, i.e., prohibition of polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the Osmansagar & Himayatsagar lakes).

- Earlier M/s. Aadeshwar Aggregates Pvt. Ltd., made a representation to the Hon'ble Chief Minister, wherein it is stated that they have obtained Mineral Dealer License (MDL), Factory License, Micro Small & Medium Entrepreneur (MSME) Certificate, Trade License and all other statutory license required. They are transporting the excavated raw stone / boulders from their construction site i.e., M/s. Vessella Woods and crushing at their crusher. They have applied for Consent for Establishment (CFE) to the Board and informed that the Board has issued CFE for captive crushers to M/s. Hyma Developers Pvt. Ltd., which is a similar activity of M/s. Aadeshwar Aggregates. They further mentioned that they have obtained Environmental Clearance and CFE of the Board for construction activity i.e., "Residential Villas" of M/s. Vessella Woods, Survey Nos. 51 (P), Madinaguda, Serilingampally, Ranga Reddy District. They have requested to issue CFE / CFO of the Board. The TSPCB, RR-I, RO has submitted a report on the above representation to the Board Office on 28.03.2021. However, the representation was not considered as the location of the industry falls within 84 catchment villages of Himayatsagar & Osmansagar, as per GO Ms No.111 dt: 18.03.1996.

- The GO Ms No. 111, MA, dated 18.03.1996 was issued by the State Govt. to protect and preserve Himayatsagar and Osmansagar Lakes. The relevant provisions of the G.O. are as follows.
- The para no. 3 (i) (e) & (f) states as follows: -

> "(e) To prohibit polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) to prevent acidification of lakes due to air pollution.

(f) There shall be total prohibition of location of industries in the prohibited zone"

- The validity of the G.O.111 and prohibition of polluting industrial activity in the 10 k.m. buffer zone was already been upheld by the Hon'ble Supreme Court of India in the case of A.P. Pollution Control Board Vs Prof.M.V. Nayudu (Retd.) Case No. Civil Appeal 368-371 of 1999, Civil Appeal 372 of 1999, Civil Appeal 373 of 1999. By its judgment dated 01-12-2000, the Hon'ble Supreme Court has settled the rule which has attained finality. The Hon'ble Supreme Court while upholding the order of refusal of permission by PCB to the applicant industry and by setting aside the order of the Hon'ble High Court and the Hon'ble Appellate Authority has held that,

"The State of Andhra Pradesh is therefore directed hereby to identify these industries located within 10 K.M. radius of these two lakes and to take action in consultation with the A.P.Pollution Control Board to prevent pollution to the drinking water in these two reservoirs. The State and the Board shall not permit any polluting industries within the 10 k.m radius."

- After the above decision of the Hon'ble Supreme Court, the Principal Secretary to the Govt. EFST Dept. issued a direction to the State PCB vide D.O.Lr.No.7769/Env./2000 dated 30-03-2001 that no new polluting industry shall be allowed within the 10 km. radius of Osmansagar and Himayathsagar lakes.

- The Industry M/s. Aadeshwar Aggregates Pvt Ltd was operating illegally without obtaining any required Consents from the Board as mandated by the law. The Applicant Industry M/s. Aadeshwar Aggregates Pvt. Ltd. falls within the 10 kms radius of Osmansagar and Himayatsagar lakes, and is located in Vattinagulapally (V), which is one of the village falling within 10 Kms catchment area of Osmansagar & Himayatsagar as per the GO Ms No. 111, MA, dated 18.03.1996. As such operations of the Industry is prohibited within 10 Kms of Himayatsagar and Osmansagar Lake area.

- The Industry was indulging in illegal operations, as such the Board has issued Closure Orders to the industry on 22.08.2019, but even after the issuance of closure order, the industry continued its illegal operations. The Board issued direction to the SE (Operations), Telangana State Southern Power Distribution Company Limited (TSSPDCL) dated 22-08-2019 to disconnect the power supply. Even inspite of the disconnection of the power supply, the industry started to continue its illegal operations using Diesel Generators in violation of the laws. As such the Board was constrained to address letter on 02.12.2019, to Tahsildhar, Gandipet Mandal to cease the Generator of the industry. After this series of events when illegal operations were closed, the industry has applied for Consent for Establishment (CFE) to TSPCB through TS-iPASS on 27.12.2019. The Board immediately raised clarifications on 31.12.2019 stating that the location of the industry comes under G.O.Ms.No.111 and the Board is not accepting any

application in this area. The industry re-submitted the application to the Board on 16.03.2020 i.e., after 76 days and during this time continued its operations using Diesel Generators. The Board acted expeditiously on its application and after due consideration rejected the CFE application on 20.03.2020 i.e., after 4 days of application, by stating the location of the industry comes under G.O.Ms.No.111 and as per the provisions of the GO Ms. No. 111, polluting industries within 10 kms radius (i.e. both on upstream and downstream side of the lakes) are prohibited. That even inspite of the rejection of its application, the Industry continued its illegal operations and the Board again addressed letters on 08.10.2020, 01.11.2021, 23.12.2021, 21.01.2022 to Tahsildhar, Gandipet Mandal and a letter dated 18.11.2020 to Revenue Divisional Officer (RDO), Rajendranagar Division, RR District, requesting to seize the D.G.Sets of the industry, as the industry was operating in violation of the Closure Orders issued by the Board.

- The claim of the Industry that the Board is acting in a pick choose method and it should be granted CFE on par with other similar units, is contrary to facts. The fact is the Board Office has issued circular vide letter dated 15.02.2018 regarding renewal of the consents of the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes in compliance to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 by ensuring the following:

    a) No new industries and expansion of the existing industries shall be permitted within the 10 kms radius of Osmansagar and Himayatsagar lakes.
    b) The industries established within the 10 kms radius of Osmansagar and Himayatsagar lakes after the Hon'ble Supreme Court order dated 01.12.2000 in CA Nos. 368-371 and 373 of 1999 shall be identified and action shall be taken to ensure their closure.
    c) Renewal of Consent for Operation for the existing industries located within the 10 kms radius of Osmansagar and Himayatsagar lakes prior to the Hon'ble Supreme Court Order dated 01.12.2000 in CA Nos. 368-371 and 372-373 of 1999 shall be considered strictly in accordance with the law after obtaining an undertaking that the existing industry will be shifted outside the 10 km radius, as and when State Government so directs.

- The above circular was issued after due consultation and obtaining the legal opinion from the office of the Addtl Advocate General vide Opinion No.6/2018 dated 30-01-2018. The legal opinion of the learned Addtl Advocate General stands on clear footing that industries generating pollution in the catchment area of lakes upto 10 km.s from FTL, shall be prohibited and only the existing industries who are complying with all the rules and regulations may be permitted subjected to the conditions.

- Some of the Crushers have obtained CFE and CFO prior to the Hon'ble Supreme Court's Order dated 01.12.2000. But the applicant industry was established in the year 2019, subsequent to the Hon'ble Supreme Court dated 01.12.2000.

- The claim of the Applicant Industry that the it is located in the downstream of the protected lakes, could not be considered as the location of the crusher of the applicant i.e., Vattinagulapally Village is covered under 84 list of catchment Villages as per GO Ms. No.111 dt:18.03.1996.

- Contention of the Industry that M/s. Ramky-enviro has established a Construction and Demolition waste recycling unit located in Jeedimetla, under the Construction & Demolition Waste Management Rules 2016. Whereas, the applicant industry is a stone crushing unit and not a Construction and Demolition waste recycling unit. The Board has consented to establish and to operate the Ramky-Enviro industry, as the Jeedimetla village does not fall under the G.O.Ms. No. 111, whereas, M/s. Aadeeshwar Aggregates is located in Vattinagulapally village which is listed in the 84 villages in G.O.Ms.No.111.

- There is no relevance or role of M/s. Chiranjeeva Excavation and Infrastructure Pvt. Ltd., which is involved in the job of Excavation for construction companies, so as to enable multi-storied/highrise buildings to have their respective footings and cellars dug-out from appropriate base level depths. Whereas M/s. Aadeshwar Aggregates Pvt. Ltd., is involved in the stone crushing activity which is categorized under Orange Category, as per Central Pollution Control Board (CPCB) Classification of Industrial Sectors. The permissions granted by the State Govt. in relation to its nature of the work to M/s. Chiranjeeva Excavation, cannot grant legitimacy of industrial operations to Aadeshwar Aggregates. The work orders and royalty payments made to the Govt is restricted to the nature of the work of the M/s. Chiranjeeva Excavation, and not at all covered or concerned with the industrial operations of the Aadeshwar Aggregates.Further the Agreement dated 07-09-2018 filed by the Applicant Industry before the Hon'ble High Court clearly shows that the business relation between M/s. Chiranjeeva Excavation andM/s. Aadeshwar Aggregates is clearly of a seller and customer and not of a partner unit.

- The Hon'ble High Court is already seized of the matter in similar Writ Petitions i.e., (i) WP (PIL) No. 233 of 2020 filed by Sri T. Sharath Kumar Reddy, R/o. Rangareddy District; (ii) WP (PIL) No. 170 of 2020 filed by Sri M. Gopal Reddy and (iii) WP No. 12022 of 2020 filed by Sri. Vislavath Sangameshwar, R/o. Hyderabad, against the stone crushers operating illegally within the 10 kms radius of Osmansagar and Himayatsagar lakes.

- The Hon'ble High Court disposed the WP(PIL) No. 170 of 2020 vide order dt. 07.06.2021, taking on record the report filed by the Board, stating that the TSPCB has issued closure orders to all the illegal stone crushing units, Electricity Department was requested to disconnect the power supply to the stone crushing

units, which was complied and the Revenue Department was asked to seize the machinery lying in the stone crushing units.

- The Hon'ble High Court disposed the WP(PIL) No. 233 of 2020 vide order dt. 20.10.2021, ordering as follows:

- *"....Resultantly, the Writ Petition stands disposed of with the direction to the Tahsildar, Gandipet Mandal, Ranga Reddy District to give effect to the closure orders passed by the Pollution Control Board and to report compliance within ten (10) days to the Registrar General of this Court...."*

- The Hon'ble High Court in its disposal order dt: 18.01.2022 in WP No. 12022 of 2020 filed by Vislavath Sangameshwar Ordered as follows:

  "....Resultantly, the present Writ Petition is disposed of with a direction the State Government to ensure that the orders passed by the Board are implemented and no mining/ crushing activity takes place in respect of the area in question. It is made clear that in case the orders passed by the Board are not implemented by the revenue authorities, this Court shall be taking suo motu contempt proceedings against the Revenue authorities.
  Let a compliance report be filed before the Registrar general of this Court positively within a period of six weeks.
  The miscellaneous applications pending, if any, shall stand closed. There shall be no order as to costs."

- During the pendency of the application, another judicial development has occurred wherein an Original Application (OA) No. 6 of 2022 is filed in the Hon'ble NGT, Chennai by Sri P.V.Subramanya Varma, Hyderabad against establishment and operation of illegal and unauthorised stone crushing units. The applicant industry i.e. M/s. Aadeshwar Aggregates Pvt. Ltd. is Respondent No. 21 in this case. The Hon'ble NGT vide order dt. 17.01.2022 appointed a Joint Committee comprising of (i) a Senior Officer from the Ministry of Environment, Forests & Climate Change (MoEF&CC), Regional Office, Hyderabad, (ii) a Senior Officer from the Telangana State Pollution Control Board, (iii) District Collectors of Ranga Reddy District and Sanga Reddy District or his/her nominee not below the rank of Assistant Collector/Sub Divisional Magistrate as deputed by them and (iv) a Senior Officer from the Department of Mines and Geology, Hyderabad to inspect the area in question and submit a factual as well as action taken report, if there is any violation found.

- The Joint Committee is also directed to ascertain as to whether the stone crusher units arrayed in the application or any other stone crusher units functioning in that area are without obtaining necessary permission under the environmental laws, whether on account of the operation, any pollution has been caused in the nearby areas affecting air, sound as well as water, as alleged by the applicant and if they

are operating without obtaining consent or other permissions required under the environmental laws and other respective laws, what is the nature of action taken against them. If they are having necessary permission/consent but the pollution control mechanism provided is not sufficient, then suggest the remedial measures to mitigate the same. The Joint Committee is also directed to impose environmental compensation for the violations committed by them if any, apart from assessing compensation for the damage caused to the environment, including cost required for restoration of the same. The Department of Mines and Geology, Hyderabad will be the nodal agency for co-ordination and also for providing necessary logistics for this purpose.

- In compliance of the Hon'ble High Court Order dated 18.01.2022 in WP No. 12022 of 2020, the Revenue Officials along with Mining Department Officials & TSPCB Officials have conducted joint inspection on 28.01.2022 on the illegal operational units. During the inspection, it was found that applicant industry is one of the illegal units operating with diesel generators ever after the closure order issued by the TSPCB. On the account of the illegalities committed by the applicant industry, Aadeshwar Aggregators Pvt. Ltd, the DG set was seized by the Revenue Officials and the operational jaw crusher was also locked and sealed. The same has been officially communicated to the TSPCB, Regional Office-I, R.R. District by the Tahsildar of Gandipet Mandal vide Lr.No.B/1961/2019 Dated 03-02-2022.

- Inspection of stone crushers illegally operating in G.O.111 area was conducted by the Joint Committee formed by the Hon'ble NGT in O.A.No.06 of 2022 on 14.02.2022. The Officials of TSPCB, RO, RR-I accompanied the Joint Committee. During the inspection, it was observed that the applicant industry, Aadeshwar Aggregators Private Limited has tampered the lock and seal put on the DG set and jaw crusher machine. The presence of raw material and crushed metal stone in the site of the unit shows that the unit has conducted production operations even after the seizure by the Revenue Officials.

- M/s. Aadeshwar Aggregators Private Limited has consistently violated the law by conducting industrial operations even after the closure notice issued by the Board and even in spite of the seizure of the Machinery/ Equipment of the unit by the Revenue Officials.

13. The Collector & District Magistrate vide letter dated 10.03.2022 has instructed the Revenue Divisional Officer, Rajenderanagar and Tahsildars of Serlingampally, Gandipet & Shamshabad Mandals to remove the illegal stone crushing units operating within the 10 km radius of Himayathsagar & Osmansagar which falls under G.O. Ms No. 111.
14. A review meeting was convened by Revenue Divisional Officer, Rajendranagar on 26.03.2022 for implementation of Orders of the Hon'ble High Court in W.P. (PIL) No.170/2020 dt.20.10.2021 & Hon'ble NGT Chennai in OA.No.6 of 2022. The RDO has directed the Tahsildhars of Gandipet, Serilingampally & Shamshabad to take immediate

necessary action and to issue notices to the concerned for illegal running of stone crushers and also to the land owners and directed to submit action taken report by 05.04.2022.

15. A D.O. Letter was addressed to the District Collector on 28.03.2022 by Member Secretary for implementation of TSPCB and Hon'ble High Court Orders.
16. The appellant industry has approached the Hon'ble NGT, Chennai against the rejection order passed by the State Pollution Control Board. The Hon'ble NGT vide order dated 31.03.2022 has stated the following:

"The 21st Respondent (M/s Aadeeswar agregattes) also filed an interlocutory application as I.A. No.65 of 2022 (SZ) seeking reliefs to declare their unit as an environment friendly / eco-friendly unit, to declare their stone crushing unit is being set up for carrying out recycling of construction debris by manufacturing reusable gravel stone chips and robo sand, to be reused in the construction industry and also by interim relief, permit their unit to recycle excavated stone boulders and to manufacture reusable gravel, stone chips, and robo sand to be reused in nation building activity in most eco friendly manner on temporary basis on part with other existing four units in the same vicinity.

Even according to the Respondent No.21/Applicant in this interlocutory application, they have not obtained Consent to Establish and Consent to Operate. It is also mentioned in the interlocutory application itself that the application for Consent filed by them was rejected by the Telangana State Pollution Control Board and they intend to file an appeal against the same before the Appellate Authority.

If that be the case, it is not known as to how the prayer sought for in this application can be granted at this stage. Whether they are operating the unit without obtaining necessary Consent or other environmental permissions, is a matter to be considered in the main application. Without considering those aspects, none of the prayers made in the application can be considered at this stage, especially when they do not even have Consent to Establish and Consent to Operate which is the primary thing required under the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 for an industry of this nature to function.

So under such circumstances, we feel that the prayer in the application cannot be granted at this stage, and if they complied all the directions and if they are entitled to operate the unit, that can be considered in the main application.

We have not expressed any opinion regarding the conduct of 21st Respondent at present. If any appeal has been filed against the rejection order passed by the State Pollution Control Board, the Appellate Authority is at liberty to consider the same in accordance with law. With the above observation, liberty and directions, this I.A.65 of 2022 (SZ) is disposed of."

As per above submissions, the Respondent Board has followed due procedure of Law and principles of natural justice.

Place: Hyderabad
Date: 18.04.2022

18/4/2022

ENVIRONMENTAL ENGINEER (FAC)

ENVIRONMENTAL ENGINEER
TS Pollution Control Board
Regional Office - I, Sangareddy

ANNEXURE - XXXIII

BEFORE THE APPELLATE AUTHORITY UNDER SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981 AND SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION) ACT, 1974.

I.A.No. of 2022

In

Appeal No. 35 of 2022

Between :-

Mr. P.V.Subramanya Varma,
S/o.P.Atchutha Rama Raju,
aged about 45 years,
Occ: Journalist, R/o H.No.8-3-762/1/A,
Flat No.3, Sai Sri Maruthi Apartments,
Jaya Prakash Nagar,
Behind RBI Quarters, Sri Nagar Colony,
Khairthabad, Hyderabad - 500073

.... Petitioner

And

M/s Aadeshwar Aggregates Pvt.Ltd.,
Situated at Sy.No.246/1, 246/2, Vattinagaulappli Village
Gandipet Mandal, rangareddy District
Rep by its Authorized Signatory,
Sri.D.Sumanth, S/o.D.Subrahmanyam Reddy
Aged about 30 years, Disignation:Director
R/o.Villal No.21, Vessella Villas, Sri Ram Nagar
Block C, Kondapur, Kothaguda Post
Hyderabad - 500084, Cell No.9652973456
Email ID - sumanth reddy1989@gmail.com
And two others....

.... Respondents

Affidavit filed by the Petitioner / Third Party

I, P.V.Subramanya Varma, S/o.P.Atchutha Rama Raju, aged about 45 years, Occ: Journalist, residing at H.No.8-3-762/1/A, Flat No.3, Sai Sri Maruthi Apartments, Jaya Prakash Nagar, Behind RBI Quarters, Sri Nagar Colony, Khairthabad, Hyderabad - 500073 do hereby solemnly and sincerely affirm and state as follows :

1. I am the Petitioner/ Third Party herein. I know the facts of the case from the counter filed in Application No.6 of 2022 by the 1st Respondent/Appellant herein.

Attr.

Deponent

2. I submit that I have filed Application No.6 of 2022 before Hon'ble National Green Tribunal praying for the following reliefs:

I. Direct the respondent Nos.1 to 14 (i.e, Official Respondents) to initiate stringent action against the respondent Nos.15 to 33 for an unauthorized and illegal operation of stone crushing activities in Ranga Reddy and Sanga Reddy Districts of State of Telangana without obtaining Consent for establishment and Consent for Operation from the 4th respondent.

II Direct the Respondent Nos.1 to 14 to demolish/remove all the illegal and unauthorized structures erected by the Respondent Nos.15 to 33 without obtaining Consent for establishment and Consent for Operation from the 4th respondent as laid down under the provisions of Water(Prevention and Control of Pollution) Act,1974 and Air (Prevention and Control of Pollution) Act,1981.

III Direct the Respondent Nos.1 to 14 in preventing establishment and operation of the illegal and unauthorized stone crushing units of Respondent Nos.15 to 33 in Ranga Reddy and Sanga Reddy Districts which is bad in law and contrary to the Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act,1974 and in violation of the fundamental rights guaranteed under Article 21 of the Constitution of India and accordingly direct the respondent Nos.1 to 14 to seize and prevent the operation of the Respondent Nos.15 to 33;

IV Direct the Respondent Nos.15 to 33 to pay environmental compensation including the cost for restitution of Environment under Section 15 of NGT Act, 2010

V pass any order or orders as this Hon'ble Tribunal may

Attr. Deponent

deem fit and appropriate in the facts and circumstances of the present Application.

3. I submit that in the said application No.6 of 2022 the Appellant herein was shown as Respondent No.21. The Hon'ble National Green Tribunal on17.01.2022 while admitting the Application and in order to ascertain the genuineness of the allegations made in the application, appointed a Joint Committee. Accordingly a Joint Committee was constituted at the request the matter was posted to 31.03.2022. I submit that the Appellant herein as Respondent No.21 not only filed its Counter but also filed I.A.No.65 of 2022 (SZ) seeking reliefs to declare the Appellant herein as an environmental friendly/eco-friendly unit etc.,. The Hon'ble National Green Tribunal, Chennai disposed of the said I.A while observing that " we feel that the prayer in the application cannot be granted at this stage, and if they complied with all the directions and if they are entitled to operate the unit, that can be considered in the main application;".

4. The Hon'ble National Green Tribunal, Chennai in Para No.9 of its order dated 31.03.2022 further observed that "We have not expressed any opinion regarding the conduct of 21st Respondent at present. If any Appeal has been filed against the rejection order passed by the State Pollution Control Board, the Appellate Authority is at liberty to consider the same in accordance with law".

5. I submit that the orders dated 17.01.2022, 25.02.2022 and 31.03.2022 passed in Application No.6 of 2022 are filed herewith and the same may be read as part of this affidavit for all purposes and to avoid the repetition of the same.

5. I submit that after going through Counter in Application No.6 of 2022 only I came to know that the Respondent No.21/Appellant herein

Attr.

Deponent

filed Appeal before this Hon'ble Appellate Authority questioning the Rejection order of CFE dated 09.03.2022. Immediately after knowing the same I got enquired about the matter and came to know that without making me as a party the present appeal is filed. Therefore, I am filing the present application to IMPLEAD me as Respondent No.3 in Appeal No. 35 of 2022 so as to enable me bring the correct facts and figures and how the Appellant herein running the Appellant unit without any permissions from the 2nd Respondent/TSPCB before this Hon'ble Appellant Authority. Hence the Application.

6. It is therefore prayed that this Hon'ble Appellate Authority may be pleased to IMPLEAD the Proposed Respondent herein as Respondent No.3 in Appeal No. 35 of 2022 in the interest of justice and to pass such other or further orders as this Hon'ble Court may deem fit and proper under the circumstances of the case.

DEPONENT

Solemnly and sincerely affirmed
and signed his name on this the
12 day of April, 2022 in
my presence,

E. Manohara Rao
Advocate, Hyderabad.

BEFORE THE APPELLATE AUTHORITY UNDER SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981 AND SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION) ACT, 1974.

I.A. No. of 2022

In

Appeal No. of 2022

Between :-

Mr. P.V.Subramanya Varma,
S/o.P.Atchutha Rama Raju,
aged about 45 years,
Occ: Journalist, R/o H.No.8-3-762/1/A,
Flat No.3, Sai Sri Maruthi Apartments,
Jaya Prakash Nagar,
Behind RBI Quarters, Sri Nagar Colony,
Khairthabad, Hyderabad - 500073

....Petitioner/ Proposed Respondent in Appeal

And

1. M/s Aadeshwar Aggregates Pvt.Ltd.,
Situated at Sy.No.246/1, 246/2, Vattinagaulappli Village
Gandipet Mandal, rangareddy District
Rep by its Authorized Signatory,
Sri.D.Sumanth, S/o.D.Subrahmanyam Reddy
Aged about 30 years, Disignation:Director
R/o.Villal No.21, Vessella Villas, Sri Ram Nagar
Block C, Kondapur, Kothaguda Post
Hyderabad - 500084, Cell No.9652973456
Email ID - sumanth reddy1989@gmail.com

...
Respondent/Appellant

2. The State Government of Telangana.,
Represented by its Principal Secretary,
E.F.S. & T. Dept., Secretariat, Hyderabad

3. T.S. Pollution Control Board
Paryavaran Bhavan, A-3,
Industrial Estate, Sanathnagar
Hyderabad - 500018, Rep by its Member Secretary.

...Respondents/ Respondents

Note: RESPONDENT NOS. 2 AND 3 ARE NOT NECESSARY PARTIES TO THIS I.A. ONLY

For the reasons stated in the accompanying affidavit, it is prayed that this Hon'ble Appellate Authority may be pleased to IMPLEAD the Proposed Respondent herein as Respondent No.3 in Appeal No. 35 of 2022 in the interest of justice and to pass such other or further orders as this Hon'ble Court may deem fit and proper under the circumstances of the case.

Hyderabad
12.04.2022

V. B. Subrahmanyam
Counsel for Petitioner/Proposed Respondent

ANNEXURE – XXXIV

BEFORE APPELLATE AUTHORITY UNDER SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION ACT), 1974 / SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981.

I.A.No. of 2022
In
Appeal No. 35 of 2022

BETWEEN:

Mr. P.V.Subramanya Varma

....Implead Petitioner.

AND

M/s. Aadeshwar Aggregates Pvt. Ltd,
Represented by its Authorized Signatory,
Sri. D. Sumanth & Others

....Respondent/Appellant

COUNTER AFFIDAVIT

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084, do hereby sincerely and solemnly affirm on oath and state as follows:

1. I am the Appellant in the present case, as such, I am well acquainted with the facts of the case.

2. The Petitioner filed the present Interim Application, seeking his impleadment in the appeal filed by me. I filed the present appeal against the rejection order of the Telangana State Pollution Control Board (TSPCB) in not issuing the Consent for Establishment (CFE) and Consent for Operation (CFO) to our recycling unit, which is an 'Orange Category' industry as per the 'Siting Criteria' of the Central Pollution Control Board (CPCB) and TSPCB. The TSPCB rejected my application on the ground that the location of my industry is falling within the 10 kms radius from

For AADESHWAR AGGREGATES PVT. LTD.
D.S.K.Reddy
DIRECTOR

the Full Tank Level (FTL) of Osman Sagar and Himayat Sagar lakes which is prohibited under G.O M. S 111. This impugned rejection order was appealed by me, before this Appellate Authority as a matter of statutory right under Section 31 of the Air (Prevention & Control of Pollution) Act, 1981 (*for short* 'AIR Act') and Section 28 of the Water (Prevention & Control of Pollution) Act, 1974 (*for short* 'WATER Act'). Thus, the present appeal arises out of a statutory right, conferred to this Respondent unit.

3. I submit that, the Petitioner herein is completely a stranger and a third party, who wants to intervene into these Appellate proceedings. He did not plead or establish his locus to get impleaded into the Appellate proceedings. Therefore, the present Interim application seeking impleadment is devoid of any merit and the same deserves to be dismissed by this Hon'ble Appellate Authority. The principles for entertaining an intervening application are already settled, where under the Court may add or strike out parties either as a plaintiff or defendant, in the original proceedings, if at all the Court feels that, without the presence of such parties, the Court would not be able to effectually and completely adjudicate upon, and will not be able to settle all the questions involved in the case. In such circumstances only, an intervening application may be allowed by the Court, that too at the primary /original proceedings.

4. It may be also pertinent to note that, this is an Appellate forum and the present proceedings are Statutory Appellate proceedings, and not the original proceedings, and the grievance is personal in nature, and this cannot be opposed by any third parties. The only question that is falling for consideration is whether I am entitled for Consent for Establishment (CFE) and Consent for Operation (CFO) to run my eco-friendly recycling unit.

5. I submit that, the petitioner who intends to intervene in this case states that he filed an application before the National Green Tribunal (NGT) to take

For AADESHWAR AGGREGATES PVT. LTD.

D.S.K.Reddy

DIRECTOR

action against all unauthorized and illegal stone crushing units in Ranga Reddy and Sanga Reddy Districts, and that the NGT at his behest appointed a Joint Committee to inspect the Sanga Reddy and Ranga Reddy Districts and submit a report in regards to the stone crushing units operating illegally.

6. I submit that, the Application filed by the Petitioner before the NGT is completely for different reliefs. Neither the Petitioner nor any other person can scuttle my Appellate remedy before this Appellate Authority. The power of the NGT and the Appellate power of this authority are two different statutory remedies. Simply because the petitioner/intervener being an applicant before the NGT will not give him a right to oppose my reliefs in the present appeal. Therefore, the present application for intervening is devoid of any merit and the same is liable to be dismissed in the interest of justice.

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy
DIRECTOR

Sworn and signed before me,
On this 18th day of April 2022

Deponent

Advocate/Hyderabad

VERIFICATION

I Sri. D. Sumanth, S/o. D Subrahmanyam Reddy, aged about 30 Years, Occ: Business, R/o. Villa No. 21, Vessella Villas, Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyderabad – 500 084 do hereby verify that the contents of Paragraph No. 1 to 6 are true and correct to my personal knowledge and belief hence verified on 18th day of April 2022 at Hyderabad.

For AADESHWAR AGGREGATES PVT. LTD.
D. S. K. Reddy
Deponent DIRECTOR

Counsel for the Petitioner

BEFORE APPELLATE AUTHORITY OF THE TELANGANA STATE POLLUTION CONTROL BOARD

AT : HYDERABAD

I.A No. of 2022
In
Appeal No. 35 of 2022

BETWEEN:

Mr. P.V.Subramanya Varma
....Implead Petitioner.

AND

M/s. Aadeshwar Aggregates
Pvt. Ltd, Represented by its
Authorized Signatory,
Sri. D. Sumanth & Others
....Respondent/Appellant

COUNTER AFFIDAVIT

Filed on: 19/04/2022

Filed by:

SMT. G. JHANSI (6144)
Advocate

Counsel for the Respondent
No.1 / Appellant

ANNEXURE – XXXV

BEFORE THE APPELLATE AUTHORITY UNDER SECTION 31 OF AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981 AND SECTION 28 OF WATER (PREVENTION & CONTROL OF POLLUTION) ACT, 1974.

I.A.No. 49 of 2022

In

Appeal No. 35 of 2022

Between :-

M/s Aadeshwar Aggregates Pvt.Ltd.,
Situated at Sy.No.246/1, 246/2, Vattinagaulappli Village
Gandipet Mandal, rangareddy District
Rep by its Authorized Signatory,
Sri.D.Sumantn, S/o.D.Subrahmanyam Reddy
Aged about 30 years, Disignation:Director
R/o.Villal No.21, Vessella Villas, Sri Ram Nagar
Block C, Kondapur, Kothaguda Post
Hyderabad - 500084, Cell No.9652973456
Email ID - sumanth reddy1989@gmail.com

.... Petitioner

And

The State Government of Telangana.,
Represented by its Principal Secretary,
E.F.S. & T. Dept., Secretariat, Hyderabad
and two others

.... Respondents

Affidavit filed by the 3rd Third Respondent

I, P.V.Subramanya Varma, S/o.P.Atchutha Rama Raju, aged about 45 years, Occ: Journalist, residing at H.No.8-3-762/1/A, Flat No.3, Sai Sri Maruthi Apartments, Jaya Prakash Nagar, Behind RBI Quarters, Sri Nagar Colony, Khairthabad, Hyderabad - 500073 do hereby solemnly and sincerely affirm and state as follows :

1. I am the Third Respondent herein. I know the facts of the case from the counter filed in Application No.6 of 2022 as well as from the Appeal filed by the Petitioner/Appellant herein.

2. I have read the affidavit filed in support of the Petition under reply as well as the allegations and the Grounds in the Appeal. I deny each and every allegation in the affidavit filed in support of the Petition and the petitioner /Appellant is put to strict proof of the same. I submit that at the outset the Petitioner/Appellant herein is not entitled for the relief prayed for in the Appeal. Further the Appeal is also not maintainable for the reasons that the order impugned herein is a composite order and in view of the Hon'ble Apex Court's Judgment in Tamil Naidu Pollution Control Board Vs. Sterlite Industries (I) Ltd & Ors (Civil Appeal Nos.4763 - 4764 of 2013)

Attr.

Deponent

3. With reference to the allegations in Para No.1 of the affidavit filed in support of the Petition under reply, I submit that these allegations are general in nature and needs no reply.

4. With reference to the allegations in Para Nos.2 to 17 of the affidavit filed in support of the Petition under reply, I submit that these allegations are not correct and invented for the purpose of the present petition under reply. In fact the Answering Respondent submits that the Answering Respondent is a journalist by profession and concerned with the establishment and operation of illegal and unauthorized stone crushing units at various places in the State of Telangana particularly Ranga Reddy and Sanga Reddy Districts, where such illegal activities are growing day by day. The Answering Respondent submits that the Stone Crushing Industry is one such industry that exists in the vicinity of almost all major cities/towns throughout the country in all the states because the construction activities go on throughout the country. Stone Crushing Industry engaged in producing crushed stones which is the basic raw material for various construction activities such as construction of Buildings, Roads, Highways, Bridges and Canals etc., which is an important industrial sector especially for infrastructure projects. The Answering Respondent submits that this sector, gives rise to substantial quantity of fine fugitive dust emissions which create health hazards to the workers as well as surrounding population by way of causing respiratory diseases. The dust also adversely affects visibility, reduces growth of vegetation and hampers aesthetics of the area. Stone crushing units are not stand-alone crushing units, but stone mining is also associated with this activity. In fact, stone mining is the primary and basic activity for the store crushing units. Therefore, this kind of industrial units need strict scrutiny while granting permission for environmental and mining operations, especially at the time of issuing permission / licence / NOC etc. It should be analyzed in totality i.e., for both activities.

ii). However, due to real estate boom in the past decade, several projects of construction have come up in the Hyderabad and its surrounding areas. Further, infrastructure sector especially roads, highways etc., is also seeing considerable growth.

Attr.

Deponent

On account of this, several illegal and unauthorized stone crushing units are coming up in the vicinity which are posing danger to the environment and also many challenges to maintain the Standards as prescribed by the Pollution Control Board (PCB) and achieve the sustainability. In fact, the stone crusher units have to follow several guidelines prescribed by the government and the Central Pollution Control Board and Pollution Control Board from time to time such as each stone crusher unit shall install adequate pollution control measures including erection of G.I. Sheets cover and the sprinklers before commencement of operations, Stone Crusher shall be covered and water sprinkling system shall be provided on crusher to suppress the dust generated due to material handling/loading/unloading activity, Screen classifier shall be adequately covered by G.I. Sheets to prevent the emission into the atmosphere due to screening/grading activity, Regular wetting of roads shall be carried out to suppress the ground level dust within the premises to control the air borne dust emission due to wind velocity, display board shall be provided at the entrance of stone crusher indicating survey no, name and address of owner and the unit, fine dust generated due to screening / crushing / grading shall be disposed off into abandoned mines and also shall comply with all prevailing Environmental Acts/Rules etc.

iii). The Answering Respondent submits that in the recent past it is noticed that, there is a sudden and unhealthy growth of establishment of unauthorized stone crushing plants at various places particularly in Ranga Reddy and Sanga Reddy Districts in Telangana Districts.

iv). Under such circumstances, one Mr. T. Sharath Kumar Reddy resident of Narsingi, Gandipet, Ranga Reddy District, has approached the Hon'ble High Court of Telangana State in W.P.(PIL) No. 233 of 2020 challenging the inaction on the part of the official respondents therein in preventing establishment and operation of the illegal and unauthorized stone crushing plants in Ranga Reddy and Sanga Reddy Districts. It is pertinent to submit here that the Hon'ble High Court of Telangana during pendency of the W.P.(PIL) No.233 of 2020

Attr.

Deponent

was pleased to pass the following Order on 24.12.2020:

ORDER:

List this case after three weeks.

The respondent Nos.2,3 and 4 are directed to inspect the concerned area. In case they discover that the stone crushers are functioning illegally, they are directed to take immediate steps against the erring stone crushers within period of two weeks. The steps shall be taken strictly in accordance with law.

v) The Answering Respondent submits that pursuant to the above said order dated 24.12.2020 passed by the Hon'ble High Court of Telangana a status report dated 11.01.2021 was filed by the Telangana State Pollution Control Board. In the Status Report dated 11.01.2021 the Telangana State Pollution Control Board stated that the Telangana State Pollution Control Board having inspected various Stone Crusher units established by various persons/firms, said to have found that such stone crushers were not in operation, however the Tahsildar, Ramachandrapuram Mandal, seized the power transmission equipment. The Applicant craves leave of this Hon'ble Tribunal to read the status report dated 11.01.2021 as part this Counter Affidavit for all purposes and to avoid repetition of the same.

vi) The Answering Respondent submits that basing on the above said status report dated 11.01.2021 filed by the Telangana State Pollution Control Board while taking the same on record, the Hon'ble High Court vide orders dated 07.06.2021, has been pleased to close the said W.P.(PIL) No. 233 of 2020.

vii). The Answering Respondent submits that the Telangana State Pollution Control Board through its Learned Standing Counsel before the Hon'ble High Court also stated that all the illegal stone crushing activities have been stopped and that the electricity department was requested to disconnect the power supply to the said stone crushing units that apart the Revenue Department was also told to seize the machinery lying in the stone crushing units.

viii) The Answering Respondent submits that after the said

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Deponent

orders dated 07.06.2021 passed by the Hon'ble High Court of Telangana, such illegal operation of stone crushing was temporarily stopped by such stone crushing units, hardly for about a week and after lapse of one week thereafter, all such illegal stone crushing units have become operational and at present they have been carrying on with such activities thereby posing danger to the environment and also inhabitants as no such units are following any of the guidelines issued by the Central / State Governments including the Pollution Control Board which are creating health hazards to the people at large and that they are forced to face such severe health problems even during the prevailing Covid-19 situation thereby unnecessarily driving the people to keep their health at a high risk in the Villages of Ranga Reddy and Sanga Reddy Districts. That apart such activities also cause tremendous loss to the State exchequer, as all such persons/firms are not only carrying on with such business illegally and going on unregulated but also evading the payment of tax to the concerned departments of the Government.

ix) . The Answering Respondent submits that under the above said circumstance, has filed Application No.6 of 2022 before Hon'ble National Green Tribunal praying for the following reliefs:

I. Direct the respondent Nos.1 to 14 (i.e, Official Respondents) to initiate stringent action against the respondent Nos.15 to 33 for an unauthorized and illegal operation of stone crushing activities in Ranga Reddy and Sanga Reddy Districts of State of Telangana without obtaining Consent for establishment and Consent for Operation from the 4th respondent.

II Direct the Respondent Nos.1 to 14 to demolish/remove all the illegal and unauthorized structures erected by the Respondent Nos.15 to 33 without obtaining Consent for establishment and Consent for Operation from the 4th respondent as laid down under the provisions of Water(Prevention and Control of Pollution) Act,1974 and Air (Prevention and Control of Pollution) Act,1981.

III Direct the Respondent Nos.1 to 14 in preventing establishment and operation of the illegal and unauthorized stone crushing units of Respondent Nos.15 to 33 in Ranga Reddy and Sanga Reddy Districts

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Deponent

which is bad in law and contrary to the Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974 and in violation of the fundamental rights guaranteed under Article 21 of the Constitution of India and accordingly direct the respondent Nos.1 to 14 to seize and prevent the operation of the Respondent Nos.15 to 33;

IV Direct the Respondent Nos.15 to 33 to pay environmental compensation including the cost for restitution of Environment under Section 15 of NGT Act, 2010

V pass any order or orders as this Hon'ble Tribunal may deem fit and appropriate in the facts and circumstances of the present Application.

5. The Answering Respondent submits that in the said application No.6 of 2022 the Petitioner/Appellant herein was shown as Respondent No.21.

6. The Hon'ble National Green Tribunal on17.01.2022 while admitting the Application and in order to ascertain the genuineness of the allegations made in the application, appointed a Joint Committee. Accordingly a Joint Committee was constituted at the request the matter was posted to 31.03.2022. The Answering Respondent submits that the Appellant herein as Respondent No.21 not only filed its Counter but also filed I.A.No.65 of 2022 (SZ) seeking reliefs to declare the Appellant herein as an environmental friendly/eco-friendly unit etc.,. The Hon'ble National Green Tribunal, Chennai disposed of the said I.A while observing that " we feel that the prayer in the application cannot be granted at this stage, and if they complied with all the directions and if they are entitled to operate the unit, that can be considered in the main application;".

7. The Hon'ble National Green Tribunal, Chennai in Para No.9 of its order dated 31.03.2022 further observed that "We have not expressed any opinion regarding the conduct of 21st Respondent at present. If any Appeal has been filed against the rejection order passed by the State Pollution Control Board, the Appellate Authority is at liberty to consider the same in accordance with law".

The Answering Respondent submits that the orders dated 17.01.2022, 25.02.2022 and 31.03.2022 passed in Application No.6 of 2022 are filed herewith and the same may be read as part of this Counter affidavit for all purposes and to avoid the repetition of the same.

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Deponent

8. The Answering Respondent submits from the material papers filed along with the Appeal it is revealed that:

(a) The Appellant was issued closure order No.15-RR-I/TSPCB/ZO HYD/2019-327 dated 22.08.2019 under Section 33(A) of the Water (Prevention and Control of Pollution) Amendment Act,1988 and under Section 31(A) of the Air (Prevention and Control of Pollution) Amendment Act, 1987 by observing that "Board is of firm opinion that you are not having consent of Board & posing severe threat to the environment, public health" not only for Violation of G.O.Ms. 111 dated but also not following the directions issued vide show cause Notice No.3/VTP/PCB/RO.I-RRD/2019-110 dated 17.05.2019 after hearing the Appellant herein.

(b) Power disconnection was also ordered. The said order has become final.

(c) Inspite of the Closure Order dated 22.08.2019 and disconnection of power supply to the Appellant herein, the Appellant Stone Crusher by violating the above Closure order used to continue its illegal operations by using Diesel Generators.

(d) Pursuant to the order dated 17.01.2022 in Application No.6 of 2022, the Revenue Officials along with Mining Department Officials and TSPCB officials conducted joint inspection on 28.01.2022 and found that the Appellant Industry is one of the illegal units operating with diesel generators even after the closure orders issued by the TSPCB. On account of illegalities committed by the Appellant herein the DG set was seized by the Revenue Officials and the operational Jaw Crusher was also locked and sealed. The same was officially communicated to the TSPCB, Regional Office-I, R.R.District by the Tahsildar of Gandipet Mandal Vide Lr.No.B/1961/2019 dated 03.02.2022.

(e) The Appellant seems to be applied for CFE on 10.12.2021 and the TSPCB after considering the all the facts and the attitude of the Appellant in implementation orders passed by TSPCB as well as High Court of Telangana as more fully described in the

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Deponent

order impugned herein rejected the CFE Application by giving cogent reasons.

9. The above narrated facts clearly establishes that the Appellant is operating the stone crusher without any consent or permission from the respective authorities illegally and also by flouting the various orders from the Hon'ble High Court of Telangana. Further mere issuance of G.O.Ms.No.69 dated 12.04.2022 by removing the restrictions imposed in Para No.3 G.O.Ms.No.111 dated 08.03.1996 does not entitle the Appellant to establish its Stone cursher in Sy.Nos.246/1 and 246/2 of Vattinagulapally Village, Gandipet Mandal, Ranga Reddy District without considering the G.O.Ms.No.470 MA&UD(I) Deptt. Dated 19.07.2008.

10. The Answering Respondent submit that as per G.O.Ms.No.470 MA&UD(I) Deptt. Dated 19.07.2008 1 K.M belt on either side of the ORRGC (Outer Ring Road Growth Carridor) is to be maintained. Further Regulation 3 of the said G.O. deals with the land use of SDZ (Special Development Zone), which prohibits expansion of existing industries and no new industries shall be permitted. Since the distance between the Appellant and ORR is only 250 meters as such the Appellant cannot be permitted to establish with in 1 K.M.

11. Further the Siting guide lines for stone crushers as follows:

-> The distance between the boundary of the site and boundary of the

i. National Highway shall be 500m

ii. State High way, MDR and others Roads shall be 100m

-> The distance between the boundary of the site and human habitation (Boundary of Town, Village etc.,) shall not be less than 800m

-> Preferably located near the quarries.

-> xxx xxx xxx

-> xxx xxx xxx

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Deponent

The above siting guide lines for stone crushers will not permit the Appellant to establish its stone crusher for the reason that:

(a) The Distance between the Appellant and the human habitation (GAR Tower) is only meters as per Google.

(b) The distance between the Appellant and ORRCG is only 250 meters.

12. In view of the above , it is therefore prayed that this Hon'ble Appellate Authority may be pleased to DISMISS the Appeal No. 35 of 2022 in the interest of justice and to pass such other or further orders as this Hon'ble Court may deem fit and proper under the circumstances of the case.

Solemnly and sincerely affirmed
and signed his name on this the
10 day of May, 2022 in
my presence,

DEPONENT

Advocate, Hyderabad.

GOVERNMENT OF TELANGANA
ABSTRACT

ANNEXURE - XXXVI

MA&UD Department – Removal of restrictions imposed in the villages covered by G.O.Ms.No.111 Dt. 08.03.1996 – Orders - Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (Plg.I(1)) DEPARTMENT

G.O.Ms.No. 69

Dated: 12 .04.2022
Read the following:

1. G.O.Ms.No.111 MA, Dated:08.03.1996
2. G.O.Rt.No.839, MA, Dated:07.12.2016
3. G.O.Rt.No.165, MA, Dated:19.03.2018
4. G.O.Rt.No.873, MA, Dated:20.12.2019
5. Report submitted by High Power Committee, Dt.31.03.2022.

ORDER

In the reference 1st read above, orders were issued prohibiting polluting industries, major hotels, residential colonies and other establishments that generate pollution in the catchment area of Osman Sagar & Himayath Sagar reservoirs upto 10 Kms from FTL covering 84 villages with an area of nearly 1,32,000 Ac. This was done with an objective of protecting catchment area of these two reservoirs which were main source of drinking water to Hyderabad city at that time.

2. As per the details furnished by HMWS&SB, these two reservoirs are accounting for 27.59% of installed capacity of drinking water when the above said G.O. was issued. However, since the total installed capacity of drinking water for Hyderabad has grown up from 145 Mgd to 602 Mgd and additional 344 Mgd is also under execution, as a result drawals dependability of these reservoirs is less than 1.25% and they are no longer the source of drinking water supply to Hyderabad City.

3. Considering the above fact that Hyderabad city's drinking water requirements are no longer dependent on Osman Sagar & Himayatsagar Reservoirs which was the underlying theme for issuance of G.O. 111 Dt.08.03.1996, Government after careful examination of the matter have decided that the restrictions imposed under para 3 of said G.O. Ms.No.111 Dt.8.3.1996 are removed, subject to condition that the water quality of these two reservoirs shall not be impacted any manner, whatsoever and all efforts will be initiated by the Government to improve the water quality of these two reservoirs, which inter-alia shall include

a) Installation of decentralised Sewerage Treatments Plants (STPs) at various locations

b) Construction of diversion channels for carrying the treated water without letting it into these two reservoirs.

c) Maintenance of Ground water quality.

d) Minimisation of pollution through agricultural surface run-off into these two reservoirs.

e) Any other measures as deemed appropriate to ensure the quality of water

4. In order to frame guidelines and detailed regulations, a Committee headed by Chief Secretary and having Special Chief Secretary (MA&UD), Special Chief Secretary (Finance), Special Chief Secretary (I&CAD), Managing Director (HMWS&SB), Member Secretary (TSPCB) & Director (Plng) HMDA is hereby constituted.

5. The Terms of Reference (ToR) of the Committee are as follows:

a) To suggest measures for protection and preventions of pollution to these two reservoirs

(continued in page ...2)

b) To suggest broad guidelines for zoning including earmarking of green zones

c) To suggest modalities for development of trunk infrastructure in this area

d) To suggest various means of resource mobilisation for taking up trunk infrastructure i.e., Roads, Major Drains, STPs, Diversion Drains etc.,

e) To suggest appropriate institutional frame work to take up the infrastructure and regulate the development in this area.

f) To suggest necessary regulatory measures to be insisted while granting any layout / building permissions in this area

g) To suggest necessary changes if any to be made in the existing legal frame work to effectively regulate the developments in this area

h) While finalising the guidelines / detailed regulations it must be ensured that not only proper Sewage Treatment Plants (STPs) are in place, the diversion drains to carry the treated water are also in place without letting the sewage water into above two reservoirs.

i) The Committee shall look into ways and means to raise resources to meet the infrastructure requirements in this area.

6. The Committee shall, keeping the broad primary objective of protecting the quality of two water bodies, shall work on the above mentioned ToR and submit its report to the Government at the earliest.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

SOMESH KUMAR
CHIEF SECRETARY TO GOVERNMENT

To
All Committee Members
The Metropolitan Commissioner,
Hyderabad Metropolitan Development Authority, Hyderabad.
The Managing Director,
Hyderabad Metro Water Supply & Sewerage Board, Hyderabad.
The Commissioner, Panchayat Raj and Rural Development, Hyderabad.
The District Collector, Ranga Reddy.
The Director of Town and Country Planning, Hyderabad.
Copy to:
OSD to Hon'ble Min (MA&UD).
The P.S. to Principal Secretary to C.M.
The P.S. to Chief Secretary to Government, Telangana.
The P.S. to Special Chief Secretary to Government, MA&UD Department
The P.S. to Special Chief Secretary to Government, Finance Department.
The P.S. to Special Chief Secretary to Government, I&CAD Department
The MD HMWS&SB.
The Member Secretary, Telangana State Pollution Control Board, Hyderabad.
The Director (Planning), MA&UD Department.
The Commissioner, Industries and Commerce Department.
The Energy, Science and Technology Department.

//FORWARDED BY ORDER//

SECTION OFFICER

ANNEXURE - XXXVII

BEFORE THE HON'BLE APPELLATE AUTHORITY, UNDER WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974 AND AIR (PREVENTION AND CONTROL OF POLLUTION) ACT, 1981.

Thursday, The Twelfth day of May, Two Thousand Twenty Two

PRESENT:

Chairman : Shri JUSTICE B. PRAKASH RAO,
Member : Prof. Dr. JAYATHIRTA RAO.

Appeal No. 35 /2022

Between:
M/s. Aadeshwar Aggregates Pvt Ltd.,
Sy. No.246/1, 246/2, Vattinagulapalli (V),
Gandipet Mandal, Rangareddy District.
Represented by its Authorized Signatory Sri. D. Sumanth,
S/o. D. Subrahmanyam Reddy, aged about 30 Years,
Designation: Director, R/o. Villa No. 21, Vessella Villas,
Sri Ram Nagar, Block C, Kondapur, Kothaguda Post, Hyd.

.....Appellant

And

1. The State of Telangana
   Represented by its Secretary to
   Government EFS&T Department,
   Secretariat, Hyd.
2. Telangana State Pollution Control Board
   Represented by its Member Secretary
   Sanathnagar, Hyderabad.

.....Respondents

3. Mr. P. V. Subramanyam Varma,
   S/o P. Atchuta Rama Raju,
   H. No. 8-3-762/1/A, Flat No. 3,
   Sai Sri Maruthi Apartments, Jaya Prakash Nagar,
   Behind RBI Quarters, Sri Nagar Colony,
   Khairthabad, Hyderabad.
   aged bout 45 years, Occ: Journalist

..... Implead Respondent

Counsel for the Petitioner : Smt. G. Jhansi
Counsel for Respondent Nos. 1 to 2 : Sri. P. Shiv Kumar
Counsel for Respondent No. 3 : Sri. V. B. Subrahmanyam

JUDGEMENT

1. Heard Smt. G. Jhansi, the learned counsel for the appellant and Sri. P. Shiv Kumar learned standing counsel appearing for the respondent no. 2. None appears for the respondent no.1.

2. Heard also Sri. V. B. Subrahmanyam the learned counsel appearing for the respondent no. 3. Further Sri. Pannala Srinivas learned counsel who intervening the hearing state that he is appearing for Crusher Owners Association of Telangana and made his submissions.

3. After hearing the counsel from all the sides, as aforesaid, it was suggested that the a main appeal itself could be taken up for final disposal on merits rather than taking up any interim applications or passing any orders, especially in view of the change in the policy of the res no 1 in regard to the restriction in and around Himayatsagar Lake.

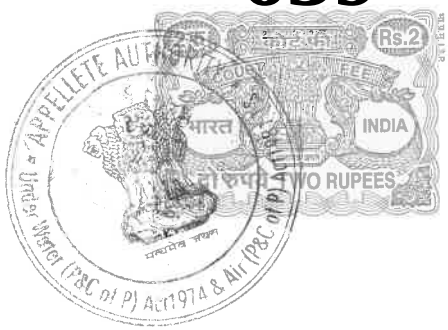
4. Therefore, at their request and as suggested we felt desirable to dispose of the appeal on merits hence the orders.

5. Few facts which are necessary for the purpose of disposal of this appeal are that this appeal is filed under Section 28 of the Water (Prevention and control of pollution) Act, 1974 read with Section 31 of Air (prevention and control of pollution) Act, 1981, aggrieved against the orders passed in order no 161/TSPCB/CFE/RRD/RO-RR-I/HO-2189, 9th march 2022 passed by respondent no 2. Herein, which was stated to have been received by appellant on 11th March, 2022, rejecting the application filed seeking for Consent for Establishment, purportedly in exercise of powers under Section 28 of the Water Act, (in short for Water (Prevention and Control of Pollution) Act, 1974) in short

for and under Section 31 of Air Act (in short for Air (Prevention and Control of Pollution)Act, 1981).

6. The case of the appellant is that they have established a stone crushing units in survey no 241/1 246/2 situated at vattinagulapally village, Gandipet mandal, Ranga Reddy District and they have complied all the formalities for establishing the industry. Since, it is an activity categorised as orange category unit by the Central Pollution Control Board and second respondent. According to the appellant the activity consists of predominantly recycling and reusing for crushing the excavated stone debris from the construction sites and at no point of time nor in any manner invokes the quarry or quarrying activity from the earth for running any such activity. Therefore, the appellant submits that they have made an application for consent for establishment of industry as per application dated 10.12.2021 and the same was rejected under the impugned orders dated 9th March, 2022 mainly on the ground that firstly, the industry falls within the prohibited limits under GO Ms. No. 111 dated 08.03.1996 and secondly, the activity amounts to quarrying from the earth.

7. That it further submitted that the appellant has been carrying on such recycling and reusing the excavated stone debris for last several years. However, on the earlier occasion the respondent no. 2 issued a closure order on 22.08.2019 on the ground that the activity is prohibited under GO Ms No.111 dated 08.03.1996. Therefore the appellant had filled earlier similar such application on 27.12.2019 for Consent for Establishment, whereupon, it was once again reiterated by respondent no. 2 by clarification dated 31.12.2019 that the restriction under GO Ms No 111 squarely applies. Hence the appellant submitted a fresh application again on 16.03.2020 for Consent for Establishment which was again rejected relying on the said GO Ms No 111 therefore, the appellant had to file a writ petition in the Hon'ble High Court of Telangana in WP No. 17554/2020 which was disposed off by orders dated 23.11.2021 directing 2nd respondent to consider and dispose off application a fresh. Hence appellant had filed fresh application for issuance of Consent for Establishment on 10.12.2021 which stood rejected under the impugned action. In



pursuance of the said application dated 10.12.2021 the respondent no. 2 called for a report from the concerned executive engineer who submitted report on 22.12.2021. Thereupon committee meant for on considering the applications for consents for establishment and operation held a virtual meeting on 31.12.2022 and after looking into said report dated 22.12.2021 directed the concerned executive engineer to submit and fresh detailed report, accordingly a fresh report was filled by executive engineer on 17.1.2022 and the aforesaid committee held a meeting on 19.02.2022. On a consideration of said report the impugned orders dated 09.03.2022 was passed. Hence the appeal.

8. The learned counsel for appellant Smt. G. Jhansi mainly submitted, apart from taking us through the entire record and chequered events that firstly, the respondent has issued the fresh policy decision in GO Ms No 69 dated 12.04.2022 withdrawing all the restrictions and reversing policy decision taken earlier in GO Ms No 111 dated 08.03.1996. Therefore, the main ground on which the impugned orders are passed with a grater and repeated stress on the GO Ms No 111 dated 08.03.1996 is no longer in force and would not come against the appellant is establishing industry and carrying out its activities. even other wise as per the orders of the Hon'ble High Court and EPCAP report, the Vattinagulapally doesnot form part of restricted area.

9. Secondly, the learned counsel for the appellant sought to stress on the nature of activities conducted by the appellant to the effect that it is only recycling and reusing of the excavated stored debris which is being carried on and there is no amount of or any element of quarrying activity much less any stone crushing on par with quarrying and therefore it would not fall within any restricted activity and this aspect has not been properly appreciated nor considered taking note of the distinctive features of the activity of quarrying and that of recycling and reusing.

10. Thirdly, Smt. G. Jhansi further submitted that having regard to the existence of and running industries of similar nature and similar activity mainly that off 1)GMR Stone

Crusher in Sy. No. 270 & 271 , 2)M/s. Sree Rama Engineering construction in Sy. No. 141/1 part &145/1 part, 3)M/s. Hyma developers Pvt, Ltd., in Sy. No. 239 24 248 249 & 250 of kokapet village and 4)M/s. Srinivas and Co., in Sy. No. 451/1 in pupallaguda village, there is clear arbitral action in denying the permission to the appellant whose activity in fact though does not amount to quarrying but only recycling hence it is hit by Article 14 of Constitution of India.

11. Sri P. Shiv Kumar the learned standing counsel appearing for respondent no. 2 which has filed a report reiterating the correctness of the impugned action submitted that on the first aspect, the appellant is not entitled to establish the industry and necessarily has to await for further guidelines to be issued by the respondent no. 1 as contemplated under GO Ms No 69 dated 12.04.2022 and therefore there is no force into the submission. Further on the second aspect, he submitted that there is no absolutely distinctive nature of activity and it is only and it also amounts to quarrying which is not permissible. Further the learned standing counsel sought to give us a detailed account as to how the matters and the complaints and the connected cases arose which were taken up by Hon'ble High Court and Hon'ble Supreme Court and also before the National Green Tribunal.

12. Sri. V. B. Subrahnanyam appearing for the respondent no. 3 who has been impleaded and on whose behalf detailed counter affidavit has been filed opposing claim of appellant submitted that having regard to nature of activity and earlier round of negation against the appellant himself he will not be entitled to any indulgence from this Authority.

13. Sri. Pannala Srinivas Learned counsel though stated that he is appearing for Crusher Owners Association of Telangana, however, no application has been filed to implead not any sort of pleading is submitted before this authority and yet he stenously opposed the claim of the appellant mainly stating that having regard to the events with have occurred earlier and the proceeding at different levels, almost all the quarrying units have already

been removed and shifted and no longer existing and therefore appellant cannot make any claim.

14. We have, perused the entire record including appeal grounds the set of papers filed by all the parties apart from the reports submitted before the second respondent and that off the counter affidavit filed by the respondent no. 3 and after considering the various submissions across the bar, the main points for determination which arise in this appeal are: 1) whether on the facts and circumstances respondent no. 2 is right in rejecting the application seeking for Consent for Establishment filed by the appellant in view of the GO Ms No.111 dated 08.03.1996; and 2) whether on the facts and circumstances the activity carried on by the appellant as alleged that of recycling and reusing the excavated stone debris amounts to or is on par with the activity of quarrying from the earth and 3) whether on the facts and circumstance the appellant is discriminated in rejecting the said application with the existing industries and which are still running as submitted above and as detailed in ground no. K and as such the same is violative the Article 14 of the Constitution of India.

Point 1: That apart from the assistance given by all the counsel who appeared in this case and especially on perusal of the earlier Go. Ms. No. 111 dated 08.03.1996 and also the later version in GO Ms No 69 dated 12.04.2022 it is seen that, amongst all the other objections individually or separately taken, the most prominent objection and reason which was given for the impugned action is a bare, sweeping and almost one line mention to the effect that there is a violation of GO. Ms. No. 111 MA, Municipal Administration and Urban Development (H) Department dated 08.03.1996 since, the industry of the appellant is located within the prohibited distance from full tank level of the Osman Sagar Lake. However, conspicuously and on the face of it, it does not refer as to how the industry effects or cause any pollution or environmental hazard. Since these matters are being taken up and argued by the both the sides, the Government of State of Telangana has issued a fresh policy pronouncement and decision in GO.Ms. No. 69 Municipal

Administration and Urban Development (Plg.I(1)) Department 12.04.2022, where under the aforesaid GO.Ms. No. 111 dated 08.03.1996 is totally varied with by removing all the restrictions imposed under the said GO.Ms. No. 111, subject to condition that the water quality of the reservoirs shall not be impacted in any manner what so ever and all efforts will be initiated by the Government to improve the water quality and also mentions the steps to be taken by the Government to prevent. In view of the latest policy decision dated 12.04.2022, the earlier decision or the bar or the restrictions under GO.Ms. No. 111 no longer remain inforce. These are the policy decisions of the government under the residuary powers under the constitution. It is not any legislative Act or rules made there under.

a. The Government has taken measures, in GO.Ms. No. 111 with certain restrictions mainly keeping the industries or any activity beyond and outside certain limits of distance, with a view to keep the source for the drinking water to the twin cities does not get polluted. In view of the substantive change of scenario, it follows that necessarily whatever the legal statutory position existing all along either before GO. Ms. No. 111 or subsequent to GO.Ms. 69, regarding the non-compliance of the requirements amounting to violation of the mandate under any of the statutory provisions concerning the environmental laws, like Air Act or Water Act or other environmental legislations or any other law concerning there to, remain inforce and continue to operate. Mere distance bar is not a sole criteria, but it has to be a concern regarding environment or pollution or human hazard, which to be looked into and if so, whether any remedial measures are taken. Now, the distance bar is taken away. It is relevant to bear that every citizen is entitled to do or carry on the business or industries or any activity, subject to above. All those requirements have to be complied with without committing any prohibited act or violation there under. Even otherwise, this in fact constitutes the primary concern and consideration for any authority before any action is taken in any manner. In view of the either of the each case and situation has to be considered afresh and the

authorities after applying their mind to the provisions of the concerned legislations and giving valid reasons after a due enquiry and putting the concerned prior notice and opportunity. It is needless to mention that the environmental loss do not intend to prohibit doing or carrying on any business industry or activity, except to the extent of compliance of the requirements under those laws and keeping in view that no such activity cause or effect any interdiction or hazard to the environment by way of pollution or otherwise or effect the human beings or any other living beings. The compliance of the environmental laws should be the prime concern and consideration by any activity and the authorities should have proper attention to course or effect to creating environmental hazards, pollution etc. A clear distinction should be drawn between those causes, if curable or non-curable due to any activity by taking resource to all such remedial measures. An opportunity should be given to mend or make provision for taking steps for those curable aspects. It is needless to say that if any cause falls within a non-curable and has wider effect on the environment or causing any health hazard etc., the question of allowing such activity or continuing the same is wholly impermissible and will be illegally and amounts to serious violation of mandate under the law.

That in view of the aforesaid reasons and the topsy-turvy situation arising at the level of state res no 1 state Government in completely over hauling the policy and especially on perusal of the impugned order which runs into 17 pages wherein there is repeated stress on the lines on the said GO. Ms. No. 111 dated08.03.1996 more so like on the pages 3,5,8,9,13,14, and 17 and ultimately forming almost the sole ground of rejection of the application, we are of the view that the impugned action is no longer sustainable and can not be upheld and such the impugned orders dated 09.03.2022 are liable needs to be set aside.

Points 2 and 3: that having held in the negative on the point no 1, the aspects regarding the consideration on the other two points 2 and 3, necessarily involves to go in to the merits on either side. Though on the point no. 2 a distinction was drawn by the appellant

between activity of recycling and reusing excavated stone debris and not that of the quarrying from earth, however, we have perused the entire impugned order running into 16 pages and also having seen the contents of the reports of the concerned executive engineer of respondent 2 dated 13.1.2022 or the earlier one 22.12.2021, there is no proper consideration or appreciation in factually on the side whether both acts are one and the same and the activity carried on by the appellant also amounts to quarrying and further there is no finding either way nor any reason are given as to consequential and resultant effect of causing any in roads into or interdiction with the environment and causing the pollution apart, from the effect there of on any living being, which in-fact should fall main concern for authorities concerned to look into. Therefore these all aspects necessarily have to be considered, appreciated with a re-look and there has to be comprehensive re-enquiry with opportunity to the appellant and all other persons interested. It is only thereafter, the sustainability of the claim for consent will weigh or out-weigh the such legal formalities. Hence this requires a fresh enquiry. Apart from these, there is no serious denial on the part of the respondent or other counsel about existence of those units as referred to above and still continue to run and operate on the site and therefore, there is no justification to make any distinction or denial the similar activity at the instance of the appellant. During the course of argument it as agreed by all counsel on respondent side and who are contesting claim of appellant that the appellant is in fact carrying our activity all along, till the impugned orders are passed. Further we are of the view that whether the activity of appellant is mere recycling and reusing and no amounting to quarrying from earth can be appreciated only if the industry runs and is allowed to run. it is only in such running condition, the nature of activity can be ascertained and if causing any effect into pollution, and environmental hazards taking place. Therefore we are of the view that especially in view of the substantial change in the policy of government and distance bar no longer remaining at operation, the matter has to be reconsidered by respondent no. 2 after following due procedure as contemplated under the law. Accordingly, the respondent No. 3 or any other person in interest is at

liberty to participate all such enquiries and raise any objection which also may be considered by authorities while disposing of application.

15. In view of aforesaid reasons and finding on three point the appeal is allowed and matter is remitted back to the respondent no. 2 for fresh consideration and disposal on merits after holding due and regular enquiry as contemplated under the law by providing opportunity to appellant to make his submission and to substantiate his case and further objections if any coming forth shall be considered after giving notice to any such objectors. To enable the proper appreciation and consideration of the aspects as mentioned above the appellant is permitted to carry out and run the activity in the industry and is at liberty to substantiate his case and further comply with all such directions for any remedial measures if any given or pointed out by the Authorities. No costs.

Sd/-
Justice B. Prakash Rao
Chairman

Sd/-
Prof. Dr. Jayathirtha Rao
Member

BY ORDER

M. Rajesh 12/5/22.

ASST. LAW OFFICER / IN-CHARGE

Copy to:

1. M/s. Aadeshwar Aggregates Pvt Ltd.,
2. The Principal Secretary, EFS&T Department, Secretariat
3. The Member Secretary, T.S. Pollution Control Board, Sanathnagar, Hyderabad
4. Mr. P. V. Subramanyam Varma, H. No. 8-3-762/1/A, Flat No. 3, Sai Sri Maruthi Apartments, Jaya Prakash Nagar, Behind RBI Quarters, Sri Nagar Colony, Khairthabad, Hyderabad.

ANNEXURE – XXXVIII

IN THE HIGH COURT FOR THE STATE OF TELANGANA AT HYDERABAD

W.P.No.21582/2022

Between:

Agni Agritech Private Limited, Hyderabad
Rep;by its Authorised Representative
G.M. Subhani & 3 others. ..Petitioners

And

State of Telangana
Represented by its Chief Secretary,
Secretariat, Hyderabad and 2 others ..Respondents

COUNTER AFFIDAVIT FILED BY THE SPECIAL CHIEF SECRETARY TO GOVERNMENT, MA&UD DEPARTMENT, (RESPONDENT NO.2)

I, Arvind Kumar, S/o Ashoka Kumar, aged about 55 years, Designation: Special Chief Secretary to Government, Municipal Administration and Urban Development Department, Government of Telangana, Hyderabad do hereby solemnly and sincerely affirm and state on oath as follows:

2. I am the Special Chief Secretary to Government, Municipal Administration and Urban Development Department, Government of Telangana, Hyderabad, the deponent herein and as such I am well acquainted with the facts of the case. I am filing this counter affidavit on behalf of Respondent Nos. 1, 2 & 3

3. It is submitted that Government vide G.O.Ms.No.111 MA dated 08.03.1996 have issued orders with regard to the protection of catchment areas of Himayatsagar and Osmansagar lakes. The main features of the said orders are as follows:

a) Prohibit polluting industries, major hotels, residential colonies or other establishments that generate pollution in the catchment of the lakes upto 10kms from full tank level of the lakes in the 84 villages listed (Annexure) to the said order.

Section Officer
M.A. & U.D. Department
Telangana Secretariat, Hyd

Special Chief Secretary to Government
Municipal Administration and Urban
Development Department
Telangana Secretariat, Hyderabad.

b) In the said orders, it is also mentioned that residential developments in the residential use zone may be permitted with certain parameters.

4. It is submitted that, Vattinagulapally village is one of the 84 villages located within 10 kms catchment area on the northern side of the Himayatsagar and Osmansagar lakes as indicated in the G.O.Ms.No.111 MA, dated 08.03.1996.

5. It is submitted that Government have received representations from various individuals with a request to exclude the areas located in Vattinagulapally Village which are not falling in catchment area water shed of Osmansagar lake from the purview of G.O.Ms.No.111 MA dated 08.03.1996. The erstwhile Government of Andhra Pradesh has referred the matter to Environment Protection Training and Research Institute (EPTRI) and requested to delineate the catchment area in Vattinagulapally village. Accordingly EPTRI has conducted an exhaustive hydrological and topographical study and submitted that there is a well defined ridge line (i.e., hill range) running through the Vattinagulapally village which divides the village into two distinct zones and EPTRI demarcated the land into catchment and non-catchment areas. As per EPTRI report the following Survey Numbers of Vattinagulapally village falls in non-catchment area that drains into Musi River i.e., downstream of Osman Sagar Reservoir.

Village Name	Survey Numbers falling in Non-catchment area
Vattinagulapally	173,178 to 214, 216 to 260 and 512

6. It is further submitted that this Hon'ble Court had an occasion to consider subject matter relating to G.O.Ms.No.111 dated 08.03.1996 in Writ Petition No.9386 of 2007 and batch and passed the order on 26.08.2021 and the operative portion of the order reads as under:

"(i) The High Powered Committee shall submit a Report to the State Government within four weeks reckoned from 13.08.2021, the date on

Section Officer
M.A. & U.D. Department
Telangana Secretariat, Hyd

Special Chief Secretary to Government
Municipal Administration and Urban
Development Department
Telangana Secretariat, Hyderabad.

which such a request was made before this court through an affidavit filed in this regard by the Principal Secretary to Government, Municipal Administration and Urban Development Department.

(ii) While submitting the said Report, the High Powered Committee shall specifically deal with the second Report submitted by the EPTRI In May, 2006 and give its findings thereon, specifically in the context of excluding the non-catchment area, from G.O.Ms.No.111 dated 08.03.1996, AS delineated by the EPTRI and forming a part of Vattinagulapally Village.

(iii) The Report of the High Powered Committee shall be uploaded on the website of the Municipal Administration and Urban Development Department contemporaneous to being submitted to the State Government.

(iv) The State Government shall examine the said Report, particularly the aspect of exclusion of the non-catchment area, as declared by the EPTRI in Table 1 of its second Report of May, 2006 and take a decision thereon by the end of September, 2021 which shall also be uploaded on the website of the Municipal Administration and Urban Development Department within two days.

(v) The Chairperson of the High powered Committee shall file an affidavit within one week from today undertaking inter alia to abide by the conditions and the timelines recorded hereinabove.

(vi) In the event the Report is not submitted by the High Powered Committee within the timeline as recorded above, no further extension shall be given and the Committee shall stand automatically disbanded on 12.09.2021. In that eventuality, those parties who claim that their land is covered in the parcels enumerated in Table I of the EPTRI Report of May, 2006, shall be entitled to approach the court for appropriate relief."

7. It is submitted that in compliance with the above order the High Power Committee has submitted Report to the Government.

8. Further, it is submitted that recently Council of Ministers, Government of Telangana have decided to remove the restrictions imposed in the 84 Villages covered by G.O.Ms.No. 111, Dt.08.03.1996. Accordingly,

Section Officer
M.A. & U.D. Department
Telangana Secretariat, Hyd

Special Chief Secretary to Government
Municipal Administration and Urban
Development Department
Telangana Secretariat, Hyderabad.

Government have issued orders in G.O.Ms.No.69, MA Dated:12.04.2022 removing the restrictions imposed under para 3 of said G.O.Ms.No.111 Dt.8.3.1996, subject to condition that the water quality of these two reservoirs shall not be impacted any manner, whatsoever and all efforts will be initiated by the Government to improve the water quality of these two reservoirs.

9. Further it is submitted that in order to frame guidelines and detailed regulations, a Committee headed by Chief Secretary and Special Chief Secretary (MA&UD), Special Chief Secretary (Finance), Special Chief Secretary (I&CAD), Managing Director (HMWS&SB), Member Secretary (TSPCB) & Director (Plng) HMDA has been constituted.

In view of the above it is prayed that this Hon'ble Court may be pleased to pass such order or orders as deemed fit and proper in the circumstances of the case.

Deponent
Special Chief Secretary to Government
Municipal Administration and Urban
Development Department
Telangana Secretariat, Hyderabad.

Sworn and signed before me on this
27th day of April 2022 at Hyderabad.

Before me

Section Officer
M.A. & U.D. Department
Telangana Secretariat, Hyd
Attestor

VERIFICATION STATEMENT

I, Arvind Kumar, S/o Ashoka Kumar, aged about 55 years, Designation: Special Chief Secretary to Government, Municipal Administration and Urban Development Department, Government of Telangana, Hyderabad the deponent do hereby verify and state that the contents in the Counter Affidavit are based on records and on legal advice and believed to be true and correct.

Verified at Hyderabad on this the 27th day of April 2022.

Deponent
Special Chief Secretary to Government
Municipal Administration and Urban
Development Department
Telangana Secretariat, Hyderabad.

Counsel for Respondents

ANNEXURE – XXXIX

HIGH COURT FOR THE STATE OF TELANGANA
AT HYDERABAD
(Special Original Jurisdiction)

THURSDAY, THE TWENTY EIGHTH DAY OF APRIL
TWO THOUSAND AND TWENTY TWO

PRESENT

THE HON'BLE THE CHIEF JUSTICE SATISH CHANDRA SHARMA
AND
THE HON'BLE SRI JUSTICE ABHINAND KUMAR SHAVILI

WRIT PETITION NO: 21801, 21582 AND 21818 OF 2022
AND
I.A.NO.3 OF 2022 IN W.P.NO.21582 OF 2022

WP NO.21801 OF 2022:

Between:

1. M. Anuradha, W/o M. Subba Raju, Age- 62 years, Occ- Housewife, Villa No. 24, Private 28, Kokapet SEZ Main Road, Near Zresta Goldfish Villas. Kokapet, Rangareddy District, Hyderabad - 500 075
2. K. Radhika, W/o K. Srinivasa Rao Age- 52 years, Occ- Business, R/o Plot No. 664, Road No. 33, Near MCRHRD Road, Jubilee Hills, Shaikpet, Hyderabad
3. K. Amulya, D/o K. Srinivas Rao Age- 25 years, Occ- Student, R/o Plot No. 664, Road No. 33, Near MCRHRD, Road, Jubilee Hills, Shaikpet, Hyderabad
4. S. Sridevi, W/o Krishna Age- 51 years, Occ- Housewife, R/o 11, Pace Spartan TNRHB Extn, Mogappair East, Mogappair, Ambattur, Tiruvallur, Tamil Nadu - 600 037
5. K. Hemalatha, W/o Late Keshava Rao, Age- 85 years, Occ- Housewife, R/o Flat No. 205. Sai Kiran Deluxe Apartments, Sri Nagar Colony, Hyderabad - 500 073

...PETITIONERS

AND

1. State of Telangana, Rep. by its Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
2. State of Telangana, Department of Municipal Administration and Urban Development Rep. by its Special Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
3. Hyderabad Metropolitan Development Authority (HMDA, Rep. by its Metropolitan Commissioner Swarna Jayanti Complex, Sanjeeva Reddy Nagar, Srinivasa Nagar, Ameerpet, Hyderabad - 500038

...RESPONDENTS

Petition under Article 226 of the Constitution of India praying that in the circumstances stated in the affidavit filed therewith, the High Court may be pleased to issue an appropriate Writ, Direction or Order, particularly one in the nature of Mandamus

a.To declare that the application of G.O. Ms.No. 69 dated 12/04/2022 to the lands of the Petitioners which fall outside the catchment area of Osmansagar and Himayatsagar lakes is illegal and arbitrary and consequently

b.To declare that the Petitioners land be subject to the same developmental regulations as the adjoining lands (i.e. Kokapet SEZ, Financial District and Neopolis)

IA NO: 1 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased To direct the Respondents to produce all records pertaining to the delineation of non-catchment area inVattinagulapally village

IA NO: 2 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased To direct that the proposed rules and regulatory measures under G.O. Ms.No.69 dated 12/04/2022 will not be applicable to the Petitioners' lands pending disposal of this Petition

Counsel for the Petitioners: SMT. SHRAVYA REDDY PATLLOLA

Counsel for Respondent No. 1: THE ADVOCATE GENERAL FOR GP FOR GENERAL ADMINISTRATION

Counsel for Respondent No. 2: THE ADVOCATE GENERAL FOR GP FOR MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT

Counsel for Respondent No. 3: THE ADVOCATE GENERAL FOR SRI Y. RAMA RAO, SC FOR HMDA

WPNO: 21582 OF 2022

Between:

1. Agni Agritech Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by Authorised Representative G.M.Subhani
2. Nimbha Biotech Pvt. Ltd., Having its registered office at Building No.3, Plot No.18, iLabs Centre , Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by its Authorised Representative M. Gopala Chakravarthi
3. Scorpio Bio Solutions Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad,

Telangana - 500 081 Rep. by its Authorised Representative M. N. S. S. N. Raju

4. Skanda Aerospace Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by its Authorised Representative G. M. Subhani

...PETITIONERS

AND

1. State of Telangana, Rep. by its Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
2. State of Telangana, Department of Municipal Administration and Urban Development Rep. by its Special Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
3. Hyderabad Metropolitan Development Authority (HMDA, Rep. by its Metropolitan Commissioner Swarna Jayanti Complex, Sanjeeva Reddy Nagar, Srinivasa Nagar, Ameerpet, Hyderabad – 500038
4. T. Pradeep Kumar Reddy S/o. Sidiram Reddy, Occ: Advocate, R/o.Sravanthi Nagar, Varsbakari Lane, Banjara Hills, Hyderabad.

(Respondent No. 4 is impleaded as per Court Order dated 28.04.2022 vide I.A.No.3 of 2022 in W.P.No.21582 of 2022)

...RESPONDENTS

Petition under Article 226 of the Constitution of India praying that in the circumstances stated in the affidavit filed therewith, the High Court may be pleased to issue an appropriate Writ, Direction or Order, particularly one in the nature of Mandamus.

a.To declare that the application of G.O. Ms.No. 69 dated 12.04.2022 to the lands of the Petitioners which fall outside the catchment area of Osmansagar and Himayatsagar lakes is illegal and arbitrary and consequently

b.To declare that the Petitioners land be subject to the same developmental regulations as the adjoining lands (i.e. Kokapet SEZ, Financial District and Neopolis)

IA NO: 1 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to direct the Respondents to produce all records pertaining to the delineation of non-catchment area in Vattinagulapaily village

IA NO: 2 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to direct that the proposed rules and regulatory measures under G.O. Ms.No.69

dated 12.04.2022 will not be applicable to the Petitioners' lands, pending disposal of this Petition

IA NO: 3 OF 2022:

Between:

T. Pradeep Kumar Reddy S/o. Sidiram Reddy, Occ: Advocate, R/o.Sravanthi Nagar, Varsbakari Lane, Banjara Hills, Hyderabad.

....IMPLEAD PETITIONER/PROPOSED RESPONDENT No. 4

AND

1. Agni Agritech Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by Authorised Representative G.M.Subhani
2. Nimbha Biotech Pvt. Ltd., Having its registered office at Building No.3, Plot No.18, iLabs Centre , Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by its Authorised Representative M. Gopala Chakravarthi
3. Scorpio Bio Solutions Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by its Authorised Representative M. N. S. S. N. Raju
4. Skanda Aerospace Pvt. Ltd, Having its registered office at Building No.3, Plot No.18, iLabs Centre, Software Units Layout, Madhapur, Hyderabad, Telangana - 500 081 Rep. by its Authorised Representative G. M. Subhani

...RESPONDENTS/WRIT PETITIONERS

5. State of Telangana, Rep. by its Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
6. State of Telangana, Department of Municipal Administration and Urban Development Rep. by its Special Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
7. Hyderabad Metropolitan Development Authority (HMDA, Rep. by its Metropolitan Commissioner Swarna Jayanti Complex, Sanjeeva Reddy Nagar, Srinivasa Nagar, Ameerpet, Hyderabad – 500038

...RESPONDENTS/RESPONDENTS

Petition under Section 16-A of Writ Rules praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased implead the proposed Respondent as Respondents No.4 in the present W.P.No.21582 of 2022 as well as in the I.A.'s in the Writ Petition for proper adjudication of the case in the interest of justice

Counsel for the Petitioners: SRI MANOJ REDDY KESHI REDDY

Counsel for Respondent No. 1: THE ADVOCATE GENERAL FOR GP FOR GENERAL ADMINISTRATION

Counsel for Respondent No. 2: THE ADVOCATE GENERAL FOR GP FOR MUNICIPAL ADMINISTRATION &

URBAN DEVELOPMENT

Counsel for Respondent No. 3: THE ADVOCATE GENERAL FOR SRI Y. RAMA RAO, SC FOR HMDA

Counsel for Respondent No. 4: SRI CHIKKUDU PRABHAKAR

WP NO: 21818 OF 2022

Between:

1. K. Suryanarayana, S/o Late Pulliah Age. 90 years, Occ. Business, R/o 8-2-293/82/A-1219, Road No.36, Near ICICI Bank, Jubilee Hills, Hyderabad - 500 033
2. K. Amulya, D/o K. Srinivas Rao Age. 25 years, Occ. Student, R/o Plot No. 664, Road No. 33, Near MCRHRD Road, Jubilee Hills, Shaikpet, Hyderabad
3. K. Hemalatha, W/o Late Keshava Rao, Age. 85 years, Occ. Housewife, R/o Flat No. 205, Sai Kiran Deluxe Apartments, Sri Nagar Colony, Hyderabad - 500 073
4. S. Sridevi, W/o Krishna Age. 51 years, Occ. Housewife, R/o Fl, Pace Spartan TNRHB Extn, Mogappair East, Mogappair, Ambattur, Tiruvallur, Tamil Nadu-600 037
5. K. Radhika, W/o K. Srinivasa Rao Age. 52 years, Occ. Business, R/o Plot No. 664, Road No. 33, Near MCRHRD, Road, Jubilee Hills, Shaikpet, Hyderabad
6. K. Srinivas Rao, S/o K. Surayanarayana Age. 57 years, Occ. Business, R/o Plot No. 664, Road No. 33, Near MCRHRD Road, Jubilee Hills, Shaikpet, Hyderabad
7. K. Aishwarya, D/o K. Srinivas Rao Age. 30, Occ. Housewife, R/o Plot No. 664, Road No. 33, Near MCHRD Road, Jubilee Hills, Shaikpet, Hyderabad - 500 033
8. M. Anuradha, W/o M. Subba Raju, Age. 62 years, Occ. Housewife, R/o Villa No. 24, Private 28, Kokapet SEZ Main Road, Near Zresta Goldfish Villas, Kokapet, Rangareddy District, Hyderabad - 500 075

...PETITIONERS

AND

1. State of Telangana, Rep. by its Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
2. State of Telangana, Department of Municipal Administration and Urban Development Rep. by its Special Chief Secretary Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
3. Hyderabad Metropolitan Development Authority HMDA, Rep. by its Metropolitan Commissioner Swarna Jayanti Complex, Sanjeeva Reddy Nagar, Srinivasa Nagar, Ameerpet, Hyderabad - 500038

...RESPONDENTS

Petition under Article 226 of the Constitution of India praying that in the circumstances stated in the affidavit filed therewith, the High Court may be pleased to issue an appropriate Writ, Direction or Order, particularly one in the nature of Mandamus

a. To declare that the application of G.O. Ms.No. 69 dated 12.04.2022 to the lands of the Petitioners which fall outside the catchment area of Osmansagar and Himayatsagar lakes as illegal and arbitrary and consequently

b. To declare that the Petitioners land be subject to the same developmental regulations as the adjoining lands (i.e. Kokapet SEZ, Financial District and Neopolis)

IA NO: 1 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to direct that the proposed rules and regulatory measures under G.O. Ms.No.69 dated 12.04.2022 will not be applicable to the Petitioners' lands pending disposal of this Petition

IA NO: 2 OF 2022

Petition under Section 151 CPC praying that in the circumstances stated in the affidavit filed in support of the petition, the High Court may be pleased to direct the Respondents to produce all records pertaining to the delineation of non-catchment area in Vattinagulapally village pending the disposal of the writ petition

Counsel for the Petitioner: SRI G. BHEEMA CHARY

Counsel for Respondent No. 1: THE ADVOCATE GENERAL FOR
GP FOR GENERAL ADMINISTRATION

Counsel for Respondent No. 2: THE ADVOCATE GENERAL FOR
GP FOR MUNICIPAL ADMINISTRATION &
URBAN DEVELOPMENT

Counsel for Respondent No. 3: THE ADVOCATE GENERAL FOR
SRI Y. RAMA RAO, SC FOR HMDA

The Court made the following: COMMON ORDER

THE HON'BLE THE CHIEF JUSTICE SATISH CHANDRA SHARMA
AND
THE HON'BLE SRI JUSTICE ABHINAND KUMAR SHAVILI

WRIT PETITION Nos.21801, 21582 and 21818 OF 2022
and I.A.No.3 of 2022 in W.P.No.21582 of 2022

COMMON ORDER: *(Per the Hon'ble the Chief Justice Satish Chandra Sharma)*

1. Regard being had to the similitude in the controversy involved in the present cases, the writ petitions were analogously heard and by a common order, they are being disposed of by this Court.

2. The facts of W.P.No.21801 of 2022 are as follows:-

The petitioners before this Court have filed the present writ petition stating that they are the owners of lands in survey Nos.173, 192, 193, 225-228, 230-233, 240 and 243 in Vattinagulapally Village, Rajendranagar Mandal, Ranga Reddy Distrcit.

3. The petitioners have stated that the Government of Andhra Pradesh has issued G.O.Ms.No.111, M.A., dated 08.03.1996 (hereinafter referred to as 'G.O.Ms.No.111') for the protection of catchment area of Himayatsagar and Osmansagar lakes in Hyderabad to ensure that the

rainwater flows into the lakes. G.O.Ms.No.111 prohibits establishments in the catchment area of the lakes upto 10 kilometers from the Full Tank Level (FTL). The petitioners have further stated that instead of identifying the precise contours of the catchment area of the two lakes, the Government had prepared a list of 84 villages falling within 10 kilometers and declared that G.O.Ms.No.111 would apply to all 84 villages in their entirety. The Government did not make any attempt to demarcate the catchment area in each village and in those circumstances, even the area which was not the catchment area and it was part of those 84 villages became the subject matter of the restrictions imposed on account of G.O.Ms.No.111. The petitioners have further stated that Vattinagulapally Village is situated on the northern side of Osmansagar and Himayatsagar and is one of the 84 villages identified by the Government in G.O.Ms.No.111 and it has got a unique geography and drainage pattern as compared to other villages in G.O.Ms.No.111. It has been further stated that a prominent ridge is subdividing the area of Vattinagulapally Village and the water on the western side of the ridge flows into

Osmansagar lake, whereas the water on the eastern side of the ridge flows into an existing storm water drain and thereafter into the Musi river downstream of Osmansagar lake. It has been further stated that the storm water drain does not form part of the catchment area of either Osmansagar or Himayatsagar lake.

4. The petitioners have further stated that in the close proximity to petitioners' land, the Government has allowed commercial development on three sides of petitioners' land and the Government has allowed the commercial development in the surrounding areas on the premise that the storm water from these development does not flow into Osmansagar or the Himayatsagar lake, but rather flows into a storm water drain which in turn joins the Musi river downstream of Osmansagar and Himayatsagar lakes. The petitioners have given details of certain development activities/commercial development carried out on three sides of the petitioners' land and they are as under:-

No.	Location (from Petitioners Property)	Nature of Development	Distance from Osmansagar Lake (FTL)
i	South Western	Neopolis (State Government	500 metres to 1 km

		developed and allotted plots for commercial and residential development. Construction of buildings of more than 20 floors is ongoing)	
ii	Southern Side	Kokapet SEZ (State Government development and allotted property to various entities for commercial and residential development with more than 20 floors)	700 metres to 3 kms
iii	Southern Side	Outer Ring Road (8-Lane Expressway constructed by the HMDA)	1.5 kms
iv	South Eastern	Puppalaguda Land – (State Government is auctioning the property for commercial development)	3.5 kms
v	Northern Side	Government Allotted Land for Commercial Development (Q City with over 10 floor building for commercial development)	4 kms
vi	North Eastern Side	Proposed Consulate of USA (Land Allotted by Government)	4 kms
vii	Eastern Side	Financial District (State Government developed and allotted to leading companies which have constructed commercial and residential with more than 20 floors)	4.5 kms

5. The petitioners have given large number of examples of adjoining lands, which are close to the petitioners' land, where commercial activities are going on. The petitioners have further stated that even the buildings having more than twenty floors have been constructed on the adjoining land or on the land which is in close proximity of the petitioners' land. The petitioners further stated that other land owners in non-catchment area also made several representations to the Government to exclude the areas in Vattinagulapally Village which do not form part of

catchment area of Osmansagar and Himayatsagar lakes from the purview of G.O.Ms.No.111 and a Committee was constituted vide G.O.Ms.No.149, M.A, dated 28.03.2006 to determine the extent of land in Vattinagulapally Village which falls outside the catchment area of two lakes and identify the survey numbers of the same. The Committee was comprising of the following members:-

> "1. Special Chief Secretary to Government of A.P., Department of Revenue (Sri V.P.Jasuhari, I.A.S.,)
>
> 2. Principal Secretary to Government of A.P., Department of Environment, Forests, Science and Technology (Sri T.Chatterjee, I.A.S.,)
>
> 3. Secretary to Government of A.P., Department of Municipal Administration and Urban Development (Sri S.P.Singh, I.A.S.,)
>
> 4. Member Secretary, Andhra Pradesh Pollution Control Board (APPCB) (Sri Rajeswar Tiwari, I.A.S.,)
>
> 5. Managing Director, Hyderabad Metropolitan Water Suply and Sewerage Board (Sri Jawahar Reddy, I.A.S.,)"

6. The petitioners have further stated that the said Committee decided to engage an expert body on the subject, i.e., the Environmental Protection Training and Research Institute (EPTRI), which is an autonomous institution set

upon in 1992 by the Government of Andhra Pradesh and the Government of India. The Committee has submitted various reports on environmental issues including the protection of Hussain Sagar lake and pollution control in Hyderabad. The report of the said Committee has been looked into and reference of cases in Ramakrishna Rao v. Principal Secretary to Government of A.P., [2001 (5) ALD 299 (DB)] and D.Achyutanand v. Union of India [2004 SCC Online AP 1445 (DB)] has been furnished by the petitioners. The petitioners have further stated that the Committee constituted vide G.O.Ms.No.149, M.A., dated 28.03.2006 formulated the terms of reference, which was referred to EPTRI and is reproduced as under:-

> "To delineate the watershed of the catchment area of Osman Sagar Lake covering Vattinagulapalli Village administrative area and assess the area outside the Catchment area."

7. The EPTRI conducted exhaustive hydrological and topographical survey, examined Government maps, topographical maps, drainage maps and satellite data of the village area and finally submitted a Report on 31.05.2006. It

has been further stated that the Report of the Committee was accepted. Meaning thereby, it has been stated that the demarcation done by the EPTRI was accepted and the petitioners' land is not part of catchment area as per the EPTRI Committee Report. The petitioners have further stated that a writ petition, i.e., W.P.No.9386 of 2007 was also filed in respect of protection of catchment area around Osmansagar and Himayatsagar lakes keeping in view the provisions of G.O.Ms.No.111 and various orders were passed from time to time. It has been further stated that on 07.04.2010, based upon the EPTRI Report, the Government had filed I.A., in W.P.No.9386 of 2007 for exclusion of land parcels identified by the EPTRI in respect of Vattinagulapally Village from the catchment area of Osmansagar and Himayatsagar lakes and after filing of the said I.A., the Government has not taken any steps to exclude the non-catchment area. The petitioners kept on representing in the matter and another application i.e., I.A.No.1 of 2017 in W.P.No.9386 of 2007 was filed and this Court was informed that a High Powered Committee (HPC) has been constituted to look into various aspects of

G.O.Ms.No.111. The High Powered Committee has been constituted on account of order, dated 19.12.2018 passed by the National Green Tribunal in O.A.No.531 of 2018 and all construction activities in respect of area in G.O.Ms.No.111 was barred till HPC submits its Report. The petitioners have further stated that finally this Court on 26.08.2021 has passed a detailed and exhaustive order in W.P.Nos.9386 and 18896 of 2007 and W.P. (PIL) No.64 of 2021 and the same is reproduced as under:-

"I.A.No.1 of 2010 (WPMP.No.10152 of 2010)
&
I.A.No.1 of 2017 (WPMP.No.15507 of 2017)
IN
W.P.No.9386 of 2007

1. This order is in continuation of the order passed yesterday wherein, it was pointed out to Mr. J. Ramachandra Rao, learned Additional Advocate General that the five terms of reference, subject matter of G.O.Ms.No.839 dated 07.12.2016 whereunder the High Powered Committee was constituted to submit its Report within 45 days, did not cover the terms of reference drawn by the Municipal Administration and Urban Development Department, State Government that had commissioned EPTRI to conduct a survey "*to delineate the watershed of the catchment area of Osmansagar Lake covering Vattinagulapally Village Administrative Area and assess the area outside the catchment area*"

2. We may note that the Report submitted by the EPTRI in May, 2006 states in clear terms that "*Based on the representations received by the Government to relax the restrictions imposed in G.O.Ms.No.111 of M.A 1996 with regard to areas which is not Catchment area Watershed of Osman Sagar Lake, the Government desired EPTRI to examine "the extent of administrative area of Vattinagulapally Village, Ranga Reddy district which falls outside the watershed after delineating the watershed boundary*" ". The findings recorded in the Report have been encapsulated in para 2.6 in the following words:-

2.6. Project Findings

The drainage pattern in the study area, Vattinagulapalli village administrative area with land parcel information and topographic profile of the study are now in GIS layer form. Keeping the direction of the flow, topography, the watershed boundary is now delineated. The delineated watershed boundary is presented in figure 9.

The land parcel boundaries are now overlayed on the topographic features and as well on delineated watershed boundary. A small hill range is subdividing the drainage area in the study area wherein the southern flows are joining Osman Sagar Lake and Northern flows are draining into Nakka Vagu catchment and drainage after the hill range is draining down in to Musi River i.e., down stream of Osman Sagar Lake. The delineated watershed boundary with land parcel information is presented in figure 10.

The satellite data as captured by Quick Bird Satellite and presented by Google Earth agency on web covering Vattinagulapalli village area is presented in figure 11. As

seen from the image, mining activity is taking place this small hill range. This has greater impact on the drainage pattern in the study area. Any damage to this ridge will facilitate the movement of surface flows into the Osman Sagar Lake which results into environmental impact on the water quality of the lack. This ridge area has to be protected.

From the above overlay analysis, it is found that the following land parcels listed in table 1 (other than the ridge area) in Vattinagulaplli village falls in the drainage area that drains into Musi river i.e., down stream of Osman Sagar Lake and same is presented in figure 12.

Table 1

PARCEL NO	PARCEL NO	PARCEL NO
173	205	233
178	206	234
179	207	235
180	208	236
181	209	237
182	209	238
183	210	239
184	211	240
185	212	241
186	213	242
187	213	243
188	214	244
189	216	245
190	217	246
191	218	247
192	219	248
193	220	249
194	221	250
195	222	251
196	223	252
197	224	253
198	225	254
198	226	255
199	227	256
200	228	257
201	229	258
202	230	259
203	231	260
204	232	512

3. It is apparent from a reading of the Report of the EPTRI that all the 87 parcels of land mentioned in Table 1 above and highlighted in a map mentioned at figure 12, are a part of the non-catchment area and qualify for being declared as falling outside the watershed boundary.

4. As noted in our earlier orders, by virtue of G.O.Ms.No.839 dated 07.12.2016, issued by the Municipal Administration and Urban Development Department, a High Powered Committee was constituted to examine G.O.Ms.No.111 dated 08.03.1996 with five specific terms of reference assigned. Strictly speaking, none of the five terms of reference deal with the singular terms of reference submitted by the very same Department to the EPTRI for a Report, which was limited to delineating the watershed of the catchment area of Osman Sagar Lake covering Vattinagulapally Village Administrative Area and assessing the area outside the catchment area.

5. Be that as it may, as learned Additional Advocate General has repeatedly been stating that though there is no plausible explanation available for the inaction on the part of the High Powered Committee in submitting a Report over the past four years and seven months, in accordance with the terms of reference and though the State Government has for reasons best known to it, given an open-ended mandate to the High Powered Committee to continue functioning without fixing any cut off date, if the Committee and the Government are granted a reasonable time, a Report shall be submitted to the State Government within four weeks, it is directed as follows:-

(i) The High Powered Committee shall submit a Report to the State Government within four weeks

reckoned from 13.08.2021, the date on which such a request was made before this court through an affidavit filed in this regard by the Principal Secretary to Government, Municipal Administration and Urban Development Department.

(ii) While submitting the said Report, the High Powered Committee shall specifically deal with the second Report submitted by the EPTRI in May, 2006 and give its findings thereon, specifically in the context of excluding the non-catchment area, from G.O.Ms.No.111 dated 08.03.1996, as delineated by the EPTRI and forming a part of Vattinagulapally Village.

(iii) The Report of the High Powered Committee shall be uploaded on the website of the Municipal Administration and Urban Development Department contemporaneous to being submitted to the State Government.

(iv) The State Government shall examine the said Report, particularly the aspect of exclusion of the non-catchment area, as declared by the EPTRI in Table 1 of its second Report of May, 2006 and take a decision thereon by the end of September, 2021 which shall also be uploaded on the website of the Municipal Administration and Urban Development Department within two days.

(v) The Chairperson of the High Powered Committee shall file an affidavit within one week from today undertaking *inter alia* to abide by the conditions and the timelines recorded hereinabove.

(vi) In the event the Report is not submitted by the High Powered Committee within the timeline as recorded above, no further extension shall be given and the

Committee shall stand automatically disbanded on 12.09.2021. In that eventuality, those parties who claim that their land is covered in the parcels enumerated in Table 1 of the EPTRI Report of May, 2006, shall be entitled to approach the court for appropriate relief.

6. List on 04.10.2021 for further orders."

8. The petitioners' contention is that liberty was granted to the petitioners to approach this Court if the Report is not submitted by the Committee upto 10.09.2021, and therefore, they have approached this Court for implementation of the EPTRI Report.

9. Another important aspect of the case is that recently the State Government has issued G.O.Ms.No.69, MA & UD, dated 12.04.2022 and modified the restrictions in G.O.Ms.No.111 to protect the water quality of Osmansagar and Himayatsagar lakes and the Government has constituted a Committee to frame guidelines and detailed regulations for protecting the quality of two water bodies. The petitioners' contention is that as per the EPTRI Report, which is the Report submitted by the expert body on the subject, the area which is subject matter of the present writ petitions, forms part of non-catchment area of

Vattinagulapally Village and does not flow into Osmansagar or Himayatsagar lakes and therefore, the petitioners' land cannot be subjected to provisions of G.O.Ms.No.69, dated 12.04.2022 also. The petitioners have prayed for the following reliefs.

> "For the reasons aforesaid, it is humbly prayed that this Hon'ble Court may be pleased to issue an appropriate writ, direction or order, particularly one in the nature of mandamus:-
>
> (a) to declare that the application of G.O.Ms.No.69, dated 12.04.2022, to the lands of the petitioners which fall outside the catchment area of Osmansagar and Himayatsagar lakes as illegal and arbitrary and consequently,
>
> (b) to declare that the petitioners' land be subject to the same developmental regulations as the adjoining lands (i.e., Kokapet SEZ, Financial District and Neopolis),
>
> (c) and pass such other order(s) as this Hon'ble Court deems fit and proper in the extraordinary circumstances of the case and in the interest of justice."

10. This Court has directed the State Government to file a counter affidavit and the Special Chief Secretary has filed the affidavit in the matter. Paragraph 5 of the affidavit is reproduced as under:-

5. It is submitted that Government have received representations from various individuals with a request to exclude the areas located in Vattinagulapally Village which are not falling in catchment area water shed of Osmansagar lake from the purview of G.O.Ms.No.111 MA dated 08.03.1996. The erstwhile Government of Andhra Pradesh has referred the matter to Environment Protection Training and Research Institute (EPTRI) and requested to delineate the catchment area in Vattinagulapally village. Accordingly EPTRI has conducted an exhaustive hydrological and topographical study and submitted that there is a well defined ridge line (i.e., hill range) running through the Vattinagulapally village which divides the village into two distinct zones and EPTRI demarcated the land into catchment and non-catchment areas. As per EPTRI report the following Survey Numbers of Vattinagulapally village falls in non-catchment area that drains into Musi River i e., downstream of Osman Sagar Reservoir.

Village name	Survey Numbers falling in Non-catchment area
Vattinagulapally	173,178 to 214, 216 to 260 and 512

11. The learned Additional Advocate General, on instructions, has stated in open Court that the area in question falls in non-catchment area that drains into Musi River, i.e., downstream of Osman Sagar Reservoir. The

learned Additional Advocate General has categorically stated that the area which is subject matter of the present writ petitions, as per the EPTRI Report, is falling outside the catchment area of Osmansagar and Himayatsagar lakes. He has stated that the stand of the State Government is that the area falls outside the catchment area of Osmansagar and Himayatsagar lakes and the petitioners' land shall be subject to the same development regulations as are applicable to the adjoining lands which are not subject to G.O.Ms.No.111, dated 08.03.1996.

12. In the light of the categorical stand of the State Government before this Court that the lands of the petitioners are falling outside the catchment area of Osmansagar and Himayatsagar lakes, the question of application of G.O.Ms.No.69, dated 12.04.2022 to the land of the petitioners does not arise and the petitioners' land shall certainly be subjected to same development regulations applicable to the adjoining lands, as stated in the open Court, by the learned Additional Advocate General.

13. Mr. Prabhakar Chikkudu, learned counsel for the petitioner in implead application, i.e., I.A.No.3 of 2022 in W.P.No.21582 of 2022. He has drawn the attention of this Court towards the order, dated 26.08.2021, passed in W.P.Nos.9386 and 18896 of 2007 and W.P. (PIL) No.64 of 2021. His main thrust is to ensure preservation of lakes in question.

14. In the considered opinion of this Court, the concern shown by the learned counsel is genuine one and it is the bounden duty of this Court as well as all citizens of this country to ensure that the lakes are not dried up, they are kept intact and the catchment area is not disturbed. However, the facts of the present writ petitions reveal that Vattinagulapally Village has a unique geography and drainage pattern as compared to other villages in G.O.Ms.No.111. There is a prominent ridge subdividing the area of Vattinagulapally Village and the water on the western side of the ridge flows into Osmansagar lake, whereas the water on the eastern side of the ridge flows into an existing storm water drain and thereafter into the Musi

river downstream of Osmansagar lake. The area in question as per the EPTRI Report is not at all under the catchment area and therefore, after hearing the learned counsel for the implead petitioner, the I.A.No.3 of 2022 in W.P.No.21582 of 2022 stands disposed of.

With the aforesaid, the writ petitions are allowed. Miscellaneous applications, pending if any, shall stand closed. There shall be no order as to costs.

SD/-R.KARTHIKEYAN
ASSISTANT REGISTRAR

//TRUE COPY//

SECTION OFFICER

To,
1. The Chief Secretary, State of Telangana, Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
2. The Special Chief Secretary, State of Telangana, Department of Municipal Administration and Urban Development Telangana Secretariat 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
3. The Metropolitan Commissioner, Hyderabad Metropolitan Development Authority (HMDA, Swarna Jayanti Complex, Sanjeeva Reddy Nagar, Srinivasa Nagar, Ameerpet, Hyderabad - 500038
4. One CC to Smt. Shravya Reddy Patllola Advocate [OPUC]
5. Two CCs to GP For General Administration, High Court for the State of Telangana. [OUT]
6. Two CCs to GP For Municipal Administration & Urban Development, High Court for the State of Telangana. [OUT]
7. One CC to Sri Y. Rama Rao, SC for HMDA (OPUC)
8. One CC to Sri K. Manoj Reddy, Advocate (OPUC)
9. One CC to Sri Chikkudu Prabhakar, Advocate (OPUC)
10. One CC to Sri G. Bheema Chary, Advocate (OPUC)
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ANNEXURE – XL

Item No. 02 & 04: **Court No.2**

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Appeal No. 37 of 2022 (SZ)
&
Appeal No. 39 of 2022 (SZ)
(Through Video Conference)

IN THE MATTER OF

P.V. Subramanya Varma, ...Appellant(s)

Versus

The State Government of Telangana & ors. ...Respondent(s)

With

Telangana State Pollution Control Board, ...Appellant(s)

Versus

M/s. Aadeshwar Aggregates Pvt. Ltd & ors. ...Respondent(s)

Date of hearing: 04.07.2022.

CORAM:

HON'BLE SMT. JUSTICE PUSHPA SATHYANARAYANA, JUDICIAL MEMBER

HON'BLE DR. SATYAGOPAL KORLAPATI, EXPERT MEMBER

Appeal No. 37 of 2022
For Applicant(s): Mr. V. B. Subrahmanyam

For Respondent(s): NA.

Appeal No. 39 of 2022
For Applicant(s): Mr. T. Sai Krishnan

For Respondent(s): NA.

ORDER

1. Appeal No. 37 of 2022 is filed by one Mr. P.V. Subramanya Varma who had impleaded himself in Appeal No. 35 of 2022 before the Appellate Authority under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. The said Appeal No. 35 of 2022 was filed by one M/s. Aadeshwar Aggregates Pvt. Ltd., who is 3rd respondent and 1st respondent in Appeal No. 37 and 39 of 2022 respectively.
2. The issue involves around unauthorised stone crushing at various places in Ranga Reddy and Sanga Reddy District of Telengana State. The private respondent had established a stone crushing unit in Vattinagulapally Village, Gandipet Mandal, Ranga Reddy District and claims to have complied with all the formalities for establishing the industry.
3. It is stated that the activities consist of re-cycling and re-using for crushing the already excavated stone debris from the construction sites and does not involve any quarrying activity. Thus, the respondent had made an application for 'consent for establishment' of the industry on 27.02.2019. The same was rejected based on G.O.Ms. No.111 M.A. dated 08.03.1996 of the Municipal Administration and Urban Development (ii) Department, Government of Andhra Pradesh.
4. The Pollution Control Board had also issued a closure order on 22.08.2019 as the consent for establishment application was rejected. Once again for the

second time the respondent had applied for 'consent for establishment' on 16.03.2020 which was also rejected by the Board and for the 3rd time the respondent had applied for 'consent for establishment' claiming that it is not involving any quarrying activity on 10.12.2021. The said application also met with the same fate on 09.03.2022 based on the G.O. No. Ms.111 dated 08.03.1996.

5. Learned Counsel for the Pollution Control Board states that the above G.O has been upheld by Hon'ble Supreme Court in the case of *A.P. Pollution Control Board Vs. Prof. M.V. Mayudu (Retd.)- Civil Appeal Nos. 368-371 of 1999* dated 01.12.2000. Despite the same, the order impugned passed by the Appellate Authority has allowed the appeal by the private respondents and remitted the matter back to the 2nd respondent, namely, Pollution Control Board to consider afresh and dispose the same on merits.

6. Aggrieved by the same, the Pollution Control Board as well as the impleaded parties have preferred the above appeals. Though, it appears to be convincing at the first blush, the Learned Counsel for the Pollution Control Board states that clause-3 of the G.O. No. Ms. 111 has been withdrawn and G.O. No. 69 dated 12.04.2022 was issued by removing restrictions imposed in the villages covered by the G.O. Ms. No. 111. Though, the restrictions are said to have been removed, the reading of the said G.O makes it clear that a Committee has been constituted headed by the Chief Secretary and other members with certain terms of reference for the Committee to consider.

After considering the terms of reference, the Committee was directed to submit a report considering the objective of protecting the quality of the two water bodies, namely, Osman Sagar and Himayat Sagar reservoirs and submit a report to the Government.

7. Learned Counsel appearing for the Pollution Control Board would submit that till such time the said report is filed by the Committee for the consideration of Government and pass any other G.O based on the same, the application of the project proponent cannot be considered at all. While so, the Appellant Authority should not have remitted the matter back to the Pollution Control Board as the Pollution Control Board cannot arrive at a decision before the G.O. No. 69 becomes fully operational. We are also to state that such kind of order of remand is usually unwarranted which gives the litigants an undeserved lease of life particularly when the applications filed by respondent was rejected thrice by the authorities. Such practices had already been deprecated by Hon'ble Supreme Court calling it as a re-cycling bin syndrome. In such circumstances, it would be appropriate to grant an order of stay of the order passed by the Appellate Authority dated 12.05.2022 for a period of six weeks.

8. Let both the appeals be admitted and the Learned Counsel appearing for the appellants are directed to issue notice to all the respondents through Tribunal as well as privately.

9. Post the matter on 17.08.2022.

.....J.M.
(Smt. Justice Pushpa Sathyanarayana)

.....E.M.
(Dr. Satyagopal Korlapati)

Appeal No. 37/2022(SZ) &
Appeal No. 39/2022(SZ)
4th July, 2022. (AM)

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ANNEXURE – XLI

2021 SCC OnLine SC 1247

In the Supreme Court of India

(BEFORE INDIRA BANERJEE AND J.K. MAHESHWARI, JJ.)

Electrosteel Steels Limited ... Petitioner(s);

Versus

Union of India and Others ... Respondent(s).

Civil Appeal Nos. 7576-7577 of 2021 [Arising out of SLP (C.) Nos. 11226-11227 of 2020]

Decided on December 9, 2021

The Judgment of the Court was delivered by

INDIRA BANERJEE, J.:— Leave granted.

2. These Appeals are against an order dated 16th September 2020 passed by a Single Bench of the High Court of Jharkhand in W.P. (C) No. 1873 of 2018 and W.P. (C) No. 4850 of 2018, discontinuing the interim orders earlier passed by the High Court, allowing the Appellant to operate its unit under the supervisory regulatory control of the Respondent - Jharkhand State Pollution Control Board, hereinafter referred to as "JSPCB", which had been in force for over two years.

3. The Appellant owns and runs a 1.5 MTPA integrated steel plant in Bokaro District in Jharkhand. The said steel plant in Bokaro, which employs 3,000 regular employees and 7000 contractual employees, produced steel worth Rs. 4,200 crores in the financial year 2019-20.

4. The Appellant claims that about 30,000 persons other than those actually employed by the steel plant as regular or contractual employees depend on the steel plant for their livelihood.

5. Corporate Insolvency Resolution Process (CIRP) had commenced against the Appellant under the Insolvency and Bankruptcy Code 2016. As successful Resolution Applicant, Vedanta Ltd. took over the Appellant on or about 4th June 2018 upon payment of Rs. 5,320 crores for discharge of its debts.

6. Pollution and consequential deterioration of environment has been assuming alarming proportions, and has become a cause of universal concern. Fumes, smoke, emission of green house gases by use of motors and machines and operation of mills, factories and plants cause environmental degradation.

7. Under the aegis of the United Nations discussions and deliberations have been held to protect and improve environment and prevent pollution.

8. In 1972, the United Nations Conference on the Human Environment was convened in Stockholm to work out ways and means to protect and improve the environment. In course of deliberations, it was felt that there was need to enact law to tackle environmental pollution. India participated in the conference and strongly voiced environmental concerns.

9. The Environment (Protection) Act, 1986, hereinafter referred to as "*the 1986 Act*", has been enacted as a consequence of decisions taken at the United Nations Conference on the Human Environment held in Stockholm in June, 1972.

10. The statement of objects and reasons for enactment of the 1986 Act declares that the Act has been prompted by concern over environment, that has grown the world over, since the sixties.

11. Sub-Section (1) of Section 3 of the 1986 Act empowers the Central Government to take all such measures as it might deem necessary or expedient for the

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purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution.

12. Sub-section (2) of Section 3 of the 1986 Act enables the Central Government to take, *inter alia*, the following measures:

"(i) co-ordination of actions by the State Governments, officers and other authorities—

(a) under this Act, or the rules made thereunder; or

(b) under any other law for the time being in force which is relatable to the objects of this Act;

(ii) planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution;

(iii) laying down standards for the quality of environment in its various aspects;

(iv) laying down standards for emission or discharge of environmental pollutants from various sources whatsoever:

Provided that different standards for emission or discharge may be laid down under this clause from different sources having regard to the quality or composition of the emission or discharge of environmental pollutants from such sources;

(v) restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards;

(vi) laying down procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents;

(vii) laying down procedures and safeguards for the handling of hazardous substances;

(viii) examination of such manufacturing processes, materials and substances as are likely to cause environmental pollution;

(ix) carrying out and sponsoring investigations and research relating to problems of environmental pollution;

(x) inspection of any premises, plant, equipment, machinery, manufacturing or other processes, materials or substances and giving, by order, of such directions to such authorities, officers or persons as it may consider necessary to take steps for the prevention, control and abatement of environmental pollution;

(xi) establishment or recognition of environmental laboratories and institutes to carry out the functions entrusted to such environmental laboratories and insitutes under this Act;

(xii) collection and dissemination of information in respect of matters relating to environmental pollution;

(xiii) preparation of manuals, codes or guides relating to the prevention, control and abatement of environmental pollution;

(xiv) such other matters as the Central Government deems necessary or expedient for the purpose of securing the effective implementation of the provisions of this Act."

13. Sub-section (3) of Section 3 of the 1986 Act provides as follows:

"The Central Government may, if it considers it necessary or expedient so to do for the purposes of this Act, by order, published in the Official Gazette, constitute an authority or authorities by such name or names as may be specified in the order for the purpose of exercising and performing such of the powers and functions (including the power to issue directions under Section 5) of the Central Government under this Act and for taking measures with respect to such of the matters referred

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to in sub-section (2) as may be mentioned in the order and subject to the supervision and control of the Central Government and the provisions of such order, such authority or authorities may exercise the powers or perform the functions or take the measures so mentioned in the order as if such authority or authorities had been empowered by this Act to exercise those powers or perform those functions or take such measures."

14. Subject to the provisions of the 1986 Act, the Central Government has power under sub-section (1) of section 3 to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution.

15. Section 5 of the 1986 Act provides that notwithstanding anything contained in any other law, but subject to the provisions of the 1986 Act, the Central Government may, in exercise of its powers and performance of its functions under the 1986 Act, issue directions in writing to any person, officer or any authority and such person, officer or authority shall be bound to comply with such directions.

16. In exercise of powers conferred by Sub-Section (1) and clause (v) of sub-section (2) of Section 3 of the 1986 Act read with Rule 5(3)(d) of the Environment (Protection) Rules, 1986 the Central Government issued the Environmental Impact Assessment Notification dated 27th January 1994 directing that on and from the date of publication of the said notification in the Official Gazette, expansion or modernisation of any activity or a new project listed in Schedule I of the Notification shall not be undertaken in any part of India, unless it has been accorded Environmental Clearance (EC) by the Central Government in accordance with the procedure specified in the Notification.

17. Under Clause (2)(I) of the said Notification, any person who desires to undertake any new project listed in Schedule I is required to submit an application to the Secretary, Ministry of Environment and Forests (MoEF), New Delhi in the pro forma specified in Schedule II, accompanied by a project report which is to include the EIA (Environmental Impact Assessment) Report/Environment Management Plan (EMP) prepared in accordance with the guidelines issued by MoEF. Another Environmental Impact Notification was issued in 2006, for grant of Terms and Environmental Clearance *inter alia* for projects which had started work on site.

18. The EIA Report submitted with the application of the project proponent is to be evaluated and assessed by the Impact Assessment Agency (IAA), that is MoEF, and if deemed necessary, it may consult a Committee of Experts constituted in the manner prescribed in Schedule III. The Committee of Experts shall have full right of entry and inspection of the site. The Impact Assessment Agency is to prepare a set of recommendations based on technical assessment of documents and data, furnished by the project proponent, supplemented by data collected during visits to sites, interaction with the affected population and environmental groups, if necessary. The summary of the reports, the recommendations and the conditions, subject to which EC is given shall, subject to public interest, be made available to the parties concerned or environmental groups on request. The IAA may solicit comments of the public within the specified period by arranging public hearings for that purpose. The public shall, subject to public interest, be provided access, to the summary of the EIA Report/Environment Management Plan (EMP). The clearance granted for commencement of the construction or operation of the plant, is to be valid for five years. Clause IV of the Environmental Impact Assessment Notification provides for the monitoring of the implementation of the conditions of EC and/or the recommendations and conditions laid down by IAA.

19. A minor amendment was made to the said Environmental Impact Assessment Notification dated 27th January 1994, by a Notification dated 10th April 1997, which

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prescribes a detailed procedure for public hearing.

20. By a notification being S.O. 327(E), dated 10th April 2001, published in the Gazette of India, Extra., Pt.II, Sec.3(ii), dated 12th April 2001, the Central Government has delegated the powers vested in it under Section 5 of the 1986 Act, to the Chairpersons of the respective State Pollution Control Boards/Committees to issue directions to any industry or any local or other authority for the violations of the standards and rules relating to biomedical waste, hazardous chemicals, industrial solid waste and municipal solid waste including plastic waste notified under the Environment (Protection) Act, 1986 subject to the condition that the Central Government may revoke such delegation of powers or may itself invoke the provisions of Section 5 of the said Act, if in the opinion of the Central Government such a course of action is necessary in the public interest.

21. On or about 8th January 2007, the Appellant applied to the Ministry of Environment, Forest and Climate Change, Government of India, hereinafter referred to as "MoEF&CC" for grant of EC to establish 3 MTPA integrated steel plant at Mauza South Parbatpur of Chandankiyari Block of Bokaro District.

22. In its application, the Appellant stated that 1350 acres of land were required for establishing the said plant at the Mauza South Parbatpur of Chandankiyari Block of Bokaro District and that no forest land was involved in the project.

23. By a letter No. F. No. J-11011/137/2006-1A-II (i) dated 21st February 2008, the Appellant was granted EC. After obtaining EC, the Appellant applied to the JSPCB, for grant of 'Consent to Establish' (CTE) under the Air (Prevention and Control of Pollution) Act, 1981, hereinafter referred to as the Air Pollution Act, and Water (Prevention and Control of Pollution) Act 1974, hereinafter referred to as the Water Pollution Act.

24. On 5th May 2008, the JSPCB granted CTE to the Appellant to establish the 3 MTPA integrated steel plant at Mauza South Parbatpur of Chandankiyari Block of Bokaro District. The CTE was granted on the basis of the EC granted by the MoEF&CC.

25. The CTE was extended from time to time till 4th May 2011. Even though CTE was granted to the Appellant to establish a steel plant at Mauza South Parbatpur of Chandankiyari Block of Bokaro District, the Appellant established steel plant in Mauza Bhagabandh in the Chas Block in Bokaro District, 5.3 Kms away from the site for which EC and CTE had been granted.

26. A Circular No. J-11013/41/2006-1A.2(i) dated 22nd January, 2010 was issued by the Ministry of Environment and Forest (MoEF) of the Government of India which provided as follows:

> *"Instances have come to the notice of this Ministry wherein the project proponents have changed the project site after the said project has been granted environmental clearance or after the public hearing has been held. The project proponents have approached this Ministry to revalidate the environmental clearance so granted without undergoing afresh the procedure prescribed for obtaining environmental clearance. The matter has been considered in the ministry. The change in project site would lead to change in project affected people as well as the change in study area and the impact zone. As such the Environment Impact Assessment Report and Public Hearing conducted for a particular location cannot be taken valid for the changed location.*
>
> *Accordingly, it has been decided that any shift in project site location after holding of public hearing will be deemed to be a new proposal and will be appraised afresh as per the procedure prescribed under EIA Notification 2006 provided the respective Expert Appraisal Committee is satisfied that the shift is so minor as to have no change in EIA/EMP, duly recorded in the minutes and prior approval of advisor (In-charge)/SEIAA for Category 'A'/Category 'B' projects respectively is*

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obtained for not holding the public hearing for the changed location afresh.

This issues with the approval of the Competent Authority."

27. By a communication being Reference No. 1142 dated 4th May 2010, the District DFO (District Forest Officer) Bokaro requested JSPCB to take action against the Appellant for setting up its integrated steel plant on forest land in Mauza Bhagabandh of Chas Block of Bokaro District, in violation of the Forest Conservation Act 1980 and Indian Forest Act 1927. The DFO, Bokaro reported encroachment of 220.88 acres of notified forest land by the Appellant to JSPCB.

28. It appears that cases had been initiated against the officials of the Appellant under the Indian Forest Act, 1927, Forest Conservation Act, 1980 and the Bihar Public Land Encroachment Act, 1955 which have been quashed by the Jharkhand High Court, by an order dated 25th January 2011.

29. On or about 23rd September 2010 the Appellant applied for Consent to Operate (CTO) under the Air Pollution Act and the Water Pollution Act for its 350 m3 blast furnace. Later on 9th September 2011, the Appellant applied for CTO in respect of its entire plant.

30. By a letter dated 2nd December 2011, addressed to the Appellant, the MoEF confirmed that the lay out of the Appellant's 3 MTPA Integrated Steel Plant was well within the Environment Impact Area and that the affected people had the opportunity to participate in a public hearing.

31. By letter dated 18th May 2012, the JSPCB reported encroachment by the Appellant upon forest land and alleged violation by the Appellant of the Forest Conservation Act, 1980 to the MoEF&CC, New Delhi. The MoEF&CC was also informed of the unauthorized shifting of the integrated steel plant from Mauza South Parbatpur of Chandankiyari Block of Bokaro District to Mauza Bhagabandh of Chas Block of Bokaro District in violation of the conditions of Environment Clearance granted by the MoEC&CC.

32. Pursuant to the report of JSPCB, MoEF&CC issued a Show Cause Notice dated 6th June 2012 to the Appellant under Section 5 of the 1986 Act. The Appellant submitted its reply to the Show Cause Notice on 20th June 2012.

33. On 10th September 2012, the Appellant once again applied to JSPCB for CTO for one year under the Water Pollution Act and Air Pollution Act. According to the Appellant, several reminders were sent to MoEF&CC requesting MoEF&CC to intimate JSPCB of the outcome of the Show Cause Notice issued to the Appellant. However, JSPCB has not been informed of the decision of MoEF&CC.

34. The Appellant filed a Writ Petition being W.P. No. 2247/2012 in the Jharkhand High Court for orders on JSPCB to grant the Appellant CTO. The said writ petition was disposed of by an order dated 5th November 2012, the operative part whereof is set out hereinbelow:—

"Respondent 1& 2 to consider the petitioner's application and as assured by them, if so required, give an opportunity of hearing to the petitioners and after taking into consideration the facts and provisions of law and the related decisions, shall dispose of the petitioner's application within five weeks from the date of receipt/production of a copy of this order."

35. On or about 27th November 2013, the application of the Appellant for CTO was rejected on the ground that the Appellant had shifted the site of its steel Plant and had encroached upon forest land in violation of the Forest Conservation Act, 1980. The operative part of the order dated 27th November 2013 reads:—

"at this stage subject to final outcome of the decision of MoEF&CC, New Delhi with respect to show cause notice dated 6.6.2012, we dispose the application for CTO in exercise of power conferred u/s 21(4) of Air (Prevention and Control of

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Pollution) Act, 1981 & u/s 25(4) of Water (Prevention and Control of Pollution) Act, 1974 by "refusing" the CTO to the unit for the reason aforesaid."

36. The Appellant filed an application for contempt being Contempt Case (C) No. 939 of 2013 in W.P.(C) No. 2247 of 2012 in the Jharkhand High Court. Pursuant to an order dated 29th November 2013 in the Contempt Petition, the JSPCB disposed of the applications for grant of CTO to the Appellant.

37. By a letter dated 17th April 2013, the MoEF&CC had called for a status report from the State of Jharkhand in respect of forest land encroached by the Appellant. The Forest Department submitted a report to the MoEF&CC on 13th May, 2014.

38. Thereafter, by a letter dated 20th October 2014, the MoEF&CC, New Delhi directed the Department of Forest, Environment and Climate Change, Government of Jharkhand to take action against the Appellant for violating the provisions of Indian Forest Act, 1927 and Forest Conservation Act, 1980. In compliance with the aforesaid order, JSPCB directed the Appellant to close down its plant under Section 31(A) of the Air Pollution Act and Section 33(A) of Water Pollution Act.

39. By a Memo No. 521 dated 6th February 2015, the Department of Forest, Environment and Climate Change, Government of Jharkhand directed the DGP, Jharkhand, Ranchi and the Deputy Commissioner, Bokaro to take action against the Appellant in the light of the letter dated 20th October, 2014 of the MoEF&CC, Government of India and to submit an action taken report.

40. The aforesaid order of JSPCB was challenged by the Appellant by filing a Writ Petition being WP(C) No. 2033 of 2015 in the Jharkhand High Court. By an order dated 5th February 2016 the High Court set aside the order of the JSPCB holding that the same had been passed in violation of principles of natural justice. The High Court however, held that JSPCB would be at liberty to pass an order in accordance with law after giving the Appellant an opportunity of hearing.

41. Thereafter, a show cause notice dated 25th April 2016, was issued to the Appellant. The Appellant replied to the show cause notice on 28th September 2016, contending that the Appellant had not set up its plant on any forest land and that all pollution control measures had been taken. However, the Principal Chief Conservator of Forests (PCCF), Jharkhand had by a communication No. 2966 dated 8th August 2016 informed JSPCB that the Appellant had encroached forest land. Thereafter JSPCB once again called upon the Appellant to show cause in the light of information provided by the PCCF, Jharkhand. The Appellant by a letter dated 28th September 2016 reiterated that there was no forest land in the plant premises.

42. JSPCB passed an order No. B-319 dated 13th February 2017 disposing of the show cause notice in the light of the direction dated 5th February 2016 of the Jharkhand High Court and the applications for CTO. JSPCB granted CTO to the Appellant which was valid till 31st December, 2017.

43. The MoEF&CC and the State Environment Impact Assessment Authorities had, in the meanwhile been receiving proposals under the Environment Impact Assessment Notification, 2006 for grant of Terms of Reference and Environmental Clearance for projects which had started the work on site, expanded the production beyond the limit of environmental clearance or changed the product mix without obtaining prior environmental clearance.

44. The MoEF&CC deemed it necessary that all entities not complying with the environmental regulation under Environment Impact Assessment Notification, 2006, be brought to comply with the environmental laws in expedient manner, for the purpose of protecting and improving the quality of the environment and reducing environmental pollution.

45. The MoEF&CC deemed it necessary to bring such projects and activities in compliance with the environmental laws at the earliest point of time, rather than

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leaving them unregulated and unchecked, which would be more damaging to the environment.

46. In furtherance of this objective, the Government of India deemed it essential to establish a process for appraisal of cases of violation of norms, and prescribing such adequate environmental safeguards that would deter violation of the provisions of Environment Impact Assessment Notification, 2006 and ensure that damage to environment was adequately compensated for.

47. In *Indian Council for Enviro-Legal Action* v. *Union of India*[1], the Supreme Court analyzed relevant provisions of environmental laws and concluded that damages might be recovered under the provisions of the 1986 Act, inter alia, to implement measures that were necessary or expedient for protecting and promoting the environment. This Court affirmed that the power of the Central Government under Section 3 of the 1986 Act was wide and included the power to prohibit an activity, close an industry, direct to carry out remedial measures, and wherever necessary impose the cost of remedial measures upon the offending industry. The question of liability of the respondents to defray the costs of remedial measures could also be looked into from the principle "polluter pays."

48. In exercise of power under Section 3(1) and Section 3(2)(v) of the 1986 Act read with Rule 5(3)(d) of the Environment (Protection) Rules, 1986, the Central Government has issued a Notification being S.O. 804(E) dated 14th March 2017 which provides for grant of ex post facto EC for project proponents who have commenced, continued or completed a project without obtaining EC under the 1986 Act or the EIA notification issued under it.

49. Paragraphs 3, 4 and 5 of the said notification, read as follows:

"(3) In cases of violation, action will be taken against the project proponent by the respective State or State Pollution Control Board under the provisions of section 19 of the Environment (Protection) Act, 1986 and further, no consent to operate or occupancy certificate will be issued till the project is granted the environmental clearance.

(4) The cases of violation will be appraised by respective sector Expert Appraisal Committees constituted under subsection (3) of Section 3 of the Environment (Protection) Act, 1986 with a view to assess that the project has been constructed at a site which under prevailing laws is permissible and expansion has been done which can be run sustainably under compliance of environmental norms with adequate environmental safeguards; and in case, where the finding of the Expert Appraisal Committee is negative, closure of the project will be recommended along with other actions under the law.

(5) In case, where the findings of the Expert Appraisal Committee on point at sub-para(4) above are affirmative, the projects under this category will be prescribed the appropriate Terms of Reference for undertaking Environment Impact Assessment and preparation of Environment Management Plan. Further, the Expert Appraisal Committee will prescribe a specific Terms of Reference for the project on assessment of ecological damage, remediation plan and natural and community resource augmentation plan and it shall be prepared as an independent chapter in the environment impact assessment report by the accredited consultants. The collection and analysis of data for assessment of ecological damage, preparation of remediation plan and natural and community resource augmentation plan shall be done by an environmental laboratory duly notified under Environment (Protection) Act, 1986, or a environmental laboratory accredited by National Accreditation Board for Testing and Calibration Laboratories or a laboratory of a Council of Scientific and Industrial Research institution working in the field of environment."

50. On or about 24th August 2017, the Appellant applied for CTO for five years. On

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13th November 2017, JSPCB issued a Show Cause Notice to the Appellant pointing out alleged contraventions of the conditions of Consent to Operate (CTO) earlier granted to the Appellant. The Appellant was called upon to show cause whether conditions of the CTO had been contravened while the application of the Appellant for CTO for five year was pending.

51. On 23rd November 2017, the Appellant submitted its online reply to the Show Cause Notice showing compliance of the conditions of the CTO.

52. By a communication No. 2105 dated 18th December 2017 JSPCB requested MoEF&CC to inform JSPCB of the decision on the show cause notice issued to the Appellant under Section 5 of the 1986 Act for revocation of the EC for non compliance of the conditions for grant of EC for the integrated plant at Parbatpur, Jharkhand.

53. Aggrieved by the failure of JSPCB to issue/renew the CTO to the Appellant, pursuant to its application made on 24th August 2017, the Appellant filed a writ petition being W.P.(C) No. 1873 of 2018 in the Jharkhand High Court on or about 12th April 2018 seeking directions on the JSPCB to issue CTO to the Appellant.

54. By an order dated 16th July 2018, the High Court directed the JSPCB to take a final decision on the application of renewal/grant of CTO filed by the Appellant on 24th August 2017 within the time stipulated in the said order.

55. The High Court further passed an interim order directing that the Appellant be allowed to operate its unit under the supervisory and regulatory control of the JSPCB, who might carry out periodical check as to adherence by the Appellant of pollution control laws.

56. JSPCB passed an order dated 21st August, 2018, rejecting at that stage the request of the Appellant for CTO, subject to the decision of MoEF&CC on the show cause notice issued to the appellant. The operative part of the said order is set out hereinbelow:

> *"at this stage subject to final outcome of the decision of MoEF&CC, New Delhi with respect to show cause notice dated 6.6.2012, we dispose the application for CTO in exercise of power conferred u/s 21(4) of Air (Prevention and Control of Pollution) Act, 1981 & u/s 25(40 of Water (Prevention and Control of pollution) Act, 1974 by "refusing" the CTO to the unit for the reason aforesaid."*

57. The Appellant, thereafter approached the High Court with a prayer for amendment of Writ Petition No. 1873 of 2018. By an order dated 25th August 2018, the High Court allowed the application for amendment of the Writ Petition and directed the respondent to file their response to the amended writ petition. The High Court further directed:—

> *"10. So far as interim relief is concerned, this court finds that the order passed by the respondent-Jharkhand State Pollution Control Board dated 23.08.2018 appears to be directly dependent on the final decision which is yet to be taken by the Ministry of Environment, Forest & Climate Change on the show cause issued to the petitioner as back as in the year 2012. As per the submission made by the counsel appearing on behalf of Union of India, they are shortly going to take a final decision in the matter after hearing the petitioner. Accordingly the operation, implementation and execution of the order dated 23.08.2018 passed by Jharkhand State Pollution Control Board is hereby stayed till 27.09.2018 and the interim order dated 16.07.2018 is hereby extended till 27.09.2018.*
>
> *11. So far as decision of the Ministry of Environment, Forest & Climate Change are concerned, considering the fact that the unit of the petitioner is running unit and large number of employees are working in this unit of the petitioner, this court consider it appropriate that the issue regarding the environmental clearance of the petitioner should be decided at the earliest.*
>
> *12. It is further observed that it is open to the petitioner to approach the Union*

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of India with their proposal/application for regularization of the alleged violation, without prejudice to their rights (including right, title, interest, possession and nature of property of the petitioner) and advance submissions before the respondent authority of Union of India pursuant to the show cause notice issued to them dated 6.6.2012 and the appropriate authority may, if possible, simultaneously consider the aforesaid application of the petitioner for regularization along with the show cause reply of the petitioner such that entire dispute is decided and the petitioner may also have a clarity about the fate of its unit. The decision which is to be taken by the Union of India be brought on record by either of the parties by filing supplementary affidavit latest by 25.09.2018.

13. I.A. No. 7610 of 2018 and I.A No. 7613 OF 2018 are hereby disposed of.

14. It is made clear that this court has not gone into the merits of the claim of the petitioner and it will be open to the respondent no 3 to take decision as per law."

58. By the aforesaid order dated 25th August 2018, the High Court directed MoEF to take a decision on the application of the Appellant for EC as also a decision regarding violation by the Appellant of the provisions of EC by encroachment upon forest land by shifting the location of the plant.

59. On 31st August 2018, MoEF&CC issued a show cause notice No. F. No. J-11011/137/2006-1A Pt.II (i) dated 31st August 2018 to the Appellant for violating the provisions of the EC by shifting the location of its plant and encroaching upon forest land.

60. The Respondent No. 1 was also accorded personal hearing on 10th September 2018. On 12th September 2018 Mr. Gyanesh Bharti who presided over the personal hearing was transferred from MoEF&CC.

61. On 20th September 2018 the Respondent No. 1 issued an order bearing No. F. No. J-11011/137/2006-IA.II(I) revoking the EC of the Appellant on the ground that the Appellant had encroached upon 220 acres of forest land and had shifted the location of its plant from Parbatpur to Bhagabandh, violating the conditions stipulated in the EC.

62. The Appellant filed Writ petition being W.P. (C) No. 4850 of 2018 in the Jharkhand High Court challenging the revocation of the EC granted to the Appellant.

63. On 27th September 2018 the High Court passed an interim order staying the operation, implementation and execution of the impugned order dated 20th September 2018. The Court prima facie found that the impugned order, passed in violation of principles of natural justice, had serious repercussions on the unit of the Appellant which was a running unit, and had caused prejudice to the Appellant.

64. On 4th October 2018, the Appellant applied for ex post facto Forest Clearance (FC) without prejudice to its rights and contentions. On 27th November 2019 the Appellant applied for a "revised" EC without prejudice to its rights and contentions. In the meanwhile, the Interim order passed by the High Court on 27th September 2018 was extended from time to time. Such extensions were granted on 10.10.2018, 5.11.2018, 11.12.2018, 8.1.2019, 23.1.2019, 16.5.2019, 25.7.2019 and 17.10.2019.

65. On 17th December 2019, MoEF&CC passed an order according ex post facto in principle approval for the forest diversion/clearance proposal of the Appellant. The operative part of the said order reads:—

"After careful examination of the proposal of the State Government and on the basis of the recommendations of the Forest Advisory Committee and approval of the same by the competent authority of the MoEF&CC, New Delhi, the Central Government hereby accords ex-post facto 'in-principle' approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 184.23 ha of forest land

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(174.39 ha encroached (ex-post facto) and 9.84 ha virgin land) in favour of M/s Electrosteel Steels Limited in the State of Jharkhand subject to fulfilment of following conditions:—

(i) Legal status of the diverted forest land shall remain unchanged;..."

66. By an order dated 26th February 2020, the Jharkhand High Court directed that the pendency of W.P. (C) No. 4850 of 2018 and W.P. (C) No. 1873 of 2018 would not come in the way of consideration by the MoEF&CC of grant or refusal of restoration of EC and it would be open to the Ministry to take appropriate decision in accordance with law. The interim orders in force were extended.

67. Thereafter by a letter dated 2nd March 2020, the Appellant requested MoEF&CC to consider the application of the Appellant for revised EC. In the meanwhile, the interim orders passed by the High Court were further extended. The interim orders were extended by orders passed on 26.2.2020, 7.4.2020 and 29.5.2020.

68. The Writ Petition was called for hearing on 19th June 2020 whereupon it was submitted on behalf of the Respondent No. 1 that the revised EC application of the Appellant would be placed before the Expert Appraisal Committee (EAC) for consideration on merit and Violation Committee would decide on the action to be taken against the Appellant for violation of Environment (Protection) Act, 1986.

69. On 6th August 2020 and 7th August 2020, the case of the Appellant was placed before the EAC at its 35th meeting. The Appellant was invited to present its proposal online before the Committee.

70. After detailed deliberation, the EAC appraised the proposal on merits and recommended issuance of Standard Terms of Reference along with Specific Terms of Reference for undertaking Environmental Impact Assessment (EIA) and preparation of Environment Management Plan (EMP). The EAC noted that the plant was a running unit and the EC was subject to the conditions imposed in the Terms of Reference.

71. On 4th September 2020, the Jharkhand High Court extended the interim orders till 8th September 2020 while awaiting response from the Respondents. On 8th September 2020, the High Court reserved orders on the extension of interim orders dated 16th July 2018 and 27th September 2018 while listing the writ petitions for final hearing on 16th September 2020.

72. On 15th September 2020, the Respondent No. 1 filed an affidavit stating that it had no objection to extension of the interim orders considering that the steel plant employed a large workforce. At the hearing on 16th September 2020 JSPCB also consented to extension of the interim order. However, the High Court passed the impugned order dated 16th September 2021 dis-continuing the earlier interim orders on, *inter alia*, the following grounds:

(i) The Expert Appraisal Committee of the MoEF&CC had, after detailed deliberations, found that the Appellant had been in violation of the EIA Notification 2006 and general condition no. (ii) of the EC dated 21.02.2008.

(ii) The MoEF&CC had while issuing ToR for grant of EC recommended action against the Appellant under Section 19 of the 1986 Act for past violations. Extension of the interim orders would amount to staying action.

(iii) In *Alembic Pharmaceuticals Ltd.* v. *Rohit Prajapati*[2], this Court had deprecated ex post facto Ecs but passed certain directions in exercise of powers under Article 142 of the Constitution.

73. By an Office Memorandum, being F. No. 22-21/2020-1A III, dated 7th July 2021, the MoEF&CC issued Standard Operating Procedure (SOP) for Identification and Handing of violation cases under EIA Notification 2006.

74. The said Office Memorandum, *inter alia*, reads:

"The Ministry had issued a notification number S.O.804(E), dated the 14th March,

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2017 detailing the process for grant of Terms of Reference and Environmental Clearance in respect of projects or activities which have started the work on site and/or expanded the production beyond the limit of Prior EC or changed the product mix without obtaining Prior EC under the EIA Notification, 2006.

2. This Notification was applicable for six months from the date of publication i.e. 14.03.2017 to 13.09.2017 and further based on court direction from 14.03.2018 to 13.04.2018.

3. Hon'ble NGT in Original Application No. 287 of 2020 in the matter of Dastak N.G.O. *v.* Synochem Organics Pvt. Ltd. *and in applications pertaining to same subject matter in Original Application No. 298 of 2020 in* Vineet Nagar *v.* Central Ground Water Authority, *vide order dated 03.06.2021 held that* ***"(...) for past violations, the concerned authorities are free to take appropriate action in accordance with polluter pays principle, following due process".***

4. Further, the Hon'ble National Green Tribunal in O.A No. 34/2020 WZ in the matter of Tanaji B. Gambhire *v.* Chief Secretary, Government of Maharashtra, *vide order dated 24.05.2021 has directed that* ***"... a proper SoP be laid down for grant of EC in such cases so as to address the gaps in binding law and practice being currently followed. The MoEF may also consider circulating such SoP to all SEIAAs in the country".***

5. Therefore, in compliance to the directions of the Hon'ble NGT a Standard Operating Procedure (SoP) for dealing with violation cases is required to be drawn. The Ministry is also seized of different categories of 'violation' cases which have been pending for want of an approved structural/procedural framework based on 'Polluter Pays Principle' and 'Principle of Proportionality'. It is undoubtedly important that action under statutory provisions is taken against the defaulters/violators and a decision on the closure of the project or activity or otherwise is taken expeditiously.

6. In the list of the above directions of the Hon'ble Tribunal and the issues involved, the matter has accordingly been examined in detail in the Ministry. A detailed SoP has accordingly been framed and is outlined herein. The SoP is also guided by the observations/decisions of the Hon'ble Courts wherein principles of proportionality and polluters pay have been outlined."

75. The Standard Operating Procedure formulated by the said Office Memorandum dated 7th July 2021 refers to and gives effect to various judicial pronouncements including the judgment of this Court in *Alembic Pharmaceuticals* (supra).

76. In terms of the Standard Operating Procedure, the proposal for grant of EC in cases of violation are to be considered on merits, with prospective effect, applying principles of proportionality and the principle that the polluter pays and is liable for costs of remedial measures.

77. By an interim order passed on 15th July 2021 in WP(MD) 11757 of 2021 in *Fatima* v. *Union of India*, the Madurai Bench of Madras High Court has stayed the operation of the Standard Operating Procedure.

78. By an order dated 25th August 2021, MoEF&CC rejected the application of the Appellant for the time being. The application has, in effect, been kept in abeyance.

79. The MoEF apparently did not take any decision on the application of the Appellant for EC, since the Standard Operating Procedure issued by it has been stayed by the Madurai Bench of Madras High Court, by the said order dated 15th July 2021, citing the judgment of this Court in *Alembic Pharmaceuticals* (supra).

80. The Appellant has filed an application being I.A No. 125221 of 2021 in this appeal seeking directions on the Respondent No. 1 to process the Appellant's application dated 5th August 2020 for revised EC.

81. There can be no doubt that the need to comply with the requirement to obtain

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Environment Clearance is non-negotiable. A project can be set up or allowed to expand subject to compliance of the requisite norms. Environmental clearance is granted on condition of the suitability of the site to set up the project from the environmental angle, and existence of necessary infrastructural facilities and equipment for compliance of environmental norms. To protect future generations, it is imperative that pollution laws be strictly enforced. Under no circumstances, can industries which pollute be allowed to operate unchecked and degrade the environment.

82. The question is whether an establishment contributing to the economy of the country and providing livelihood to hundreds of people should be closed down for the technical irregularity of shifting its site without prior environmental clearance, without opportunity to the establishment to regularize its operation by obtaining the requisite clearances and permissions, even though the establishment may not otherwise be violating pollution laws, or the pollution, if any, can conveniently and effectively be checked. The answer has to be in the negative.

83. The Central Government is well within the scope of its powers under Section 3 of the 1986 Act to issue directions to control and/or prevent pollution including directions for prior Environmental Clearance before a project is commenced. Such prior Environmental Clearance is necessarily granted upon examining the impact of the project on the environment. Ex-Post facto Environmental Clearance should not ordinarily be granted, and certainly not for the asking. At the same time ex post facto clearances and/or approvals and/or removal of technical irregularities in terms of Notifications under the 1986 Act cannot be declined with pedantic rigidity, oblivious of the consequences of stopping the operation of a running steel plant.

84. The 1986 Act does not prohibit ex post facto Environmental Clearance. Some relaxations and even grant of ex post facto EC in accordance with law, in strict compliance with Rules, Regulations Notifications and/or applicable orders, in appropriate cases, where the projects are in compliance with, or can be made to comply with environment norms, is in over view not impermissible. The Court cannot be oblivious to the economy or the need to protect the livelihood of hundreds of employees and others employed in the project and others dependent on the project, if such projects comply with environmental norms.

85. As held by a three Judge Bench of this Court in *Lafarge Umiam Mining Private Limited* v. *Union of India*[3] ("Lafarge") reported in (2011) 7 SCC 338:

> *"119.* ***The time has come for us to apply the constitutional "doctrine of proportionality" to the matters concerning environment as a part of the process of judicial review in contradistinction to merit review. It cannot be gainsaid that utilization of the environment and its natural resources has to be in a way that is consistent with principles of sustainable development and intergenerational equity, but balancing of these equities may entail policy choices****. In the circumstances, barring exceptions, decisions relating to utilization of natural resources have to be tested on the anvil of the well-recognized principles of judicial review. Have all the relevant factors been taken into account? Have any extraneous factors influenced the decision? Is the decision strictly in accordance with the legislative policy underlying the law (if any) that governs the field? Is the decision consistent with the principles of sustainable development in the sense that has the decision-maker taken into account the said principle and, on the basis of relevant considerations, arrived at a balanced decision? Thus, the Court should review the decision-making process to ensure that the decision of MoEF is fair and fully informed, based on the correct principles, and free from any bias or restraint. Once this is ensured, then the doctrine of "margin of appreciation" in favour of the decision-maker would come into play."*

86. In *Alembic Pharmaceuticals* (supra) this Court observed:—

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"27. The concept of an ex post facto EC is in derogation of the fundamental principles of environmental jurisprudence and is an anathema to the EIA notification dated 27 January 1994. It is, as the judgment in Common Cause holds, detrimental to the environment and could lead to irreparable degradation. The reason why a retrospective EC or an ex post facto clearance is alien to environmental jurisprudence is that before the issuance of an EC, the statutory notification warrants a careful application of mind, besides a study into the likely consequences of a proposed activity on the environment. An EC can be issued only after various stages of the decision-making process have been completed. Requirements such as conducting a public hearing, screening, scoping and appraisal are components of the decision-making process which ensure that the likely impacts of the industrial activity or the expansion of an existing industrial activity are considered in the decision-making calculus. Allowing for an ex post facto clearance would essentially condone the operation of industrial activities without the grant of an EC. In the absence of an EC, there would be no conditions that would safeguard the environment. Moreover, if the EC was to be ultimately refused, irreparable harm would have been caused to the environment. In either view of the matter, environment law cannot countenance the notion of an ex post facto clearance. This would be contrary to both the precautionary principle as well as the need for sustainable development.

87. In *Alembic Pharmaceuticals* (supra), this Court deprecated ex-post facto clearances, but this Court did not pass orders for closure of the three industries concerned, on consideration of the consequences of their closure. This court proceeded to observe and held:—

44. The issue which must now concern the Court is the consequence which will emanate from the failure of the three industries to obtain their ECs until 14 May 2003 in the case of Alembic Pharmaceuticals Limited, *17 July 2003 in the case of* United Phosphorous Limited, *and 23 December 2002 in the case of* Unique Chemicals Limited. *The functioning of the factories of all three industries without a valid EC would have had an adverse impact on the environment, ecology and biodiversity in the area where they are located. The Comprehensive Environmental Pollution Index[4] report issued by the Central Pollution Control Board for 2009-2010 describes the environmental quality at 88 locations across the country. Ankleshwar in the State of Gujarat, where the three industries are located showed critical levels of pollution[5]. In the Interim Assessment of CEPI for 2011, the report indicates similar critical figures[6] of pollution in the Ankleshwar area. The CEPI scores for 2013[7] and 2018[8] were also significantly high. This is an indication that industrial units have been operating in an unregulated manner and in defiance of the law. Some of the environmental damage caused by the operation of the industrial units would be irreversible. However, to the extent possible some of the damage can be corrected by undertaking measures to protect and conserve the environment.*

45. Even though it is not possible to individually determine the exact extent of the damage caused to the environment by the three industries, several circumstances must weigh with the Court in determining the appropriate measure of restitution. First, it is not in dispute that all the three industries did obtain ECs, though this was several years after the EIA notification of 1994 and the commencement of production. Second, subsequent to the grant of the ECs, the manufacturing units of all the three industries have also obtained ECs for an expansion of capacity from time to time. Third, the MoEF had issued a circular on 5 November 1998 permitting applications for ECs to be filed by 31 March 1999, which was extended subsequently to 30 June 2001. On 14 May 2002, the deadline was extended until 31 March 2003 subject to a deposit commensurate to the investment made. The circulars issued by the MoEF extending time for obtaining ECs came to

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the notice of this Court in Goa Foundation (I) *v.* Union of India[9]. *Fourth, though in the context of the facts of the case, this Court in* Lafarge Umiam Mining Private Limited *v.* Union of India[10] *("Lafarge") has upheld the decision to grant ex post facto clearances with respect to limestone mining projects in the State of Meghalaya. In* ***Lafarge****, the Court dealt with the question of whether ex post facto clearances stood vitiated by alleged suppression of the nature of the land by the project proponent and whether there was non-application of mind by the MoEF while granting the clearances. While upholding the ex post facto clearances, the Court held that the native tribals were involved in the decision-making process and that the MoEF had adopted a due diligence approach in reassuring itself through reports regarding the environmental impact of the project."*

(Emphasis supplied)

46. After adverting to the decision in Lafarge, *another Bench of three learned judges of this Court in* Electrotherm (India) Limited *v.* Patel Vipulkumar Ramjibhai[11], *dealt with the issue of whether an EC granted for expansion to the appellant without holding a public hearing was valid in law. Justice Uday U. Lalit speaking for the Bench held thus:*

> *"19...the decision-making process in doing away with or in granting exemption from public consultation/public hearing, was not based on correct principles and as such the decision was invalid and improper."*

47. The Court while deciding the consequence of granting an EC without public hearing did not direct closure of the appellant's unit and instead held thus:

> *"20. At the same time, we cannot lose sight of the fact that in pursuance of environmental clearance dated 27-1-2010, the expansion of the project has been undertaken and as reported by CPCB in its affidavit filed on 7-7-2014, most of the recommendations made by CPCB are complied with. In our considered view, the interest of justice would be subserved if that part of the decision exempting public consultation/public hearing is set aside and the matter is relegated back to the authorities concerned to effectuate public consultation/public hearing.* ***However, since the expansion has been undertaken and the industry has been functioning, we do not deem it appropriate to order closure of the entire plant as directed by the High Court****. If the public consultation/public hearing results in a negative mandate against the expansion of the project, the authorities would do well to direct and ensure scaling down of the activities to the level that was permitted by environmental clearance dated 20-2-2008. If public consultation/public hearing reflects in favour of the expansion of the project, environmental clearance dated 27-1-2010 would hold good and be fully operative.* ***In other words, at this length of time when the expansion has already been undertaken, in the peculiar facts of this case and in order to meet ends of justice, we deem it appropriate to change the nature of requirement of public consultation/public hearing from pre-decisional to post-decisional. The public consultation/public hearing shall be organised by the authorities concerned in three months from today****."*

(Emphasis supplied)

48. Guided by the precepts that emerge from the above decisions, this Court has taken note of the fact that though the three industries operated without an EC for several years after the EIA notification of 1994, each of them had subsequently received ECs including amended ECs for expansion of existing capacities. These ECs have been operational since 14 May 2003 (in the case of Alembic Pharmaceuticals Limited), *17 July 2003 (in the case of* United Phosphorous Limited), *and 23 December 2002 (in the case of* Unique Chemicals Limited). *In addition, all the three units have made infrastructural investments and employed significant numbers of*

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workers in their industrial units.

49. In this backdrop, this Court must take a balanced approach which holds the industries to account for having operated without environmental clearances in the past without ordering a closure of operations. The directions of the NGT for the revocation of the ECs and for closure of the units do not accord with the principle of proportionality. At the same time, the Court cannot be oblivious to the environmental degradation caused by all three industries units that operated without valid ECs. The three industries have evaded the legally binding regime of obtaining ECs. They cannot escape the liability incurred on account of such noncompliance. Penalties must be imposed for the disobedience with a binding legal regime. The breach by the industries cannot be left unattended by legal consequences. The amount should be used for the purpose of restitution and restoration of the environment. Instead and in place of the directions issued by the NGT, we are of the view that it would be in the interests of justice to direct the three industries to deposit compensation quantified at Rs. 10 crores each. The amount shall be deposited with GPCB and it shall be duly utilised for restoration and remedial measures to improve the quality of the environment in the industrial area in which the industries operate. Though we have come to the conclusion, for the reasons indicated, that the direction for the revocation of the ECs and the closure of the industries was not warranted, we have issued the order for payment of compensation as a facet of preserving the environment in accordance with the precautionary principle. These directions are issued under Article 142 of the Constitution. Alembic Pharmaceuticals Limited, United Phosphorous Limited and Unique Chemicals Limited shall deposit the amount of compensation with GPCB within a period of four months from the date of receipt of the certified copy of this judgment. This deposit shall be in addition to the amount directed by the NGT. Subject to the deposit of the aforesaid amount and for the reasons indicated, we allow the appeals and set aside the impugned judgment of the NGT dated 8 January 2016 in so far as it directed the revocation of the ECs and closure of the industries as well as the order in review dated 17 May 2016."

88. The Notification being SO 804(E) dated 14th March, 2017 was not an issue in *Alembic Pharmaceuticals* (supra). This Court was examining the propriety and/or legality of a 2002 circular which was inconsistent with the EIA Notification dated 27th January, 1994, which was statutory. Ex post facto environmental clearance should not however be granted routinely, but in exceptional circumstances taking into account all relevant environmental factors. Where the adverse consequences of ex post facto approval outweigh the consequences of regularization of operation of an industry by grant of ex post facto approval and the industry or establishment concerned otherwise conforms to the requisite pollution norms, ex post facto approval should be given in accordance with law, in strict conformity with the applicable Rules, Regulations and/or Notifications. Ex post facto approval should not be withheld only as a penal measure. The deviant industry may be penalised by an imposition of heavy penalty on the principle of 'polluter pays' and the cost of restoration of environment may be recovered from it.

89. We are of the view that the High Court erred in passing the impugned order, vacating interim orders which had been in force for two years. The impugned order is not in conformity with the principle of proportionality. This is not a case where the steel plant was started without environmental clearance or consent of JSPCB. The Appellant had applied for and obtained environmental clearance to set up an integrated steel plant (3MTPA) on 1350 acres of land at Mauza South Parbatpur, as observed above. Environmental Clearance had been granted on 21st February 2008 and Consent to Operate had been granted by JSPCB on 5th May 2008.

90. The Appellant established its steel plant in Mauza Bhagaband, 5.3 kms away

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from the site for which EC and CTE had been granted. It is the contention of the Appellant that the shift is minor and makes no change in the EIA/EMP on the basis of which EC has been granted. The shift did not require fresh public hearing in terms of the Circular dated 22nd January 2010 of the MoEF.

91. As aforesaid, by a letter dated 2.12.2011 addressed to the Appellant, the MoEF confirmed that the steel plant of the Appellant was within the Environment Impact Area and the affected people had the opportunity to air their views in a public hearing. The question is whether the Petitioner was required to obtain fresh prior clearance for shifting or was covered by the exemption under the said Notification dated 22nd January 2010.

92. The Appellant has all along asserted that no part of the premises of the integrated steel plant is in any forest. As such there was no violation of the Indian Forest Act, 1927 or the Forest Conservation Act, 1980. The MoEF had also confirmed that the steel plant in question was well within the Environment Impact Area and the affected people had the opportunity in a public hearing. Be that as it may, whether the shifting of the site has really made any difference from the environmental impact angle requires consideration by the appropriate authority/forum.

93. In any case, the Appellant has duly applied for ex post facto forest clearance approval without prejudice to its rights and contentions that its steel plant is not on forest land and also applied for revised EC. On 17th December 2019, MoEF&CC accorded ex post facto in principle approval to the forest clearance proposal on the recommendations of the Forest Advisory Committee. The application for revised clearance is pending consideration. No final decision has however been taken, ostensibly in view of the interim order passed by the Madras High Court staying the operation of the Standard Operation Procedures issued vide Memorandum dated 7th July 2021.

94. The interim order passed by the Madras High Court appears to be misconceived. However, this Court is not hearing an appeal from that interim order. The interim stay passed by the Madras High Court can have no application to operation of the Standard Operating Procedure to projects in territories beyond the territorial jurisdiction of Madras High Court. Moreover, final decision may have been taken in accordance with the Orders/Rules prevailing prior to 7th July, 2021.

95. In passing the impugned order the High Court overlooked the consequences of closure of an integrated steel plant with a work force of 300 regular and 700 contractual workers. The High Court also failed to appreciate that the judgment of this Court in *Alembic Pharmaceuticals* (supra) was distinguishable on facts. Furthermore, continuance of the interim orders allowing operation of an industrial establishment or even the grant of revised EC to the industrial establishment cannot stand in the way of action against that establishment for contraventions, including the imposition of penalty, on the principle 'polluter pays'. The scope and effect of Section 32A of the IBC is a different issue. This Court need not examine into the question of whether penal action can be initiated against the Appellant or, whether compensation can be recovered from the Appellant, at this stage. The issue may be decided by the appropriate authority at the appropriate stage when it adjudicates an action for penalization of the Appellant or recovery of compensation from the Appellant. The application of the Appellant for revised EC, CTO etc. shall be considered strictly in accordance with environmental norms.

96. The appeals are allowed. The impugned order is set aside. The Respondent No. 1 shall take a decision on the application of the Appellant for revised EC in accordance with law, within three months from date. Pending such decision, the operation of the steel plant shall not be interfered with on the ground of want of EC, FC, CTE or CTO.

———

[1] (1996) 3 SCC 212

[2] 2020 SCC OnLine SC 347

[3] (2011) 7 SCC 338

[4] "CEPI"

[5] CEPI score - 88.50

[6] CEPI score - 85.75

[7] CEPI score - 80.93

[8] CEPI score - 80.21

[9] (2005) 11 SCC 559

[10] (2011) 7 SCC 338

[11] (2016) 9 SCC 300

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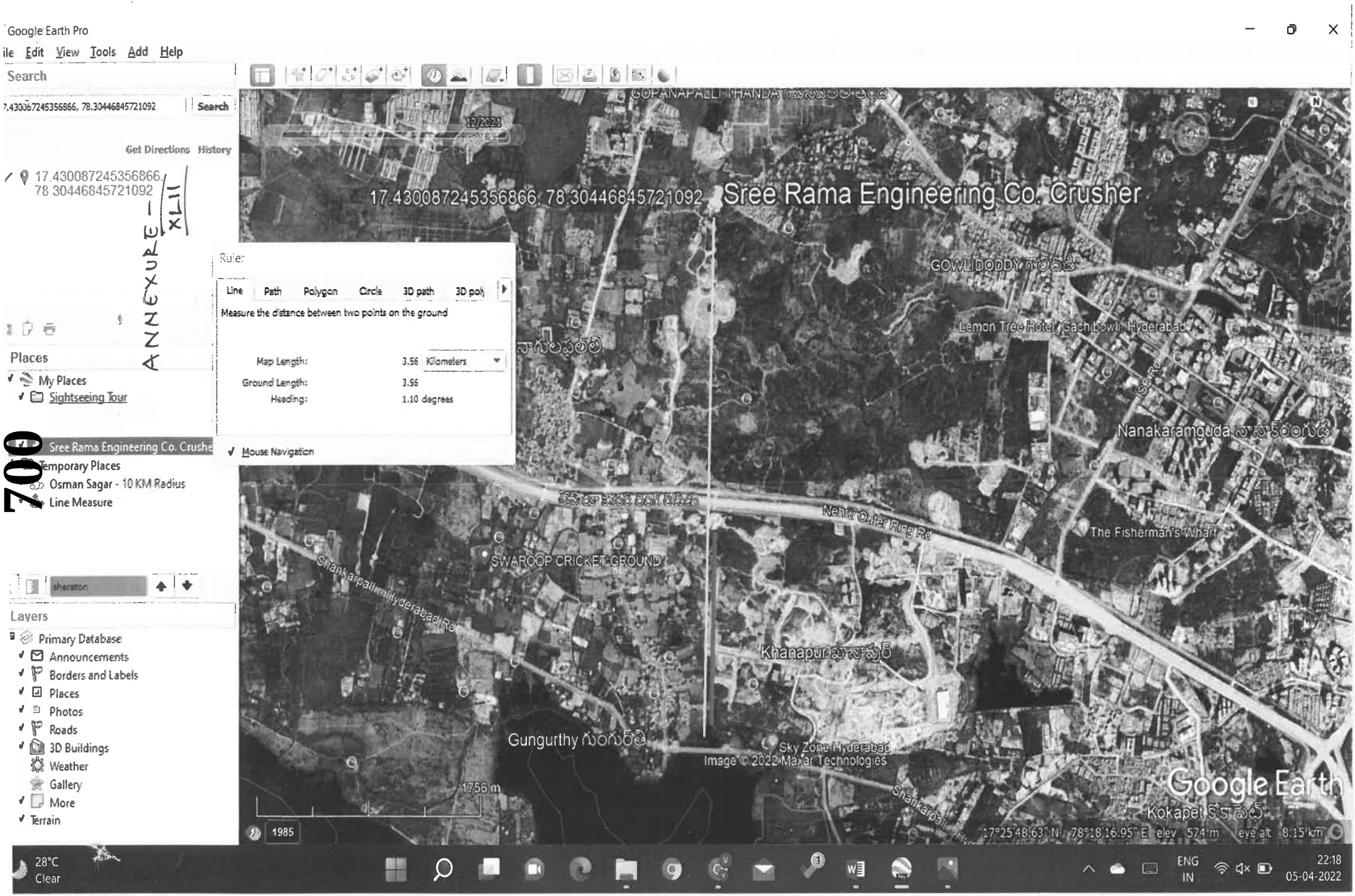
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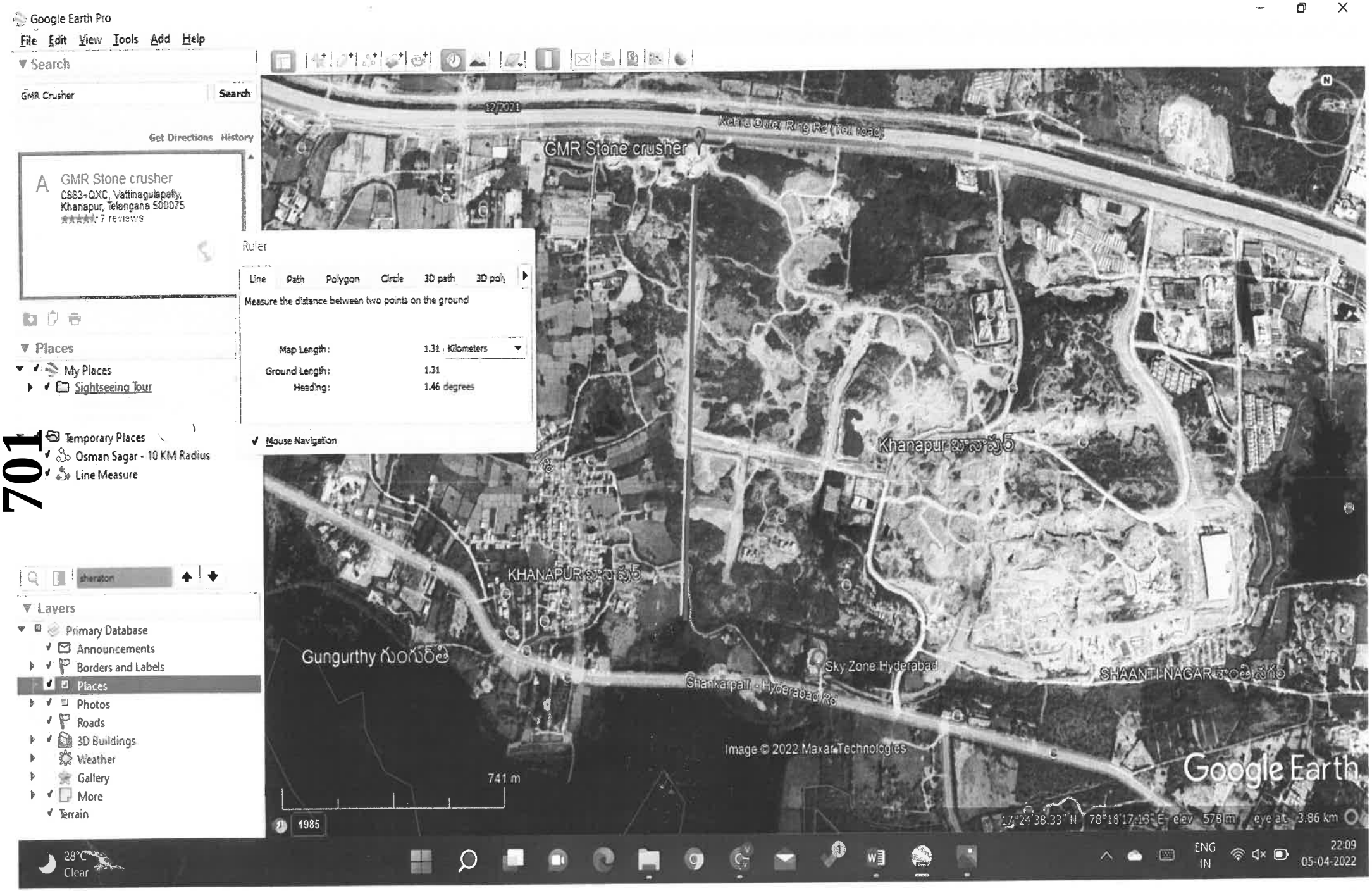
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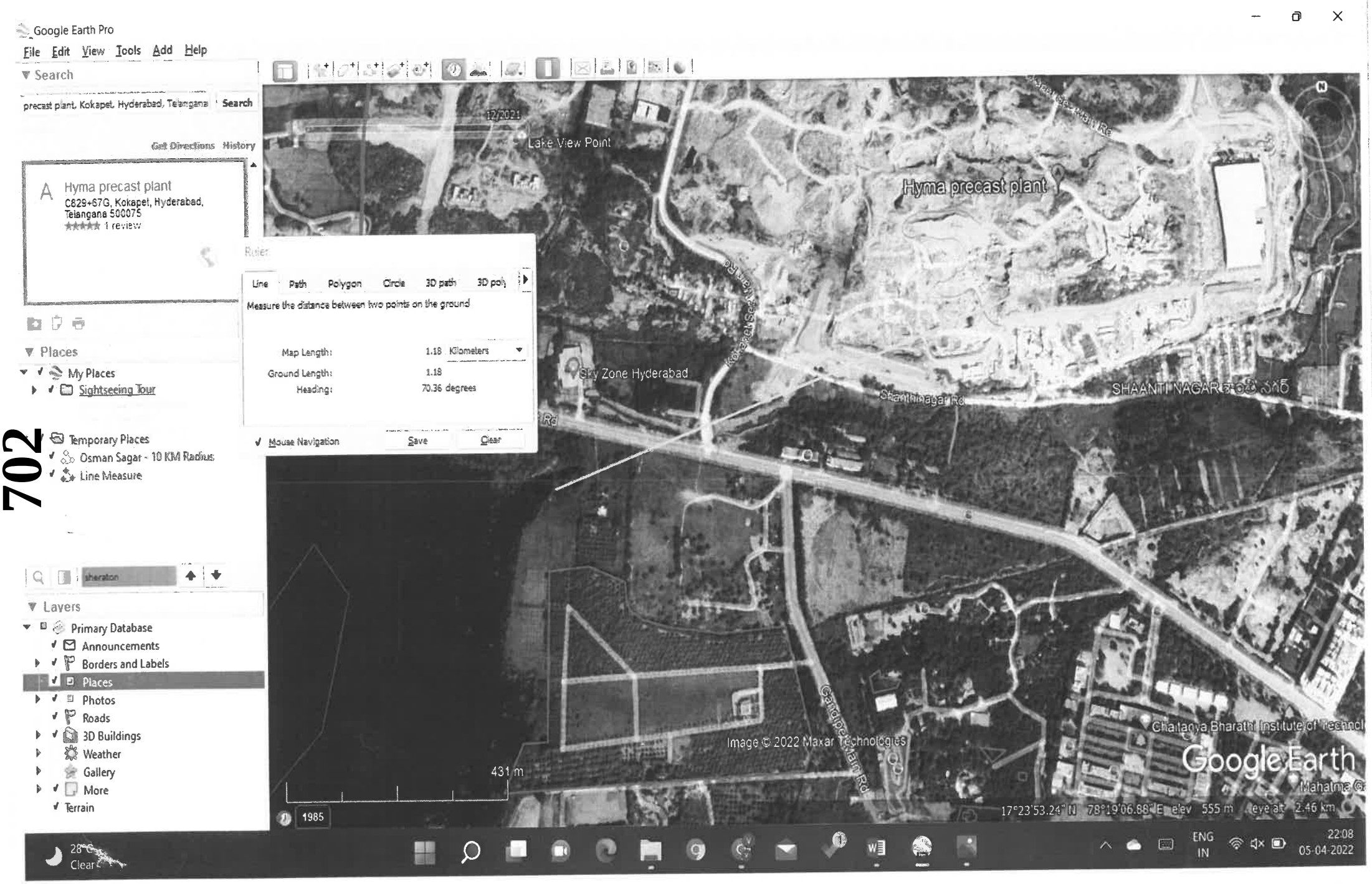
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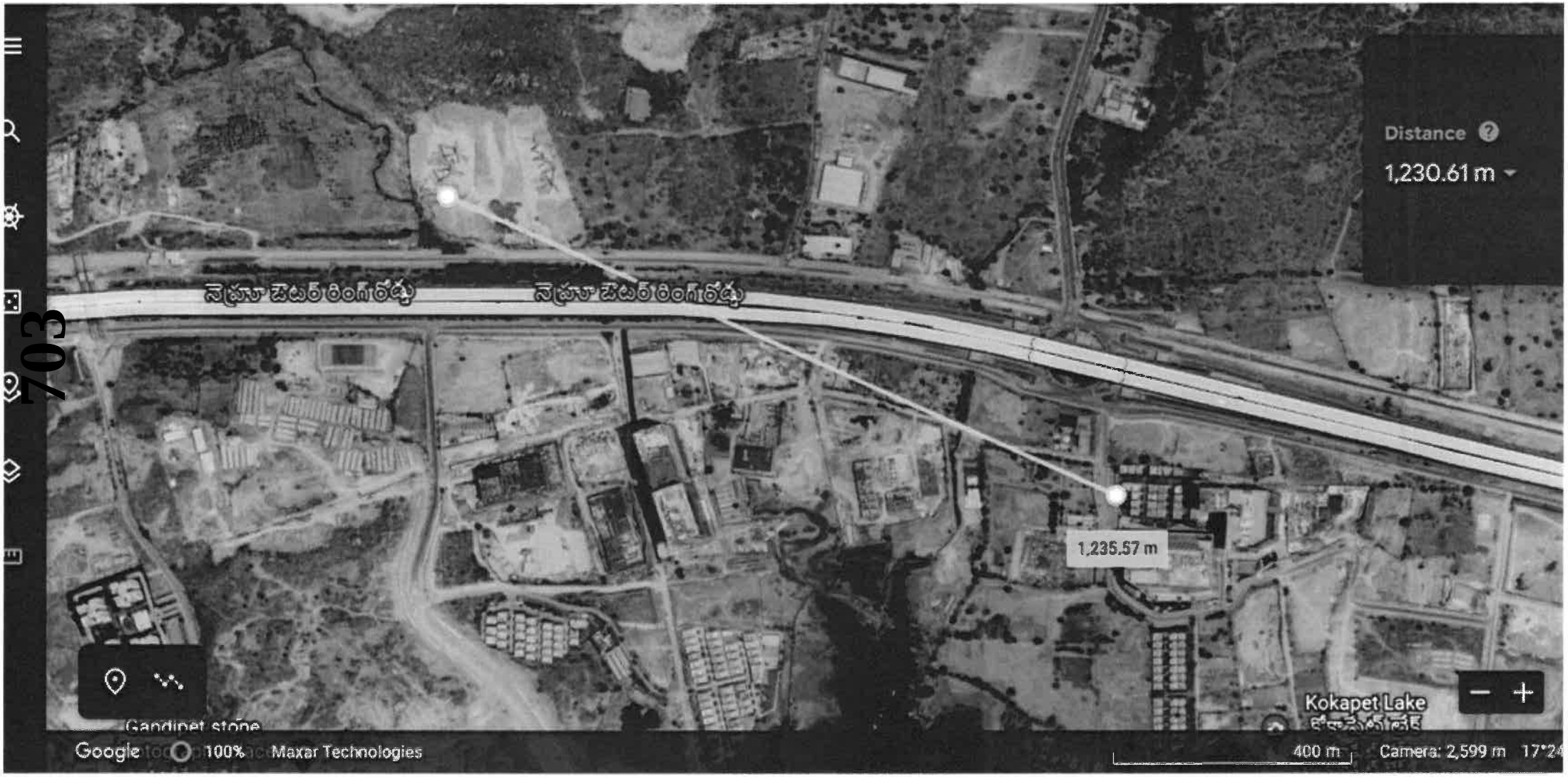

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Use sand resources 'wisely' or risk development fallout – UNEP report

705
ANNEXURE - XLIII

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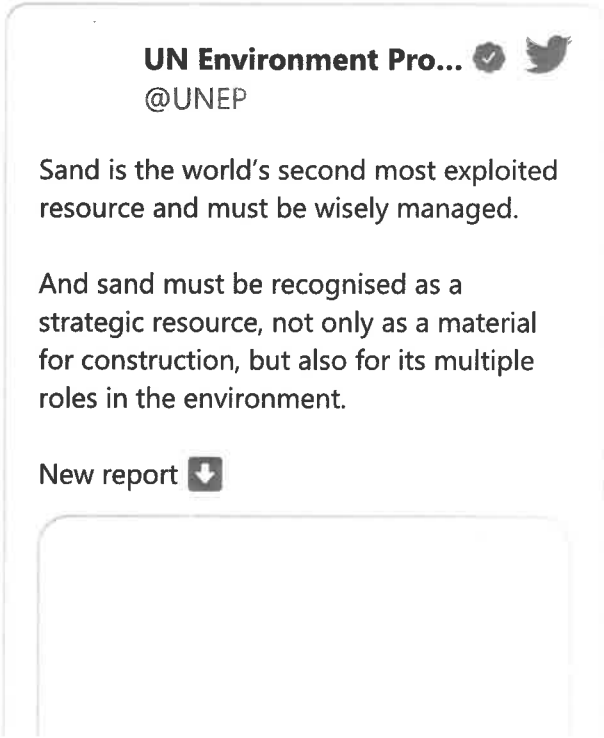
26 April 2022 | Climate and Environment (/en/news/topic/climate-change)

All countries should be aware that their development is at stake unless they take better care of a common but precious resource, found on many of the world's beaches, and in our seas, the UN Environment Programme (UNEP) said in a new report launched on Tuesday.

Sand and Sustainability: 10 Strategic Recommendations to Avert a Crisis (https://www.unep.org/resources/report/sand-and-sustainability-10-strategic-recommendations-avert-crisis), makes clear that the world cannot continue to keep taking 50 billion tonnes of sand out of the ground and sea every year without serious consequences.

"Our sand resources are not infinite, and we need to use them wisely," said Pascal Peduzzi, Director of GRID-Geneva at UNEP (https://www.unep.org/) and report programme coordinator.

"To achieve sustainable development, we need to drastically change the way we produce, build and consume products, infrastructures and service."



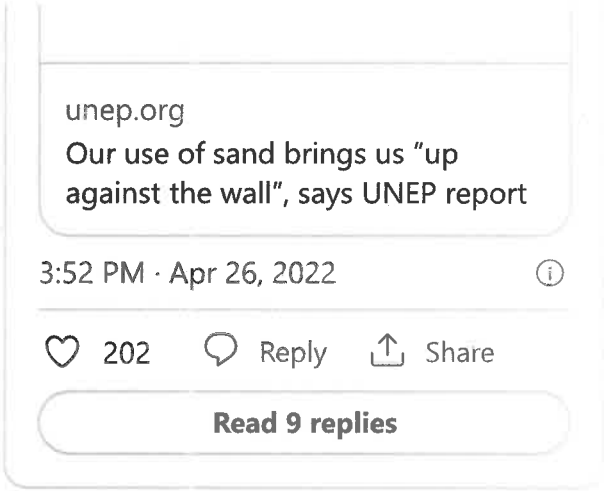
Precious resource

After water, sand is the most used resource globally.

The world uses 50 billion tonnes of sand and gravel each year, enough to build a wall 27 metres wide and 27 metres high around planet Earth.

Given our dependency on it, sand must be recognized as a strategic resource and its extraction and use needs to be rethought, the new report finds.

"If we can get a grip on how to manage the most extracted solid material in the world, we can avert a crisis and move toward a circular economy," said Mr. Peduzzi.



Extract mindfully

The report provides guidance on switching to improved practices for extracting and managing the resource.

According to its authors, sand must be recognized as more than a construction material, but as a strategic resource with multiple roles in the environment.

Extracting sand from rivers and coastal or marine ecosystems can lead to erosion, salination of aquifers, loss of protection against storm surges and impacts on biodiversity – posing a threat to livelihoods, including through water supply, food production or fisheries, as well as the tourism industry.

The authors stress that governments, industries and consumers should price sand in a way that recognizes its true social and environmental value.

Shifting sands?

Keeping sand on coasts may be the most cost-effective strategy for climate adaptation because it protects against storm surges and sea level rise. They argue that such services should be factored into its value.

Moreover, the report proposes that an international standard be developed on how sand is extracted from the marine environment, underscoring that it could bring about dramatic improvements as most marine dredging is done through public tenders, open to international companies.

It also recommends banning sand extraction from beaches as it is crucial for coastal resilience, the environment and the economy.

"Given our dependency on sand, it should be recogniszd as a strategic resource and its extraction and use needs to be reassessed", Mr. Peduzzi attested.

Global Goals impact

As an essential element in producing concrete for vital infrastructure, sand is critical to economic development.

It also provides habitats for flora and fauna while supporting biodiversity, including marine plants that act as carbon sinks or filter water.

Despite its importance in achieving the Sustainable Development Goals (https://www.un.org/sustainabledevelopment/sustainable-development-goals/) (SDGs (https://sustainabledevelopment.un.org/sdgs)) and tackling the triple planetary crisis of climate change, pollution and biodiversity loss, sand is being used faster than it can be naturally replenished, making its responsible management crucial.

Circular economy

Banning the landfilling of mineral waste and encouraging sand to be reused in public procurement contracts, are among the policy measures cited that will aid the move towards a virtuous, circular economy for sand.

The report also details that crushed rock, recycled construction, demolition material, and 'ore-sand' from mine tailings are viable alternatives that should be incentivized.

For sand to be more effectively governed and best practices implemented, new institutional and legal structures are needed.

Sand resources must furthermore be mapped, monitored and reported on, the report recommends, and everyone involved in decisions related to its management, allow for place-based approaches and avoid one-size-fits-all solutions, the paper stressed.

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Our use of sand brings us "up against the wall", says UNEP report

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- Strategic recognition for sand and actions across sectors needed, report urges
- Sand is the world's second most exploited resource and must be wisely managed
- Legal changes, recycled building material, crushed rock and 'ore-sand' from mining, among solutions.

Geneva, 26 April 2022 – 50 billion tons: enough to build a wall 27 metres wide and 27 metres high around planet Earth. This is the volume of sand and gravel used each year, making it the second most used resource worldwide after water. Given our dependency on it, sand must be recognised as a strategic resource and its extraction and use needs to be rethought, finds a new report by the United Nations Environment Programme (UNEP).

The report, Sand and Sustainability: 10 strategic recommendations to avert a crisis, released today by UNEP's GRID-Geneva team, provides the necessary guidance gathered from world experts to switch to improved practices for the resource's extraction and management.

Extracting sand where it plays an active role, such as rivers, and coastal or marine ecosystems, can lead to erosion, salination of aquifers, loss of protection against storm surges and impacts on biodiversity, which pose a threat to livelihoods through, among other things, water supply, food production, fisheries, or to the tourism industry.

According to the report's authors, sand must be recognised as a strategic resource, not only as a material for construction, but also for its multiple roles in the environment. They stress that governments, industries and consumers should price sand in a way that recognises its true social and environmental value. For example, keeping sand on coasts may be the most cost-effective strategy for adapting to climate change due to how it protects against storm surges and impacts from sea level rise - such services should be factored into its value.

An international standard on how sand is extracted from the marine environment should also be developed, the report proposes. This could bring about dramatic improvements as most marine dredging is done through public tenders open to international companies. Meanwhile, the report recommends that the extraction of sand from beaches be banned due to its importance for coastal resilience, the environment and the economy.

"To achieve sustainable development, we need to drastically change the way we produce, build and consume products, infrastructures and services. Our sand resources are not infinite, and we need to use them wisely. If we can get a grip on how to manage the most extracted solid material in the world, we can avert a crisis and move toward a circular economy," said Pascal Peduzzi, Director of GRID-Geneva at UNEP and overall programme coordinator for this report.

Infrastructure, homes, food and nature at stake

Sand is critical to economic development, needed to produce concrete and build vital infrastructure ranging from homes and roads to hospitals. By providing habitats and breeding grounds for diverse flora and fauna, sand also plays a vital function in supporting biodiversity, including marine plants that act as carbon sinks or filter water. The resource will be crucial to achieving the Sustainable Development Goals and tackling the triple planetary crisis of climate change, pollution and biodiversity loss. However, it is being used faster than it can be naturally replenished, so its responsible management is crucial.

A circular economy is within reach

The authors note that solutions exist for moving towards a circular economy for sand, including banning the landfilling of mineral waste and encouraging sand to be reused in public procurement contracts are among the policy measures cited. Crushed rock or recycled construction and demolition material, as well as 'ore-sand' from mine tailings are among the viable alternatives to sand that should also be incentivised, the report details.

They add that new institutional and legal structures are needed for sand to be more effectively governed and best practices shared and implemented. Sand resources must furthermore be mapped, monitored and reported on, the report recommends. Meanwhile, all stakeholders must be involved in decisions related to the management of sand to allow for place-based approaches and avoid one-size-fits-all solutions, the paper stresses.

The report follows a resolution on Mineral resource governance adopted at the fourth United Nations Environment Assembly (UNEA) that called for actions on sustainable sand management. This mandate was confirmed at UNEA-5 in 2022 in the new resolution titled Environmental aspects of minerals and metals management, adopted by all member states.

NOTES TO EDITORS

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Sand and Sustainability: 10 strategic recommendations to avert a crisis

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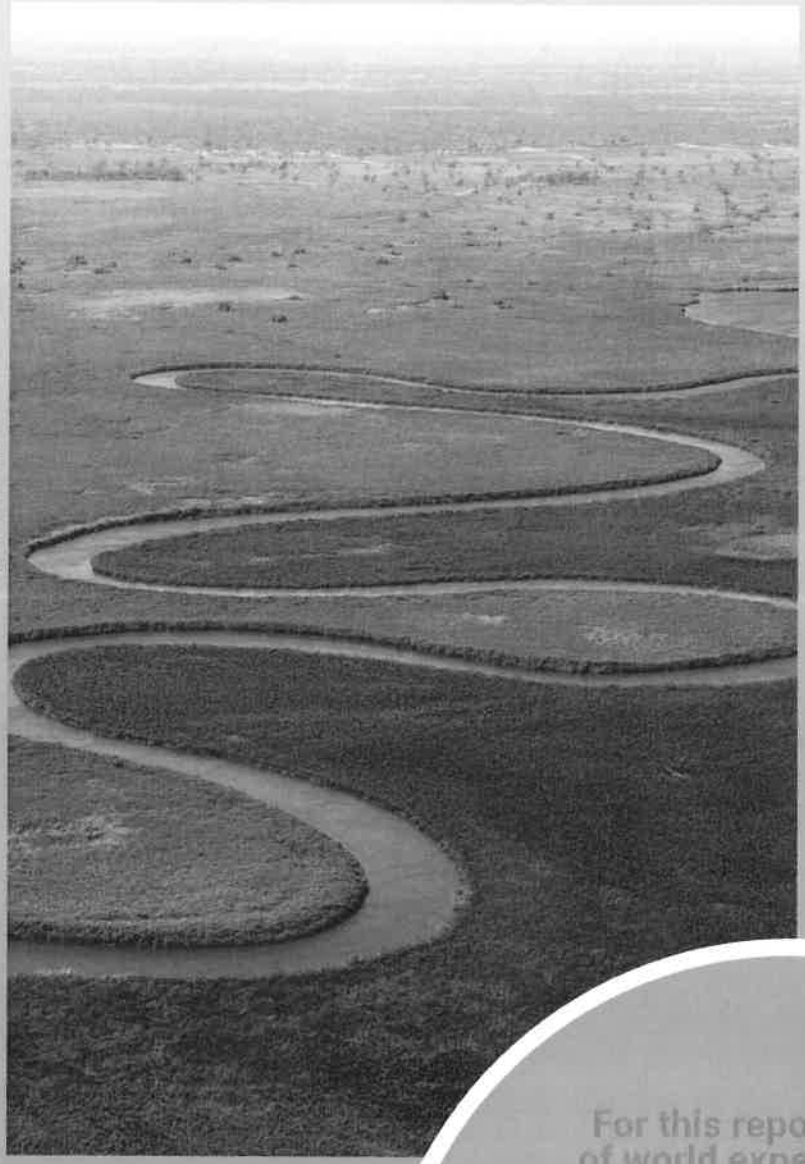
1 Specific contributions available in the appendix.

Table of Contents

Acknowledgements IV
Foreword VI
Abbreviations VIII
Glossary X
Executive Summary XIII
Introduction 2
Recommendation 1 : Recognise sand as a strategic resource 8
Recommendation 2 : Include place-based perspectives for just sand transitions 13
Recommendation 3 : Enable a paradigm shift to a regenerative and circular future 17
Recommendation 4 : Integrate policy & legal frameworks strategically 23
Recommendation 5 : Establish ownership and access to sand resources through mineral rights and consenting 29
Recommendation 6 : Map, monitor and report sand resources 33
Recommendation 7 : Establish best practices, national standards, and a coherent international framework 39
Recommendation 8 : Promote resource efficiency & circularity 43
Recommendation 9 : Source responsibly 51
Recommendation 10 : Restore ecosystems and compensate remaining losses 55
Conclusion 61
Bibliography 64
Appendix 73



Foreword

For this report, a group of world experts from all sectors was convened to propose 10 solution-oriented recommendations to this impending sand crisis.

I encourage all stakeholders, including governments, industry, and civil society to take this opportunity and start the necessary transformations in our institutions, businesses, and societies in how we manage and use sand.

Foreword

When the United Nations Environment Programme (UNEP) released its first report on sand in 2014, the issue of sand and sustainability had not received considerable scientific, nor policy, attention at the inter-governmental level. Despite sand being the most used solid material (50 billion tonnes per year), global attention about the sheer scale and impact of sand extraction remains limited.

All countries and most sectors need sand. As this report shows, sand resources play a strategic key role in delivering ecosystem services, maintaining biodiversity, supporting economic development, and securing livelihoods within communities. Indeed, sand is increasingly vital for building the very foundations of our societies: our homes, the schools for our children, the dams and photovoltaic panels to produce renewable energy. Sand is also essential for building the roads, bridges, hospitals, and infrastructure that are key to human development. Sand is thus the unrecognised hero of our development.

The world has been living with easy-to-access sand resources. Consequently, sand is being used faster than it can be replenished by natural geological processes in some locations, while damages to ecosystems is occurring in others. As the global urban population will increase to represent over 68% of the world population by 2050, and as cities expand and urban infrastructure is upgraded, demand for sand will only increase. Yet, sand in the natural environment supports fisheries, biodiversity, protects against coastal erosion and salinisation of aquifers, and serves as a natural filtration of water. Until now we may have considered sand as a common material; it is time to reassess and recognise sand as a strategic material.

We now find ourselves in the position where the needs and expectations of our societies cannot be met without improved governance of sand resources. The sand and sustainability challenge is already being considered by the international community. In 2019, the 4th United Nations Environment Assembly (UNEA-4) adopted UNEA resolution 4/19 on Mineral Resource Governance, which specifically included sand as a topic of concern. At UNEA-5 in 2022, Member States requested for more information on sustainable practices related to, amongst others, sand as a mineral, as acknowledged in the UNEA resolution 5/12 on minerals and metals management. Additionally, the International Union for the Conservation of Nature (IUCN) has called for the urgent global management of marine and coastal sand resources.

For this report, a group of world experts from all sectors was convened to propose 10 solution-oriented recommendations to this impending sand crisis. They include, namely, adopting integrated policy and legal frameworks, mapping sand resources, promoting resource efficiency and circularity, sourcing responsibly and restoring our ecosystems. The overarching purpose of this report is to encourage policy makers at all governance levels to adopt relevant policies and standards, and promote best practices, in tune with local sand dependencies and development imperatives.

If we act now, it is still possible to avoid a sand crisis. I encourage all stakeholders, including governments, industry, and civil society to take this opportunity and start the necessary transformations in our institutions, businesses, and societies in how we manage and use sand.

Sheila Aggarwal-Khan
Director, Economy Division
United Nations Environment Programme

Abbreviations

Table 1 : Abbreviations and acronyms

Term	Definition
BMAPA	British Marine Aggregate Producers Association
BRE	Building Research Establishment
C&DW	Construction and demolition waste
CIDA	Construction Industry Development Authority (of Sri Lanka)
DWCRA	Development of Women and Children in Rural Areas
DSS	Decision support system
EC	European Commission
EU	European Union
EZZ(s)	Exclusive economic zone(s)
EIA	Environmental impact assessment
EMSAGG	European Marine Sand and Gravel Group
EPFL	École polytechnique fédérale de Lausanne
FAIR	Findable, accessible, interoperable, and reusable
FIR	Fédération Internationale du Recyclage
FOEN	Federal Office for the Environment (of Switzerland)
GAIN	Global Aggregates Information Network
GESAMP	Group of Experts on the Scientific Aspects of Marine Environmental Protection
GHGs	Greenhouse Gasses
GMSL	Global Mean Sea Level
GRID	Global Resources Information Database
GST	Goods and Services Tax
IADC	International Association of Dredging Companies
ICES	International Council for the Exploration of the Sea
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resource Panel
IUCN	International Union for Conservation of Nature
LCA	Life cycle assessment
LCI	Life Cycle Inventory
LSE	London School of Economics
MFA	Material Flows Analysis
MPA	Mineral Products Association
NbS	Nature-based Solution(s)
NetWwater	Network of Women Water Professionals
NGO(s)	Non-governmental organisation(s)
RSM	River sand mining
SLWP	Sri Lanka Water Partnership
SMI	Sustainable Minerals Institute (at the University of Queensland)
UEPG	European Aggregates Association
UN	United Nations
UNDP	United Nations Development Programme
UNEA	United Nations Environmental Assembly
UNEP	United Nations Environment Programme

UNFC	United Nations Framework Classification
UNIGE	University of Geneva
UQ	The University of Queensland
USA	United States of America
USGS	United States Geological Survey
WWF	World Wildlife Fund/Worldwide Fund for Nature
SDGs	Sustainable Development Goals
SEEA	System of Environmental Economic Accounting
SFS	Spent Foundry Sand
VAT	Value-Added Tax

Glossary

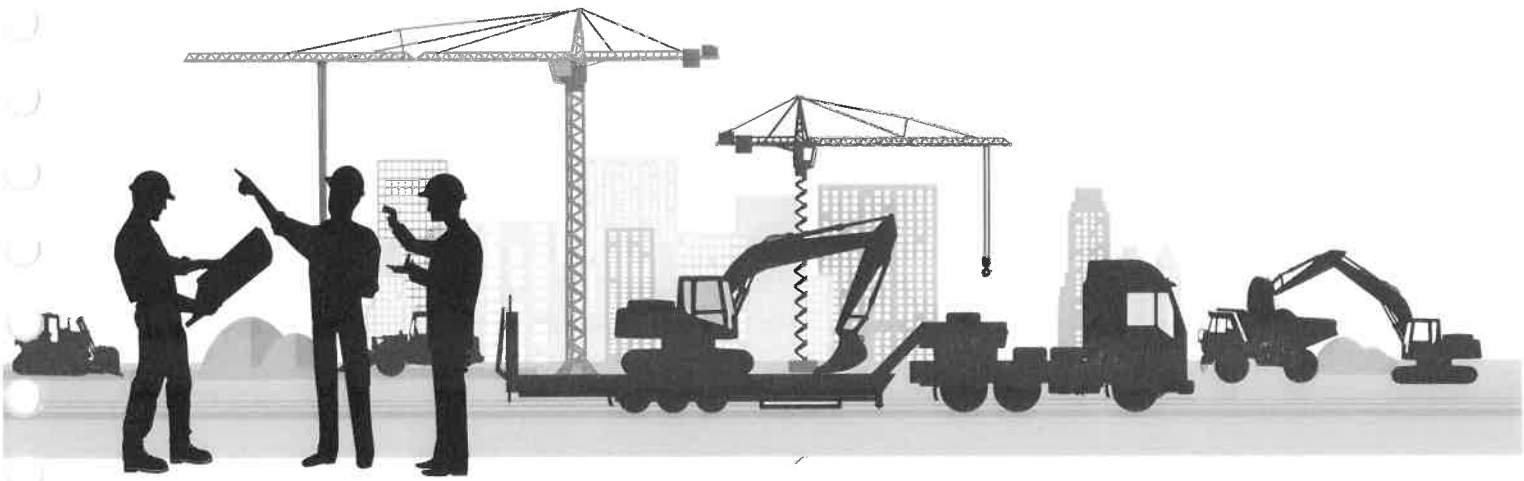
Although the issue of the management of sand and gravel resources is gaining international recognition, there are no universally accepted terminology and basic definitions, including of sand itself. It should be noted that the definitions below vary by industry and region.

Within the framework of the Global Sand Observatory initiative, UNEP/GRID-Geneva initiated an open-ended review on terms and definitions related to sand resource governance in consultation with a growing network of experts. The terms reviewed in 2021 are presented in (UNEP/GRID-Geneva 2022a) and (UNEP/GRID-Geneva 2022b) and provide further information on the definitions used in this glossary. The terms are presented in alphabetical order.

Table 2 : Definition of terms used	
Aggregate	Aggregate is a granular material of natural, processed, or recycled origin used essentially for construction purposes with an upper grain size limit of 75mm (UNEP/GRID-Geneva 2022a).
Primary materials	Sand, gravel, and crushed rock extracted from the natural environment (UNEP/GRID-Geneva 2022a).
Crushed rock	A mineral granular material which is the result of mechanical crushing of rock. Crushed rock usually also involves screening and possibly washing.
Circular economy	An economic system in which products and materials are designed in such a way that they can be reused, remanufactured, recycled or recovered and thus maintained in the economy for as long as possible, along with the resources of which they are made, and the generation of waste, especially hazardous waste, is avoided or minimised, and GHGs are prevented or reduced (UNEP/EA.1/Res.1).
Development Minerals	Minerals and materials that are mined, processed, manufactured, and used domestically in industries such as construction, manufacturing, infrastructure, and agriculture (Franks 2020).
Efficiency	Efficiency is a broad concept that compares the inputs to a system with its outputs, essentially achieving more with less in common usage (IRP and UNDP 2017). However different efficiencies are important in different disciplines relevant to sand and gravel sourcing, use and management.
Ecosystem services	Functions and processes which ecosystems provide, and which affect human well-being. They include (a) provisioning services such as food, water, timber, and fibre; (b) regulating services such as the regulation of climate, floods, disease, wastes, and water quality; (c) cultural services such as recreation, aesthetic enjoyment, and spiritual fulfilment; and (d) supporting services such as soil formation, photosynthesis, and nutrient cycling (Millennium Ecosystem Assessment 2005).
Environmental impact assessment	The assessment of the consequences of a plan, policy, program, or major projects prior to the decision to move forward with the proposed action. Both environmental and social aspects can be considered to complement cost-based assessments. EIA is a well-established assessment framework in infrastructure projects (e.g., for dams, motorways, airports, or factories).
Extraction rates	The rate at which sand resources are removed from the natural environment by volume over time.
Governance	The on-going interaction and co-evolution between public and/or private entities with the purpose of realising a collective interest. This process can vary in its level of institutionalisation, collaboration, and ability to adapt to change. The collective interest in the context of responsible sourcing and use of sand and its alternatives include human wellbeing, environmental quality and economic performance being maintained or enhanced equitably for resilience (Cairney 2021).

Gravel	A mineral granular material which does not stick together when wet and remolded (i.e., non-cohesive) and where the combined weight of 50% of the particles is larger than 4.75mm but smaller than 75mm with less than 15% of material smaller than 75µm. For a precise and correct description of gravel, it is highly recommended to use secondary qualifiers (UNEP/GRID-Geneva 2022a).
Inactive sand bodies	A deposit of sand that lies outside of the influence of modern erosional and depositional processes. In geological terms, these sediments can be described as relict or fossil.
Life cycle assessment	The evaluation of the expected environmental and social impacts of a product, service, or any other type of system (company, region, country). LCAs, also called footprints, provide a systemic perspective considering the full extraction-production-consumption chains needed to deliver a service. They consider multiple indicators including climate-change, biodiversity loss, eutrophication, impacts on human health, water use and scarcity, resource use, etc.
Marine sand	Sand derived from near- and offshore deposits, beaches, bays, and lagoons (UNEP/GRID-Geneva 2022a).
Natural/green infrastructure	Refers to a strategically planned and managed network[s] of natural lands, such as forests and wetlands, working landscapes, and other open spaces that conserves or enhances ecosystem values and functions and provides associated benefits to human populations (UNEP 2021c).
Naturally occurring sand	Sand sourced from the natural environment, which does not include crushed rock.
Nature-based Solutions	Actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. (IUCN 2016).
Ore-sand (O-sand)	A type of processed sand sourced as a co-product or by-product of mineral ores. Typically, it is a result of mechanical crushing and grinding, different physical and physicochemical beneficiation processes for mineral concentrates recovery, including optimisation of these processes and additional processing stages to achieve the required properties of sand. (Gallagher et al. 2021 ; Golev et al. 2022).
Policy	Policy is difficult to define particularly across the varied domains that are core to sand and sustainability. The term can mean : a domain of interest ; an intended outcome or proposal for action by any policy actors ; formal decisions taken by government, private sector or other policy actors or the process to take such decisions ; government plans, programs, legal frameworks, or legislation (Cairney 2019).
River sand	Sand derived from river channels, estuaries, deltas, and river floodplains (UNEP/GRID-Geneva 2022a) but does not cover sand sourced from lakes (lacustrine sand).
Sand	A mineral granular material that does not stick together when wet and remoulded (i.e., non-cohesive) and where the combined weight of 50% of the particles is smaller than 4.75mm, with less than 15% of material smaller than 75µm. For a precise and correct description of sand, secondary qualifiers are highly recommended (UNEP/GRID-Geneva 2022a).
Sand extraction	The removal of primary (virgin, natural) sand resources from the natural environment (terrestrial, riverine, lacustrine, coastal, or marine) (UNEP 2019). Sand can be removed for infrastructure works without the objective of using it as a resource (e.g., the construction of a channel).
Sand mining	The removal of primary (virgin, natural) sand resources from the natural environment (terrestrial, riverine, lacustrine, coastal, or marine) as a resource for subsequent processing or use.
Sand resources	An abbreviation used to denote sand, gravel, crushed rock, and aggregates. [Also used as: Global sand resources].
Scale	Scale refers to spatial, temporal, jurisdictional, institutional, management, networks, knowledge scales. 'Level' refers to the different units of analysis possible in each of these scales (Cash et al. 2016).

Secondary aggregates/ material	Secondary aggregates/raw materials can include both recycled and reused aggregates and material (UNEP/GRID-Geneva 2022a).
Silica sand	Sand with a high silica concentration fit for industrial uses (UNEP/GRID-Geneva 2022a).
Sustainability	Sustainability means transforming our ways of living to maximise the chances that environmental and social conditions will indefinitely support human security, well-being, and health (UNEP 2019).
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland Commission 1987).
Sustainable infrastructure	Any infrastructure that is planned, designed, constructed, operated, and decommissioned in a manner that ensures economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire infrastructure lifecycle (UNEP 2021c)
Sustainable sand management	Ensuring that (a) consumption does not exceed levels of sustainable supply and (b) that the earth 's systems are able to perform their natural functions (e.g., that sediment flows in river basins continue). The objective is to ensure the long-term material basis of societies in a way that resource extraction, use, and waste and emissions management do not surpass key thresholds for long-term environmental sustainability and human wellbeing (UNEP 2019).
Sustainable sand supply	Amount of resources that can be extracted and used for production and consumption before the threshold of a safe operating space is surpassed (UNEP 2019).



Executive Summary

Executive Summary

Sand plays a strategic role in delivering ecosystem services, maintaining biodiversity, supporting economic development, and providing livelihoods within communities. It is linked to all 17 Sustainable Development Goals (SDGs) either directly or indirectly. Despite the strategic importance of sand, its extraction, sourcing, use, and management remain largely ungoverned in many regions of the world, leading to numerous environmental and social consequences that have been largely overlooked (Peduzzi 2014 ; UNEP 2019).

"Sand and Sustainability : 10 strategic recommendations to avert a crisis" therefore consolidates the expertise in sand and sustainability from different sectors to bring attention to the impacts from the current state of extraction, use and (mis)management, putting forward recommendations for actions to set the global sand agenda in addressing environmental sustainability needs alongside justice, equity, technical, economic, and political considerations.

The Case for Better Governance & Management of Sand Resources

The sand and sustainability challenge is undoubtedly complex; real solutions will need to be cross-sectoral, and in some cases cross-border, where immediate actions across all scales of governance are needed to avert a global crisis.

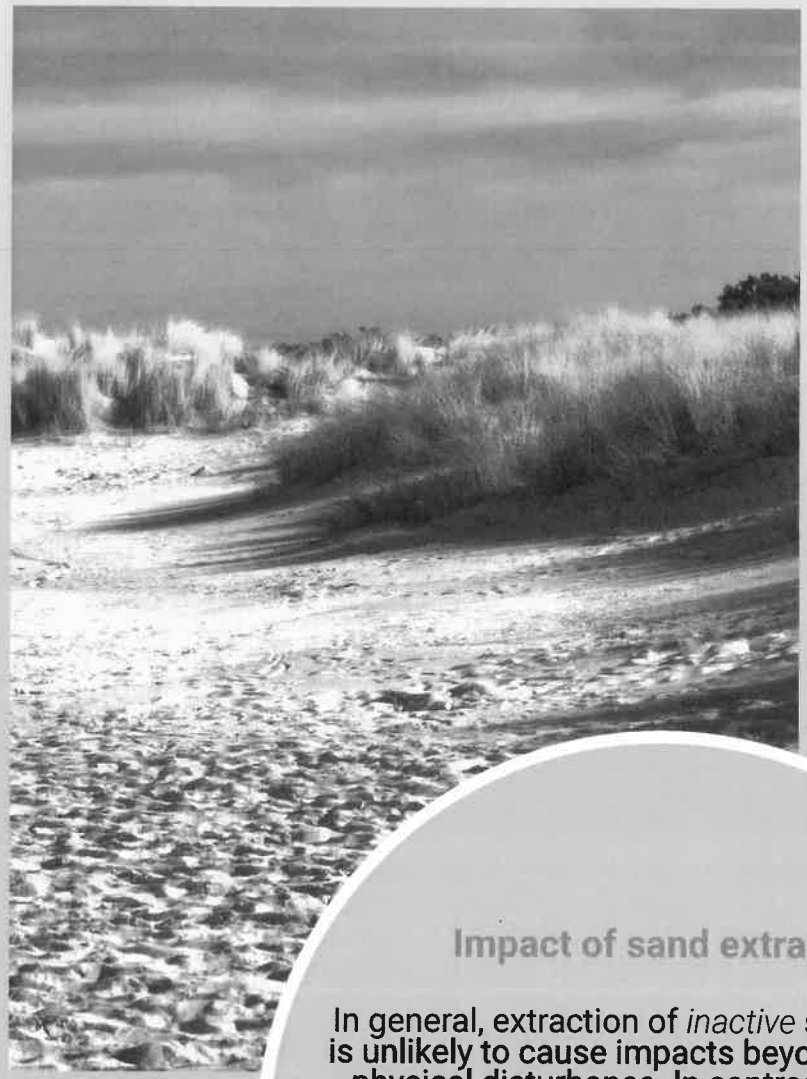
A holistic approach that covers the entire value chain of the sector is therefore required. As such, these 10 recommendations are organised under three broad levels:

- **Setting the overarching agenda - Recommendation 1 to 3** are principles for the overall governance of sand resources. Recognising and formalising sand as a strategic resource at all levels of government and society is a crucial step in the transition towards sustainable sand resource governance and management. Similarly, a place-based approach and the participation and inclusion of all people in decision making are crucial, and necessary to avoid the pitfalls of one-size-fits-all solutions. Breaking down silos and promoting diverse materials, methods and models are necessary for the paradigm shift towards a circular future. Together, they provide a collective vision that could be conferred with institutional (through law or policy) and perceived legitimacy (stakeholder agreement).
- **Setting the (right) institutional and legal structure - Recommendation 4 and 5** propose changes to governmental and legal structures through integrating policy and legal frameworks horizontally, vertically and intersectionally to manage sand resources, and creating an effective mineral ownership and access framework (extending onshore and offshore) that will also allow for a locally acceptable commercial mechanism for cost recovery.
- **Implementation - Recommendation 6 to 10** are instruments that are vital in managing sand as a resource; from mapping, monitoring, and reporting sand resources to putting together best practices and national standards, and a coherent international framework; from promoting innovation and experimentations with new ways to substitute sand, and responsible sourcing, to advancing knowledge and practices that could restore ecosystems and compensate for remaining losses.

It is important to note that these three levels of recommendations reinforce one another, driving towards governance that should be effective, equitable, responsive, and robust (Bennett and Satterfield 2018).

The following ten recommendations offer guidance on how sand resources should be governed and managed in a responsible, sustainable, and just manner :

Table 3 : 10 Recommendations to Avert a Crisis	
Recommendation 1	**Recognise sand as a strategic resource** that delivers critical ecosystem services and underpins the construction of vital infrastructure in expanding towns and cities globally.
Recommendation 2	**Include place-based perspectives for just sand transitions**, ensuring the voices of all impacted people are part of decision-making, agenda-setting and action.
Recommendation 3	**Enable a paradigm shift to a regenerative and circular future.**
Recommendation 4	**Adopt strategic and integrated policy and legal frameworks** horizontally, vertically and intersectionally, in tune with local, national, and regional realities.
Recommendation 5	**Establish ownership and access to sand resources** through mineral rights and consenting.
Recommendation 6	**Map, monitor and report sand resources** for transparent, science-based and data-driven decision-making.
Recommendation 7	**Establish best practices and national standards, and a coherent international framework**
Recommendation 8	**Promote resource efficiency & circularity** by reducing the use of sand, substituting with viable alternatives and recycling products made of sand when possible.
Recommendation 9	**Source responsibly** by actively and consciously procuring sand in an ethical, sustainable, and socially conscious way.
Recommendation 10	**Restore ecosystems and compensate for remaining losses** by advancing knowledge, mainstreaming the mitigation hierarchy, and promoting nature-based solutions.



Impact of sand extraction

In general, extraction of *inactive* sand deposits is unlikely to cause impacts beyond immediate physical disturbance. In contrast, extraction from *active* sand bodies resulting in changing rates of sand transport (e.g., in rivers or in coastal and nearshore marine zones) could lead to erosion threatening communities and livelihoods – not just at the point where extraction is occurring, but also downstream in the affected system.

Introduction

Sand, gravel, crushed stone and aggregates (hereinafter 'sand resources') are the second most exploited natural resource in the world after water, and their use has tripled in the last two decades to reach an estimated 40-50 billion metric tons per year (UNEP 2019), driven by factors such as urbanisation, population growth, economic growth, and climate change.

Sand resources play a strategic role in delivering ecosystem services, maintaining biodiversity, supporting economic development, as well as securing livelihoods within communities. Sand is the key raw material in the concrete, asphalt and glass that build our infrastructure. It is also used for land reclamation as well as flood protection in coastal areas, as efforts are ramping up to protect eroding coasts and address climate change impacts such as sea-level rise and increasingly severe storms. Satisfying a growing sand demand without transgressing planetary boundaries represents an important and insufficiently recognised sustainability frontier (Torres et al. 2021).

Box 1 - Active or inactive sand bodies: Differences in impact

On a geological timescale—over thousands and millions of years—naturally occurring sand has been continually moved as sediments around the surface of the earth. Again and again, sand has been eroded, deposited, and transported across the land surface, through our river systems, and around the marine environment by natural physical processes (e.g., winds, water currents and tidal flows). Where the energy of those natural physical processes is high enough to mobilise the grains, sand can be eroded and transported. Sand is then deposited as accumulations—sand bodies—in areas where the energy of the processes transporting them declines[2].

Tectonic forces and changes in global climate have resulted in the continuous and widespread movement of substantial volumes of naturally occurring sand. For example, over the past few million years there have been significant shifts in the location and intensity of erosional and depositional processes, largely arising from repeated global cold phases ('ice ages'). Ensuing glaciations and marked changes to sea-level and rivers have redistributed naturally occurring sand into the complex configuration of sand bodies we observe today.

While the erosional and depositional processes remain ongoing, on a human timescale, sand bodies can be considered *inactive* or *active*. *Inactive*[3] sand bodies are static and lie outside of the influences of the present-day sedimentary regime. In contrast, where sand bodies are subject to modern erosional and depositional processes, they can be considered active and dynamic. Some environments where active sand movement occurs are more dynamic (e.g., estuaries, rivers, deltas, deserts, and beaches), while others represent lower energy regimes (e.g., the offshore marine environment).

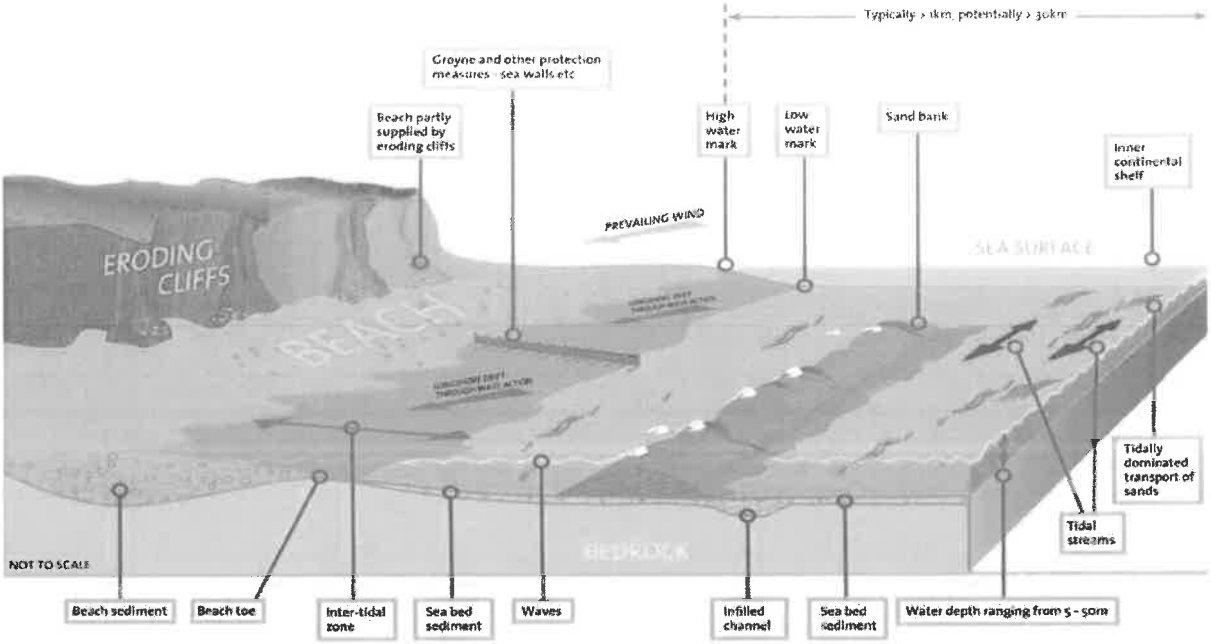
Globally, sand bodies form an integral part of the landscape and ecological system, contributing to biodiversity and our living environment. Until recently the landscape and natural balance of continual erosion and deposition of sand has been largely unaffected as sand could flow freely and was extracted at relatively low levels from *both inactive and active* sand bodies. However, the rapid growth in demand for sand resources and the localised buildup of sediment caused by infrastructure (e.g., by hydropower dams) have increased the threat to these systems. Unless properly managed, the significant short-term impacts arising from the increase in scale and rate of sand extraction can tip the natural balance, resulting in potentially critical social, economic, and environmental impacts.

Recognising sand as an integral component of the landscape and environmental system and understanding the processes controlling sand distribution (Figure 1) is the first step towards sustainable management. For example, in general, extraction of *inactive* sand deposits is unlikely to cause impacts beyond immediate physical disturbance. In contrast, extraction from *active* sand bodies resulting in changing rates of sand transport (e.g., in rivers or in coastal and nearshore marine zones) could lead to erosion threatening communities and livelihoods – not just at the point where extraction is occurring, but also downstream in the affected system.

Extraction from active sand bodies therefore requires careful assessment, mitigation, and management. In summary, understanding the geological origin of sand bodies and the modern-day natural processes, and acting upon them, is critical to the success of their sustainable extraction.

2 Alongside naturally occurring sand, coarser sediments, ranging from gravels to boulders, could also be eroded and transported over great distances before being deposited, where the energy of the physical processes acting upon them is high enough.
3 In geological terms, inactive sand bodies may be described as relict or fossil – deposited in past depositional environments and preserved.

Figure 1: Key features and processes considered in a coastal impact study for aggregate dredging



Source: (BMAPA and The Crown Estate 2013 p.41)

The Sand and Sustainability Challenge: An Impending Crisis

Despite sand's strategic importance, its extraction, sourcing, use, and management remain largely ungoverned in many regions of the world, leading to numerous environmental and social consequences that have been mostly overlooked (Peduzzi 2014 ; Bendixen et al. 2021).

Current extraction exceeds the replenishment rates of naturally occurring sand (John 2009 ; Hackney et al. 2021). Sand extraction from dynamic systems, such as riverine and active marine ecosystems, leads to significant environmental impacts, including coastal and river erosion, shrinking deltas, land-use changes, air pollution, salinisation of coastal aquifers and groundwater reserves, threats to freshwater and marine fisheries and biodiversity (UNEP 2019).

Beyond damaging threatened ecosystems, growing demand is triggering socio-economic conflicts (see Box 2) and is fueling concerns over sand shortages (Torres et al. 2017). Sand is mined by a wide range of actors, from large formal companies to informal artisanal and small-scale miners, who often mine in circumstances of poverty, as a cash-in-hand livelihood source. Governance is integral to the sand and sustainability challenge. Sand extraction is unregulated and under-regulated in many parts of the world. In weak governance settings some sand actors have exploited the absence of regulation and oversight to control markets through coercion and even violence. Meanwhile, miners and communities face health and safety risks from drowning (of workers removing sand from riverbeds), subsidence and landslides, amongst other hazards (Awaaz Foundation 2017).

Yet, future urbanisation and massive infrastructure development and maintenance will only further intensify our demand for sand, increasing sand market prices and the construction industry's ecological footprint[4]. Decisive actions are therefore urgent, particularly in the context of anticipating climate-change impacts (IPCC 2021), biodiversity loss (Koehnken and Rintoul 2018) and infrastructure-driven programmes to support critical industries after COVID-19. These economic recovery packages and policies will involve significant investments in infrastructure to stimulate the economy (UNEP 2021a), and therefore represent a crossroads: business-as-usual that is inevitably leading to an environmental, social and economic crisis, or an opportunity to rethink sand extraction and sourcing practices, including a move towards a circular future through substitution with other material and the inclusion of sand into sustainable infrastructure standards.

4 Sand is a constituent component of concrete production, alongside cement, water and coarse aggregates. The cement industry is responsible for around 7 to 8% of global GHG at a lower bound (UNEP 2010).

Box 2: Sand & Gender

Gender participation in the mining of sand resources is highly context dependent, varying from country to country (Bendixen et al. 2021). The sector creates paid employment and contributes to the financial independence of both men and women, yet it has, in certain contexts, given rise to gender inequalities. These inequalities are particularly pronounced in the distribution of benefits (e.g., jobs, revenues) and its impacts (e.g., effect of siltation on downstream water users) (UNDP 2018b).

Distribution of benefits - In Uganda, women represent 70% of crushed rocks and aggregate miners, whereas in Fiji this number is only 6% (UNDP 2018a; UNDP 2018b). Often men undertake the heavy jobs whereas women are responsible for labour-intensive work (Lahiri-Dutt 2008). Although the sand extraction sector provides opportunities for employment and financial independence to women, a large pay gap exists between women and their male peers.

Impacts of sand mining - As women's livelihoods—both subsistence farming and financial income—are often more dependent on the land, e.g., through collecting vegetables and shrubs, environmental degradation from sand mining leads to soil infertility and eventually increases food insecurity. Simultaneously, women in a majority of households in rural communities are responsible for collecting water and wood for fuel. As sand mining in riverbeds leads to soil erosion, groundwater salinization and the destruction of vegetation, women have to walk longer distances in search of water and wood for fuel, as reported in Kenya, Uganda and Tanzania (Global Alliance for Green and Gender Action 2018). In some instances, women reported displacement as access to these resources become impossible and the land on which they have lived for generations become inhabitable (ibid.)

Looking ahead - Women's high participation in the sand mining workforce highlights the importance of this sector in providing opportunities for paid employment and the significance of women's contributions to economic development, but also the need for targeted measures to rectify inequalities in the extractive and mining sector.

International Dialogue

The impacts of the unsustainable extraction, management and use of sand have recently started to gain international recognition. The resolution on mineral resource governance (UNEP/EA.4/Res.19) adopted at UNEA-4 specifically recognises the findings of the report by UNEP/GRID-Geneva - "Sand and Sustainability: Finding New Solutions for Environmental Governance of Global Sand Resources" (UNEP 2019). This recognition of the sustainability challenges related to sand is also highly relevant to the resolution on sustainable infrastructure (UNEP/EA.4/Res.5), as sand is a major resource for construction materials used in infrastructure, including concrete, as well as the latest UNEA-5 resolution on minerals and metals management (UNEP/EA.5/Res.12).

The strategic importance of sand was further highlighted through the adoption of a motion by the IUCN in 2020, calling 'for the urgent global management of marine and coastal sand resources' (IUCN 2020a). UNEP's "International Good Practice Principles for Sustainable Infrastructure" further underlined sand's importance in the context of minimising resource use, closing material loops and incorporating sustainability into public procurement (UNEP 2021b).

In light of the momentum on the international stage and rising pressure from the ground, UNEP/GRID-Geneva carried out a consultation process between 2019 and 2021, engaging with policy actors, scholars and practitioners that lead to the production of the current report. "Sand and Sustainability: 10 strategic recommendations to avert a crisis" consolidates the expertise in sand and sustainability from different sectors, putting forward recommendations for actions by governments and all key stakeholders (Table 4) to set the global sand agenda in addressing environmental sustainability needs alongside justice, equity, technical, economic and political considerations.

While immediate and deliberate actions are necessary, these recommendations should nonetheless **1) work within the local realities of sand resource availability and development imperatives; and 2) help identify the strategic opportunities for cooperation and innovation in how we govern access to and the use of sand resources.**

This report therefore aims to :

- **Raise awareness** around the world on sand extraction and use, and its related impacts.
- **Urge policymakers** to explore and adopt policies on sand extraction and use that are appropriate to their contexts and jurisdictions.
- **Shape common goals** across sectors that will help achieve just and responsible sand governance and management everywhere.
- **Propose solutions** for finding pathways toward a more sustainable use of sand. Findings from this report can serve to inform decision-making and support actions at intergovernmental level, in line with a responsible and just management of sand resources.

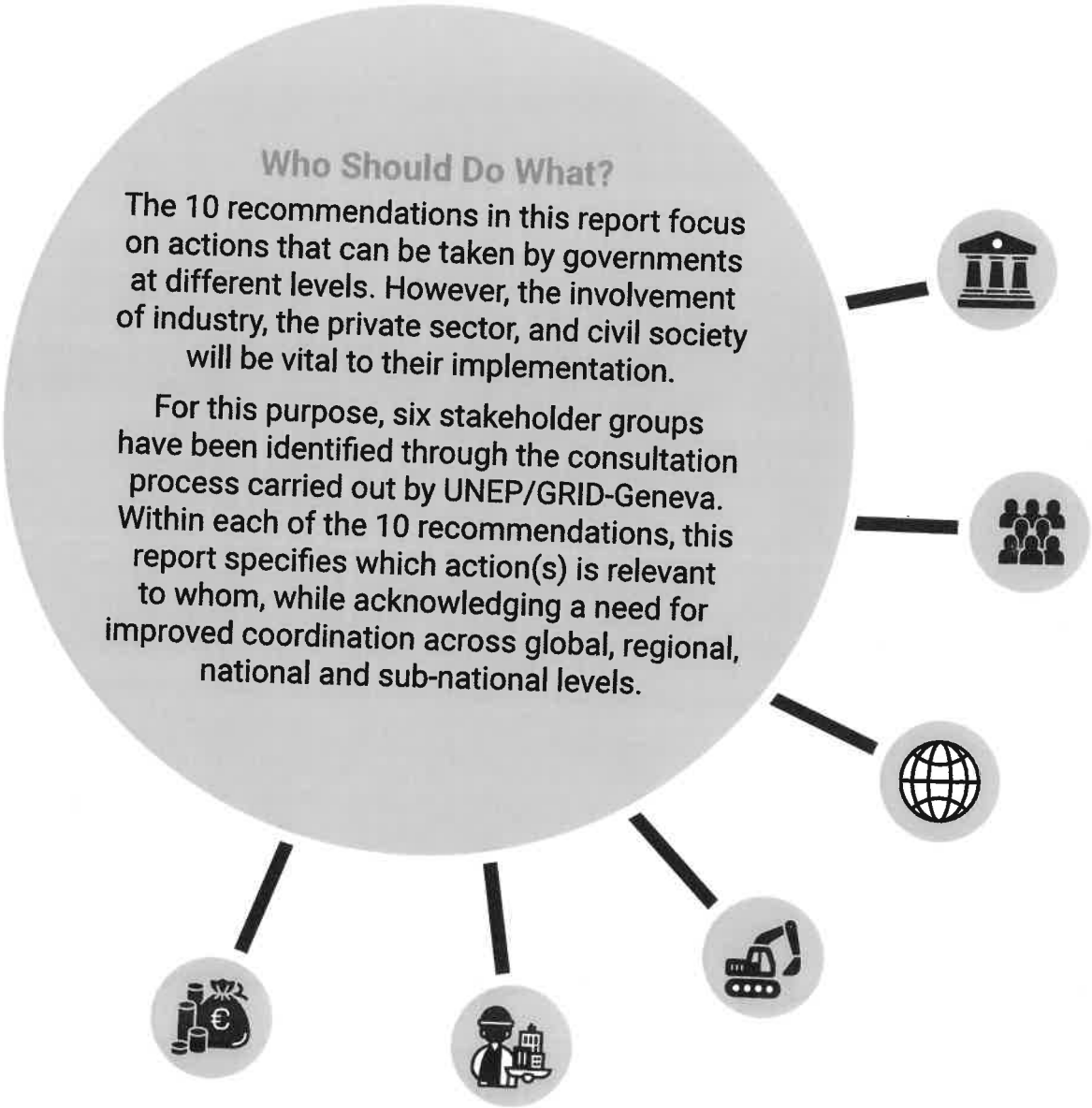


Table 4 : Relevant stakeholders in sand and sustainability

Stakeholder group	Relevance	Who
Governments/ Public Authorities	Responsible for the natural resources, and mining and extractive industries at the national, municipal and/or sub-national scale. They also influence local livelihoods and (equitable) development pathways, implement environmental and social protection laws, and national monitoring and reporting efforts.	National governments Municipal/sub-national governments and line ministries (local land and spatial planning, economic development, water management, fisheries management, buildings) Law enforcement (e.g., local police force) Village chiefs
Civil Society	Organisations and groups along the value chain of sand engaging in environmental and social advocacy, peer support, research, education and capacity development, and global awareness raising to support decision-making. They also lead some of the thinking behind best practices and innovation in the sand sustainability challenge.	Local communities, youth, dissenters, activists, CSOs (involved and/or impacted by extraction activities) Education & research institutions Nongovernmental organisations (NGOs) Media
International Entities	Organisations involved in norm-setting, knowledge transfer, convening, consensus-building, research, global data monitoring programs.	Inter-governmental organisations Transboundary cooperation platforms Standard-setting and certification bodies
Extractive Industry & Sand Producers	Enterprises of different sizes directly engaged in extractive activities in rivers, coastal zones, marine zones, terrestrial sand deposits, quarries, as well as in trading and transporting sand resources for further use.	Primary sand extraction, dredging and production companies Aggregates associations Artisanal and small-scale miners Firms involved in the initial processing and transport of sand resources Recycling industry and producers of substitutes to naturally occurring sand or crushed rock including secondary aggregates, by-products, co-products
End-users	Users of sand resources and/or products that use sand.	Commercial material suppliers (e.g., concrete and concrete products) Civil engineering firms engaged in sourcing crushed rock, sand, gravels and using these materials in construction activities. R&D and materials scientists, construction project managers, operations managers, sales support, supply chain managers (at firm level) Architects
Infrastructure Procurement & Finance	Entities that fund construction and infrastructure projects, both in the private and public sector, and thus have a say in the procurement of sand resources	Development banks Municipal & national governments Private & industry investors

10 Strategic Recommendations to Avert a Crisis

Recommendations

Recommendation 1 : Recognise sand as a strategic resource

Summary

Sand is a material that holds significant environmental, social, and economic value and it is central to achieving the SDGs. Yet this strategic value is often overlooked. In the natural environment, sand contributes to maintaining biodiversity and delivers a series of critical ecosystem services[5], including the protection of deltas and coastal zones vulnerable to the impacts of climate change. Simultaneously, sand underpins the construction of vital infrastructure across the world. Nonetheless, such strategic values are often at odds with each other. Faced with increasing demand for infrastructure in many places and the accelerating impacts of climate change, it is crucial that sand is recognised as a strategic material. A recognition as such is the necessary foundation for a just and responsible governance of sand resources.

Rationale

Sand is an essential building block of human life (as a commodity used in infrastructure, electronics, etc.), of life support functions (ecosystem services) and for maintaining biodiversity (see Figure 2).

Present estimates indicate that we are using 40-50 billion metric tons of sand resources per year, an average of 18 kg per person per day (Peduzzi 2014 ; Beiser 2018). However, this resource is not consumed evenly. Many still live without basic infrastructure, including decent shelter, clean water, regular electricity, safe roads, equipped hospitals, and a space to learn or work. Achieving the SDGs will require the building of vast infrastructure, for which sand will be crucial[6]. Silica sand is also essential in the building of the green economy, e.g., for the production of solar panels and renewable energy infrastructure, while climate change adaptation efforts also require infrastructure investment to protect against intensifying risks, like coastal erosion, and rebuilding will increase following severe weather events and relocation of people away from risk-prone areas. The need to build becomes even stronger in emerging COVID-19 recovery plans, which centre infrastructural investment as a cornerstone of national—and indeed global—economic revival (UNEP 2021a).

Sand also plays an important role in delivering ecosystem services upon which we are highly dependent and remain fundamental to achieving the SDGs (e.g., SDG 6, SDG 7, SDG 11, SDG 12, SDG 13, SDG 14 and SDG 15). For instance, across marine, delta, beach, river and underground environments, sand plays an important role in controlling erosion, delivering nutrients, contributing to food security, and regulating the quality of aquifers. By providing habitats and breeding grounds for diverse flora and fauna, sand also plays a vital function in supporting biodiversity (see Box 3).

Despite its irreplaceable value, societies are treating sand as an insignificant material. For one, there is no global inventory of sand production and use; as a result, reserves are incorrectly assumed to be infinite. Yet, long-term availability and supply of natural occurring sand and gravel should not be taken for granted, as short- and mid-term supply emerging as an issue in multiple places. In the regions where demand is not anticipated (i.e., in most, if not all countries), and planning and management policies are not implemented, sand and gravels are extracted from fragile spaces, e.g., beaches, agricultural land, zones of water supply, which in turn, giving rise to devastating ecological and social consequences and putting governments in challenging situations.

To meaningfully engage with the sand and sustainability challenge, there is a need to first recognise the strategic values of sand. This can be done by recognising the diverse forms, timescales, overlapping, and sometimes conflicting, functions of sand. As work is carried out to diversify building materials, generate stronger circular economies, and reduce the reliance on concrete and sand, both imminent building needs and the strategic work sand does in our environments must be considered. Questions of equity and distribution should remain at the centre of these considerations.

5 Four major categories of ecosystem services have been identified by the Millennium Ecosystem Assessment (Millennium Economic Assessment 2005): provisioning, regulating, cultural and supporting services. Refer to the glossary for further information.

6 It is estimated that 75% of infrastructure needed by 2050 - including health facilities, schools, dams for hydropower, housing - is yet to be built (Global Infrastructure Basel 2014).

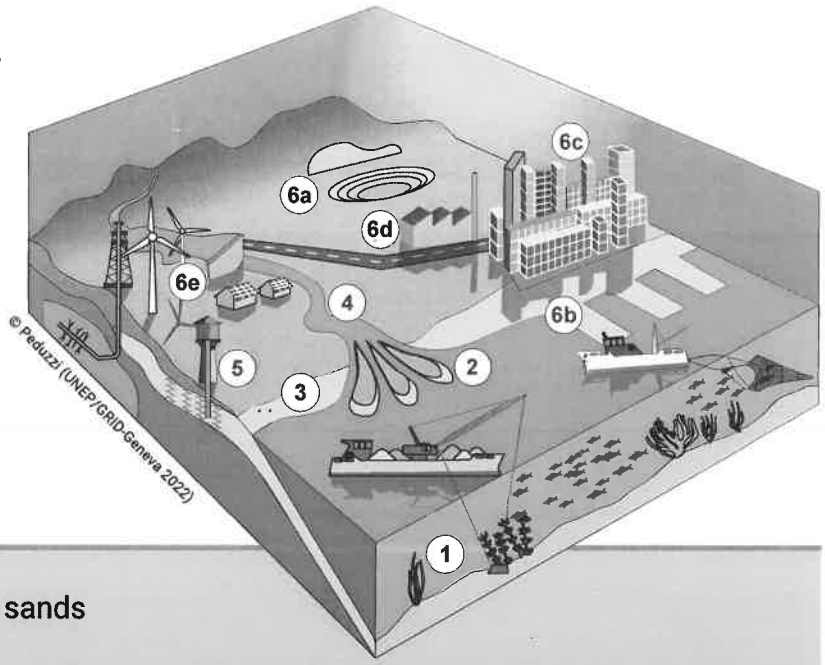


Figure 2 : Strategic value of sand in our natural and built environment

Box 3 : The strategic value of sands

Ecosystem services

1. **Marine** : Sands are habitats for microorganisms and cyanobacteria as the basis of marine food webs (Peduzzi 2014), as well as benthic species. Sand dredging in marine environments leads to major impacts on fauna and flora (Desprez et al. 2010), with significant impacts on biodiversity and fisheries. Marine plants act as an important carbon sink, many of which require a sandy subsoil for their reproduction.
2. **Delta** : Deltas are areas of high biodiversity and high fertility, and thus vital for food security (SDG 2) - hosting and feeding millions of people. Deltas are already shrinking due to decreased sediment supply (e.g., caused by sediment retention in upstream dams, for example), land subsidence (due to groundwater extraction) and increased wave-tidal erosion. With shrinking deltas, these processes can impact the system even further inland.
3. **Beach** : Keeping sand on coasts may be the most cost-effective adaptation strategy. Beaches and dunes are important in protecting against coastal erosion where sand is an important barrier in the face sea level rise and increasingly frequent extreme weather events, such as storm surges (Apitz 2012), due to climate change; they also protect inland communities against storms. Coastal dunes provide habitats for diverse flora and fauna (Everard et al. 2010), support soil formation and nutrient cycling and offer protection against the salinization of coastal aquifers. Sandy beaches are also key sites of tourism- critical to many local and national economies.
4. **River** : Sand delivers nutrients to surrounding ecosystems, protects water sources, reduces riverbank erosion and controls river flows (regulation of floods and droughts) (Apitz 2012). In channel ecosystems, fish and invertebrates breed in riverbed and riverbank material, essential to sustaining healthy reproduction rates, which provide protein and food stocks for communities. Vegetation on sand bars has also been shown to aid processes of water filtration and denitrification (Gopal 2020).
5. **Subsurface** : Underground layers of sand and gravel are often aquifers that hold significant volumes of water, one of the main sources of potable water around the world.
6. **Infrastructures for development (including sustainable development)** :
   a. **Land use** : Static sand extracted from quarries and crushed rock has an impact on the landscape and may cause deforestation. Extraction is in competition with crop land, forest, built areas, water sources, protected areas, and leisure areas. However, impacts are lower compared to more dynamic environment.
   b. **Coastal use** : Sand protects shorelines (see above) and it is used for land reclamation, beach nourishment and to build harbour infrastructure.
   c. **Urban infrastructures** : Sand is used in the concrete to build roads, bridges, hospitals, industrial infrastructure, and housing.
   d. **Industrial use** : Sand is used in the production of glass and windows, while silica sand is used for electronic chips, rare earth, and aeronautics.
   e. **Energy** : Concrete is used to build hydropower dams and wind turbines. Silica sand is used to produce solar panels and in gas fracking.

Key actions

Action 1.1 : Understand, formalise, and evaluate the strategic value of sand

- Governments (cross-border, national, regional, and local) should participate in a thorough, rigorous inventory of the strategic values of sand (see Figure 2), and their alignment with the SDGs.
- Support the formal recognition of the value of sand (for both ecosystem services and infrastructure development).
- Implement economic policies to reflect the strategic value of sand in its pricing (e.g., by integrating externalities).
- Review options for taxes and subsidies to reveal different price points, consulting models that enable governments to better understand impacts on supply and demand.
- Understand how shifts in price may impact inequality. Consider possibilities for multiple markets for large scale, government and/or corporate pricing, compared to localised self-building projects for housing or small-scale commercial infrastructure.

A detailed inventory of the strategic values of sand should consider sand's overlapping functions across the environment, economy and society, highlighting the relationships between sand and its management in achieving the SDGs. It is imporant to evaluate the potential conflicts among these functions. The inventory should provide an estimate of the real costs of sand, if the externalities of extraction are included into the price, and compared with the value of the services provided by sand in the natural environment over time (e.g., coastal protection and contributions to biodiversity).

Steps should be taken to formalise the recognition of sand's strategic value by integrating sand challenges into existing governing domains and/or create new sub-departments where appropriate. Where new legislation is needed, legal action should be taken to formally recognise sand as a strategic material, with appropriate legal frameworks that ensure policies are developed and implemented, and compliance is monitored over time with clear accountability structures in place.

Action 1.2. Anticipate increasing demand to enable planning

- Research and develop models to deliver insights into anticipated demand over time, including multiple demand scenarios, based on population growth, urbanisation trends, development of infrastructure, climate change impacts/adaptation and the uptake of alternative materials (Recommendation 8).
- Identify priority areas for restoration or infrastructure provision, taking into account potential impacts on equity.
- Establish a national map that is supplemented by sub-regional insights that can better identify the specific geography of demand and how supply might be managed in local sand economies, taking into account environmental and socio-economic outcomes (See Action 6.4).

The world's population will increase by an average of 1.9 billion inhabitants from 2020 to 2050 (UN 2021a ; UN 2021b). Africa will concentrate nearly 60% of the world population increase (+1 to 1.2 billion inhabitants) and Asia 33% (+400 to 900 million inhabitants) (ibid.). Population growth as well as the anticipated rural-to-urban migration will generate demand for new housing and infrastructure. In 2020, 56% of the world population was living in cities (4.4 billion people) (ibid.). In 2050, this figure will be 68.3%, increasing the urban population by 2.25 billion to reach 6.65 billion people. 89% of the world's urbanisation increase will be in Asia (50%) and in Africa (39%) (ibid.).

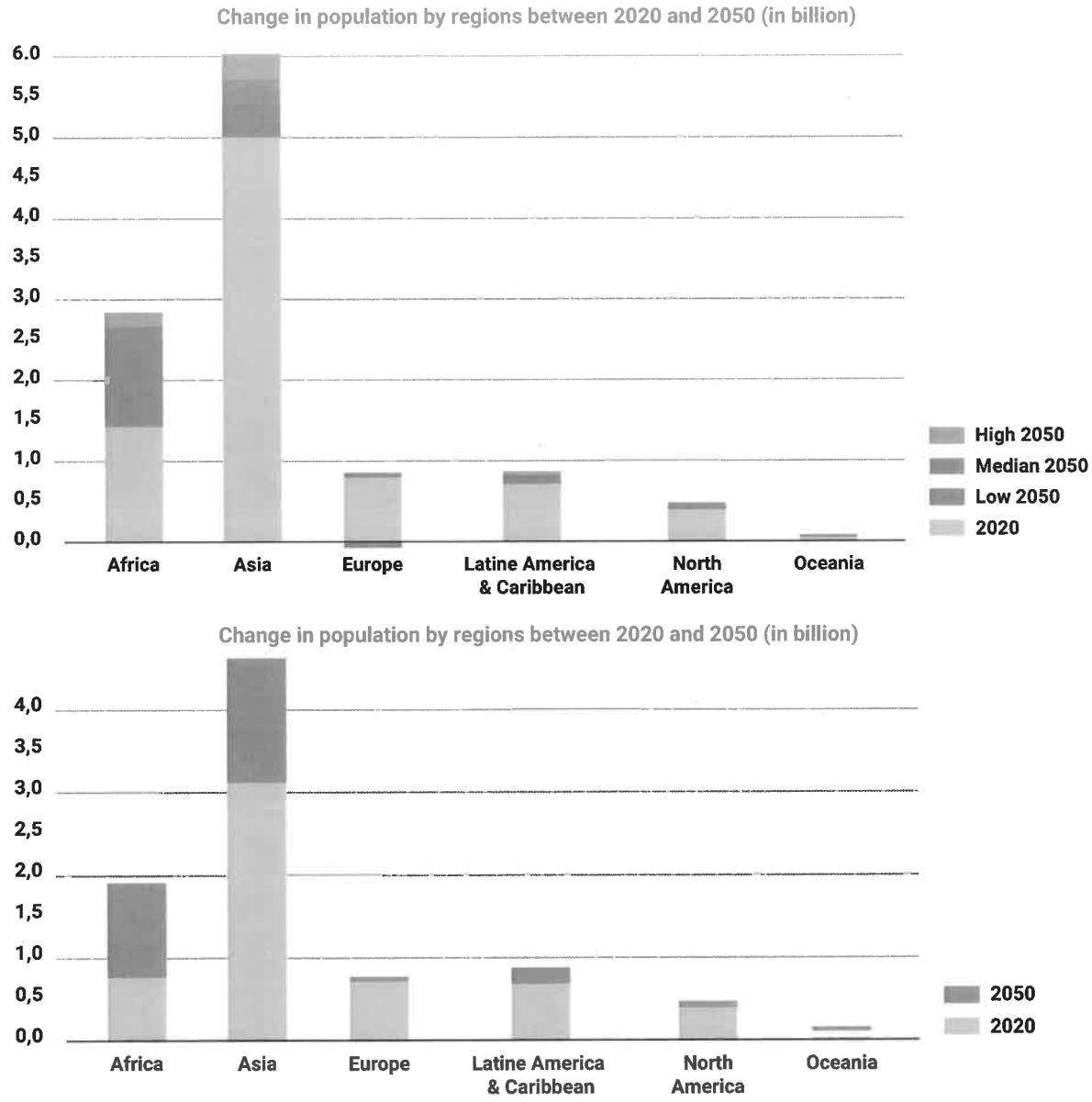
Urbanisation will increasingly take place in secondary cities, which will demand the extensive building of roads to connect these towns and cities to other urban hubs and surrounding areas, alongside initial investments in vital infrastructure such as drainage, sewage, and electricity. Existing infrastructure is also in need of upgrading[7] - particularly in places where building standards are harder to regulate and/or yet to be created (UNEP 2021a). With 50% of the building stock standing in 2060 yet to be built (ibid.)—much of which will be necessary to achieve SDGs 6, 8, 9, 10 and 11—anticipating increasing demand for sand becomes ever more urgent.

Anticipating the increasing demand should also take into account the impacts of climate change and adaptation needs. While significant strides are taken to implement nature-based solutions (NbS) against climate change challenges, it is important to note that NbS requires large volume of sand. Additionally, NbS may take time to have the desired effect. Thus in some cases, grey structures (i.e., concrete) may be necessary in the mean time to address challenges in the short- to medium-term. In the context of extreme heat and its impacts on cities, NbS

7 Depending on its quality, the lifespan of concrete is somewhere between 75-100 years, suggesting that a significant portion of the global concrete currently in structures will need to be replaced or significantly upgraded in the near future.

will also be instrumental to promote building designs and materials that require neither concrete infrastructure nor sand (UNEP 2021b). Climate change induced pressures, such as temperature stress and precipitation, will also speed up the degradation of existing infrastructure and the need for upgrading or replacement.

Figure 3 : Projected population increase and urban population trends between 2021- 2050 (with low, median, and high scenarios)



Data sources : (UN 2021a ; UN 2021b).

Action 1.3. Consider the strategic role of sand with respect to climate change and biodiversity loss

- Consider the direct and indirect contributions of sand extraction to climate change.
- Estimate the value of sand as an asset that protects against the impacts of climate change.
- Evaluate the function of sand in maintaining biodiversity (see Box 3).

Steps should be taken to better understand the direct and indirect contributions of sand extraction to climate change and other environmental crises, including climate change and biodiversity loss. The relationship between sand and climate change is significant and complex. For instance, the extraction of marine sand releases GHG trapped in sediments (direct) (Sala et al. 2021) and the process of producing concrete releases CO^2 (indirect). In the natural environment, sand also functions as an important asset that mitigates the impacts of climate change, including protecting against coastal erosion, storm surges, coastal flooding and salinisation of coastal aquifers. This is particularly important given the accelerating rise of Global Mean Sea Level (GMSL). Under various scenarios, GMSL will increase between 0.37 and 1.88 m by 2100, affecting land that currently hosts between 147 and 216 million people (IPCC 2021). 70% of the world's beaches are also eroding due to a rise in GMSL, increasing wave intensity and reduction of sediment reaching the coast (Oppenheimer 2019). Additionally, more than 20% of the world population and half of the world's fastest-growing megacities live on low-lying sedimentary coasts, many of which are sinking at an even faster pace due to land subsidence - a process known as *relative sea level rise* (ibid. ; IPCC 2019). In some locations, if sand were not extracted from rivers and coasts, large areas of new land could be gained over the sea, or coastal areas would continue to gain elevation over rising seas in a natural manner and without any human action required. Keeping sand on coasts may therefore be the most cost-effective adaptation strategy.

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Recommendation 2 : Include place-based perspectives for just sand transitions

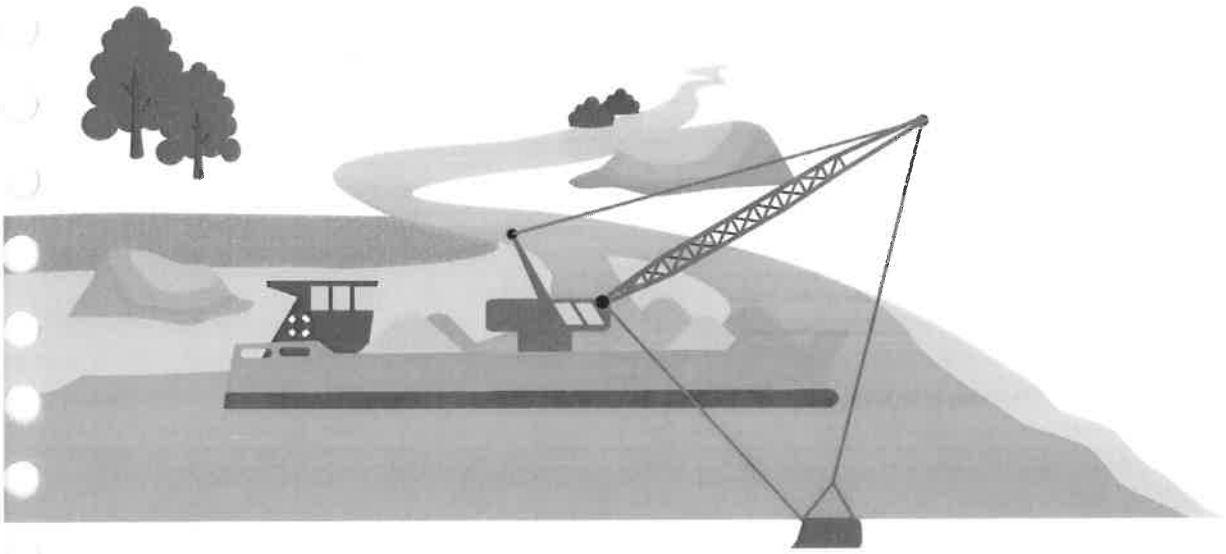
Summary

Sand, whether extracted from the natural environment, or manufactured from the crushing of stone, is a material intimately linked with place. Every location from where sand is extracted has a unique environmental, social, political, and economic setting that shapes its sustainability. Effectively addressing the environmental implications of sand extraction will require the consideration of social, political, and economic dynamics. This includes the participation and inclusion of all interested and affected people in sand resource governance and decision-making, and a just transition for the sand workforce impacted by sector reform.

Sand, like other development minerals, is overwhelmingly a locally consumed resource (Franks 2020). Dictated by the economics of transportation, locally extracted sand typically services local markets. With the exception of marine sand, which requires expensive vessels, sand is principally extracted by large numbers of small- and medium-sized domestic enterprises who rely on sand for their livelihoods and, in the developing world, are often in circumstances of poverty. The sustainability of sand is therefore critical to poverty reduction (SDG 1) and decent work (SDG 8) (Bendixen et al. 2021). Sand is strongly linked to both the livelihoods of those that harvest or mine sand, and to those that rely on the ecosystem services that sand provides within natural waterways. Equity (SDG 10), peace and justice (SDG 16), participation and partnership (SDG 17) must underpin all of the other recommendations on sand sustainability if we are to achieve a sustainable transformation of the sector.

Rationale

The immense scale of global sand extraction, and the historical neglect of this sector, makes this issue an important —and challenging—one for global sustainability. Millions of people mine sand in thousands of places, with impacts accumulating at local, regional, national, continental, and global scales. A huge transformation is necessary, one that will affect very large numbers of people. It is critical, therefore, that as a global community we bring people along on the journey toward sustainable development so that such transformation is inclusive and just for all parties[8].



8 The Mosi-Oa-Tunya Declaration on Artisanal and Small-Scale Mining, Quarrying and Development provides some guidance on the issues facing the formalisation and transformation of the informal mining sector. See Franks et al. (2020).

Key actions

Action 2.1 : Include the voices of all people potentially impacted by policy, action, and advocacy for sand sustainability

- Involve all relevant actors in decision-making, and the design and implementation of any programs or policies at all scales.
- Ensure that language is inclusive and does not overly generalise or stigmatise groups in the sand supply chain who are necessary to mobilise for change.
- Provide accessible pathways for the formalisation of sand mining accompanied by well-designed environmental and social obligations.

Any transformation in sand governance must recognise the diversity of settings in which sand is extracted and be guided by those voices most closely involved and influenced by sand extraction, whether it be the miners who may rely on sand for their livelihoods, the businesses and consumers who receive the benefit of sand's utility, or the local communities who are dependent on the presence of sand in ecosystems for healthy waterways, clean drinking water, and the protection of their livelihoods (Recommendation 1). Involving all actors is essential for mobilising a successful coalition (see Table 4). Participatory approaches, that are also based on the protection and respect for human rights, are necessary at all scales, including at national and global levels where decisions are often dominated by expert viewpoints. This is especially the case for excluded and marginalised groups, such as ethnic minorities, the poor, women and for those whose involvement in the sector might not be obvious at first, but who may bear the brunt of the impacts of sand mining or transitions away from sand mining.

Inclusivity is also important in the language that we use. In too much of the written literature and media on sand and sustainability, the only reference to the large number of – often informal – sand and aggregate miners in developing countries is as criminals, using pejorative and stigmatising terms such as 'illegal sand mining' and 'sand mafia.' In reality, sand mining is a livelihood diversification activity for large numbers of people in poverty. There are significant barriers to artisanal and small-scale miners to obtain legal licences, and in some countries, sand is excluded from the formal definition of 'minerals' in the mining act, leaving no opportunity to mine 'legally.' Loose application of the term 'sand mafia' implies that informal sand miners are in positions of power, which is counter to the actual situation in many settings. This is not to say that sand mining actors will welcome change. There are actors and businesses within the sand supply chain that are not motivated by livelihood concerns, and instead operate to maximise economic benefit. There are also circumstances where miners, informal and formal, large, and small-scale, have extracted without concern for the environmental and social consequences, have resisted calls for change, or have used power, corruption and even violence, to entrench the status quo. However, the generalisation of examples where sand mining is linked with criminal activities or criminal networks to represent the global situation is counterproductive to the desired sustainable development outcome and reverts to an earlier time where the analysis of environmental issues was divorced from the human development implications.

While formal sand mining does not necessarily equate to sustainable sand mining, formalisation can nevertheless be one pathway toward a more responsible, well-governed and sustainable sector, if it is context specific and designed to balance the legitimate interests of all parties.

Action 2.2 : Accompany any change toward sustainable production with a just transition, and avoid any deterioration in workers' rights, increased hardship, or poverty

- A just transition is necessary to ensure any people impacted by sectoral change are provided with the necessary support to maintain and improve livelihoods.
- Finance and capacity building should accompany sectoral transformation for a just transition and can help to mobilise support for change, which include opportunities for women and other excluded or marginalised groups to directly benefit from these solutions.
- Justice is also important from an intergenerational perspective, the integrity of the dynamic ecosystems most impacted by sand extraction is critical not only for current generations but also those of the future.

Sustainability transformations require fundamental changes to production systems. They also require careful attention to the social dimensions. A just transition refers to a range of social interventions necessary to ensure workers' rights and livelihoods are at the forefront when economies are shifting toward sustainable production. This concept has been utilised most prominently in climate change debates; however, it is equally relevant to the transformations necessary in sand sustainability. Ensuring a just transition is important from both an ethical perspective, due to the disempowered position of many involved in the sector, and from an effectiveness perspective, as mobilising large numbers of people in practice change - many of whom are in circumstances of poverty - will only be possible if that change results in an improvement in livelihoods.

Box 4 : Case study – Water security and sand extraction in Sri Lanka

A women's volunteer organisation, NetWwater (Network of Women Water Professionals) was founded in 1999 to promote gender mainstreaming and holistic water management in the water sector in Sri Lanka. In 2005, it started a Gender and Water Dialogue in the North Western Province when women reported the drying up of dug wells, which are an important source of domestic water. This was due to declining water levels in the vicinity of excessively mined rivers. The 2004 tsunami precipitated a construction boom, at which point sand demand was estimated to be 8 million cubic meters (m^3) /annum, and has risen steadily to 70 million m^3/annum today (GWP 2018). Despite a Supreme Court intervention in Deduru Oya, which allowed mining only at specific locations, mining outside of these legally demarcated areas continued.

Women, who previously had easily available access to drinking water, were now forced to travel 3 to 4 km in search of water due to the impacts of river sand mining (RSM). In the early days of activism in Deduru Oya, women took on an active role in demonstrating and acting as human shields to the activists at the river banks. After studying the extent of the negative impacts of sand mining in Deduru Oya, NetWwater activists, with the support of the Sri Lanka Water Partnership (SLWP), catalysed the formation of a local awareness and advocacy network, the Deduru Oya Protection Campaign. Recognising weak law enforcement mechanisms and legal loopholes meant that regulations alone were not enough to fully address the impacts of RSM, NetWwater and SLWP supplemented legislative changes with community action. Awareness campaigns and dialougues were conducted with different stakeholders, such as government officials at the district and divisional level, local authorities, media, youth and NGOs, emphasising on transparency and accountability.

They raised awareness at the national level and supported the development of the 2006 National Policy on Sand as a Resource for the Construction Industry, which was initiated to manage the construction sector in a sustainable manner. SLWP understood that in order to truly move away from river sand mining, viable alternatives to sand would need to be identified and taken on. They partnered with the construction industry regulator, the Construction Industry Development Authority (CIDA), to organise a series of consultative and awareness-raising workshops and brainstorming sessions under CIDA's programme, Alternatives for River Sand in Construction.

Although RSM in Sri Lanka is now either entirely prohibited in sensitive areas or highly regulated according to strict extraction and transportation schedules, some regions in Sri Lanka are still facing challenges of illegal sand mining carried out by politically influential persons. While more stringent RSM regulation has led to an increased interest in alternatives to river sand, expanded advocacy programs are still needed to ensure water security in Sri Lanka.

Source : **Kusum Athukorala**

Just transitions are important for all impacted workforces, employed by small, medium, and large-scale enterprises, however, they are especially important when the workforce operates in circumstances of poverty (or is at risk of impoverishment). Any effort to ban or limit mining from certain environmentally sensitive locations should be accompanied by:

- opportunities to access alternative sand resources (e.g., static rather than dynamic sources of sand such as terrestrial deposits and quarries);
- support and access to alternative livelihoods for those miners that are open to working in a different field;
- access to finance and a policy environment that facilitates the transformation from informal, low technology operations to more formal, productive and secure mining and quarrying, and;
- capacity building support to acquire the skills necessary to adopt sustainable business practices.

Consistent with Action 2.1, the design and implementation of such a transition should be undertaken in a participatory, inclusive, and transparent manner. The introduction of policies to limit mining may constitute a form of involuntary resettlement and should thus be carefully planned, including the preparation and implementation of resettlement action plans. Getting a just transition right requires sophistication and significant resources and in practice often falls short of intentions, which raises the stakes for such decisions.

Lack of access to affordable and tailored financial products; skills, training, and technology; affordable and accessible mineral licensing; and alternative sand resources is often cited by miners as key barriers to reforming practices. Where the transformations necessary require new skills, techniques and production patterns, capacity building can be an effective means of mobilising support for change.

A just transition is also an important consideration from an intergenerational perspective. Sand plays a critical role in existing ecosystems (Figure 2). The functionality of these ecosystems is not only important for current generations who rely on them for ecosystem services, but so to those of the future.

Action 2.3 : Governance should be at the same scale as the issue (subsidiarity)

- Solutions should be scaled so that decisions are retained by the lowest possible level of governing body consistent with their resolution.
- Decision-making undertaken at the right scale, will result in more relevant solutions with a greater chance of success.
- Accountability and transparency are important aspects of effective governance at all levels.

The impacts and implications of sand extraction play out at a range of scales. Solutions therefore must also be scaled. Sand governance must be strategic and follow the principle that decisions are retained by the lowest possible level of governing body consistent with their resolution. This principle is sometimes known as subsidiarity or political scaling. For scaling to be accomplished the devolvement of power by government is often necessary (see Figure 4). Solutions also must be relevant to the place in which they are implemented. Solutions that work in developed economies where the sand sector is predominantly formal, may not be successful in emerging economies where informal markets are the norm. Ensuring that decision-making is undertaken at the right scale, will result in more relevant solutions with the most chance of success.

Figure 4 : Examples of scaled sand governance

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Level 1 : Local – community elders may decide that a stretch of river is important for irrigation of local land in the dry season due to the sand working as a water trap and forbid harvesting or mining in that area.

Level 2 : District – a district authority may restrict the number of trucks transporting sand to a city and due to low sand replenishment rates requires sand extraction only to be carried out (and sand to only be used for construction) in its own district.

Level 3 : Regional – regional authorities implementing a large infrastructure program may notice the interconnected naturally occurring sand supply and instigate a big picture plan.

Level 4 : National – the development of the nation is based on the use of sand for concrete and so some goals/aims from lower levels of scale accommodate a new national (level 4) policy or law on sand sector formalisation.

Level 5 : International – capacity building and cross-boarder monitoring may result from global cooperation and coordination.

Recommendation 3 : Enable a paradigm shift to a regenerative and circular future

Summary

Since the industrial revolution, sand has become an important commodity used to build and sustain our economies. However, the hitherto invisible trade-offs made in the process of such commoditisation are becoming increasingly concerning and unacceptable. Recognising key drivers that underpin our economies, addressing barriers to scaling up regenerative solutions, and embracing diverse materials, methods and models are vital to enable a circular future.

Rationale

Sand supply is often perceived to be unlimited. However, since naturally occurring sand can be finite and non-renewable in timescales relevant for policy makers (Van Lancker et al. 2019), its uses and their inherent trade-offs need to be examined closely and re-evaluated. Often, the physical and socio-economic scarcity, competing uses or the cumulative impact of extraction (Pereira 2020) are not taken into consideration (Recommendation 1). Our current systems also do not consider the immense cultural, spiritual, and religious importance of sand in many places nor the effect of losing such heritage. The triple planetary crises of the climate emergency, the ongoing critical loss of biodiversity and the toxic trail of pollution and waste makes it imperative for us to change how we operate. Experience has shown that it is possible to meet the needs of the present without damaging the ability of future generations to meet their own needs, using regenerative and circular materials and processes (Recommendation 8). However, in order to scale-up these solutions quickly, a paradigm shift in current organisational and economic structures is required.

Key actions

Action 3.1 : Break silos to accelerate innovative approaches through public-private knowledge networks

- Establish a baseline map of all sand-dependent industries and potential markets within each country. This will shed light on material flows, potential points of leverage as well as areas requiring strategic research.
- Establish public-private knowledge networks with national governments, extraction industry, start-ups, universities, research institutes and civil society supporting the exchange of expertise. Cross-sectoral and cross-regional cooperation will help accelerate innovation and co-design best practices.
- Boost consumer confidence in the regenerated resource through certifications and public procurement.

Sand supply chains contain a multitude of actors from both the public and private sector (Recommendation 9). However, they often work within silos. Stakeholders often collaborate only within their own domain or market, limiting the innovation which can stem from cross-sectoral exchange. In addition, innovation can be impeded by regulation that is yet to catch up and the voices of civil society actors can get lost.

Public-private knowledge networks consisting of national governments, the extraction industry, academics, knowledge institutes and civil society could close the gaps between policy and implementation. This would accelerate the dissemination and implementation of practical and sustainable solutions by approaching the sand supply chain and ecosystem as a whole.

In a pilot project in Spain for example, spent foundry sand was reclaimed and used in construction applications (Box 5). Such pilot projects are required to prove solutions' technical and economic feasibility, and thereby break the silos that currently exist in policy between industrial and construction sand use (Pereira 2020). The benefits are manifold. Developing a symbiosis among currently siloed industries and sectors can not only enhance the long-term viability of sand-dependent industries, provide additional resources, save landfill space for municipalities, but also safeguard ecosystem services provided by sand for future generations, minimise biodiversity loss and address the climate emergency.

Action 3.2 : Align fiscal policy with a regenerative and circular future

- Identify and address potential barriers and misaligned policy incentives.
- Provide clear guidance/market direction in favour of regenerative resources rather than non-renewable ones to help them scale up fast.

Fiscal policy has a profound influence in both mature and emerging economies. Potential barriers need to be identified and addressed to reduce consumption and help regenerative solutions scale up fast (Box 6, as well as Action 3.4).

Box 5 : Case Study - LIFE ECO-SANDFILL Project, Spain

Background

The LIFE ECO-SANDFILL project aimed to demonstrate the technical and economic feasibility of using reclaimed Spent Foundry Sand (SFS) as a fine aggregate in construction applications (European Commission n.d.). It was co-financed by the LIFE Program, the financial instrument for the Environment and Climate Action of the EU. There are around 3,000 active foundry operations in Europe that generate over 6 million tons of waste sand annually (Delgado et al. 2016). As the project description says "Only 25% of this SFS is recycled for a few applications, mainly by the cement industry, but these sectors are unable to absorb the total amount of sand generated, so the remaining 75% is landfilled. However, re-using SFS can help minimise the environmental impacts from sand extraction, processing, and transport.

The global warming potential of sand extraction (from quarrying and dredging) and processing is between 92-120 g CO^2 eq. per 1 kg of dry silica sand obtained. Air pollutants are emitted by the extracting equipment (usually diesel), and noise is a common occurrence due to extraction and transportation. Sand extraction involves considerable land take and loss of soil (estimated at 0.4 ha per ton of sand extracted), with associated loss of wildlife habitat. The re-use of SFS would minimise these impacts."

Screed mortar for indoor use

© LIFE ECO-SANDFILL

Implementation process and stakeholders

The consortium involved five partners from Spain and the project ran for 36 months. Three full-scale case studies were implemented in the construction works for a High-Speed Train in Spain.

Replicability

The LIFE ECO-SANDFILL project's objective of reusing a waste stream to divert it from landfill was aligned with the EU's Roadmap to a Resource Efficient Europe (European Commission n.d.) and the 7th Environment Action Program (European Commission n.d.). The technique was found to be suitable for all types of sand and moulding systems. It has high replicability potential, provided that toxicity and leaching concerns are addressed either through hydraulically bound construction applications or special conditioning treatment for unbound applications (Garitaonandia et al. 2018).

Beyond the project's alignment with existing policy frameworks, it also benefited the local economic context. Participating foundries saved up to 75% in sand waste management costs per ton of SFS diverted from landfill and reclaimed for reuse. There was also a substantial decrease of over 80% in raw material costs (excluding transport costs) from the sand purchases avoided at the foundry as well as the replacement of silica sand with SFS in mortar screed (LIFE ECO-SANDFILL n.d.).

Action 3.3 : Encourage capacity building within key sectors

- Offer local governments training opportunities on mineral resource governance. Such training should include the potential end-uses and the long-term environmental and social impact of mining, especially through a gendered lens in keeping with SDG 5.
- To ensure a just and inclusive transition (Recommendation 2), develop alternate livelihood programs for miners and specific programs to boost resilience of mining-impacted communities. Improved diversity and inclusion can support the resilience of society and contribute to SDG 11.
- Realign professional education towards a regenerative and circular economy.

Capacity building at all levels is fundamental to a just transition. Experience has shown that gender-based approaches empowering women in particular can benefit entire communities (ibid.). In addition, professional education within key sectors needs revisiting.

The current system of professional education is not geared towards a regenerative and circular economy. This is a significant barrier as many professionals are trained on outmoded models of development. In the UK, 77% of respondents who participated in the Architects' Climate Action Network Student Survey felt their course was not adequately preparing them to address the twin crises of climate and ecological breakdown. Respondents believed that "aesthetics are valued more than sustainable design" (Students Climate Action Network 2021). Facilitating urgent reforms of the curriculum in key sectors including Architecture, Engineering, Mining, Finance can speed up such capacity building.

Figure 5 : Students' response in a survey by Architects' Climate Action Network

© Adapted from (Students Climate Action Network 2021)

Action 3.4 : Create incentives for public and private investment in sustainable activities related to sand

- Facilitate shifts in financial streams to drive durable change.
- Identify sustainable practices for sand, either in extraction, application or in deploying alternatives, to incentivise funds for structural and sustainable change in the sand supply chains.

A transnational framework categorising sustainable activities can help both the private and public sector to divert investments towards environmentally friendly activities, which are investigated and approved by national experts of the participating countries. The framework can then be (voluntarily) applied to tax benefits for investments or criteria for the award of funds, loans or in procurement.

Knowledge networks can evaluate a list of activities related to sand sectors which are considered a sustainable investment. As a result, financial streams can be shifted away from sand related sectors with poor socio-environmental records. A sustainable finance categorisation can be applied in government fund allocation for instance and serves as an incentive for the private sector to invest in sustainable projects. This can help build or restore reputation and recognition of a sustainable activity. An example of how such a voluntary framework can have far reaching impacts is the development of the EU Sustainable Taxonomy (European Commission n.d.), listing all activities the EU deems sustainable (see also Action 10.4).

Action 3.5 : Leverage insurance in favour of regenerative practices and materials

- Based on the EIA, infrastructure contractors should take ecosystem insurance covering damage done to the natural environment. Such ecosystem insurance should work in-hand with restoration and compensation measures (Recommendation 10).
- Remove regulatory and insurance barriers for regenerative materials.

Large scale infrastructure projects and sand extraction can change and/or damage biodiversity in marine, coastal or terrestrial environments, with repercussions for economic livelihoods. Numerous companies already undertake EIAs at the start of an extraction project, to insure against incidents causing immediate harm to the environment or local communities. However, unexpected consequences do arise over time (e.g., workers in

the fisheries sector losing livelihoods and ecosystem disruptions due to mining of riverine sand.) For large-scale infrastructure projects, standards and specifications for design, construction and operation of infrastructure should be in place to ensure against unexpected ecosystem damage.

One promising example integrating ecosystem damage insurance into construction procurement projects is the Standard for Sustainable and Resilient Infrastructure (Global Infrastructure Basel 2021). This sustainable infrastructure certification scheme can help input sustainability into the project tendering through its specifications set on pollution and resource management, biodiversity, climate protection and resilience, as well as land use criteria. This can drive projects to reduce negative impacts (e.g., by employing recycled materials instead of new concrete), and create positive impacts (e.g., by regenerating habitats through NbS replacing 'grey engineering' (Box 12). Additionally, regenerative projects, which restore or enhance ecological value and are considered innovators, can be recognised. In some cases, a lack of regulation on embodied carbon[9] in building regulations (European Environmental Bureau 2021 ; Architects Climate Action Network 2021) and the undersupply of insurance for regenerative materials are significant barriers (Timber Accelerator Hub 2021) that need to be addressed. Enabling a regenerative and circular future is fundamental to the responsible governance of sand resources. It requires identifying and eliminating barriers, promoting cross-sector collaboration, and aligning disparate pieces of the current economic system.

Action 3.6 : Embrace diversity of building materials, methods, and business models

- Densely built, low-rise buildings are the future – not skyscrapers (Pomponi and Saint 2021).
- Tap into the wide variety of alternate building materials and methods available.
- Re-establish pride in vernacular architecture.
- Facilitate the creation of digital and physical infrastructure (e.g., warehouses) required to rework and store building materials reclaimed from urban mining.

"The built environment is the greatest cause of carbon emissions, global energy demand, resource consumption and waste generation" (Pomponi et al. 2021). In 2020, human-made mass was found to outweigh all living things (Elhacham et al. 2020). As humanity thinks about the legacy we wish to leave behind in the Anthropocene, learning from the past can shed light on biases that are embedded within systems and mindsets. Before colonial powers imposed their building codes in their colonies, architecture was a vibrant expression of each place and its people. Re-establishing pride in vernacular architecture can be a win-win solution. Tapping into local culture and vernacular traditions can provide important place-based perspectives (Intbau 2021) (Recommendation 2) and solutions to the sand and sustainability crisis.

Densely built, low-rise environments have been found to be more space and carbon efficient, while high-rise buildings have a drastically higher carbon and material impact (Pomponi and Saint 2021). Depending on the geography, the skills available and the building regulations, there are a wide variety of alternatives to create such a built environment. Modern methods and forms of construction are driving innovation in the natural building sector. Prefabricated panels and modular designs can greatly reduce build times and cost. Some prominent alternate methods are timber construction including engineered wood such as cross-laminated timber, glued laminated wood (Glulam), bamboo construction, straw bale construction including prefabricated industrial panels, rammed earth, cob, adobe, compressed or stabilised earth blocks and other types of earth construction, and biophilic construction elements such as mycelium insulation panels.

There is also an urgent need to "mine the Anthropocene", using and reusing existing materials/products instead of continuing to mine primary materials (Miller 2021). Urban mining can provide both materials and opportunities for job creation within urban centres, apart from the climate benefits. There are many promising examples of such reuse (see Baker-Brown 2017). Creating buildings that can be deconstructed and reassembled, alternative business models such as offering products as services instead are some other ways, we can embed circularity into the built environment.

Several publicly funded research projects are working on articulating the benefits of natural building methods, improving results, and designing ways of bringing in circularity into the built environment. Examples of some EU-funded projects are UP STRAW, COBBAUGE, FCRBE, BAMB, CIRCuIT (Interreg n.d. ; BAMB 2020 ; CIRCuIT n.d.). The more diversity we can build into the palette of building materials, methods, and business models, the greater will be the resilience of societies.

9 CO^2 emissions associated with materials and construction processes throughout the whole lifecycle of a building and includes CO^2 emitted during the manufacturing of building materials, their transport for distribution and job site, and construction activities (UNEP 2021a).

Box 6 : Case Study - The profound influence of fiscal policy in both mature and emerging economies (UK and India)

Background

Fiscal policy plays a crucial role in aligning actions with the intended goal in both mature and emerging economies. Misaligned policies can lock in the status quo or worse, end up incentivising unhelpful behaviours

UK : Architects' Journal, the UK's best-selling weekly architecture magazine and the voice of architecture in Britain has been leading the 'RetroFirst' campaign calling on policy makers to prioritise retrofit over demolition and rebuild (Hurst 2019).

The Architects' Journal points out that of the 200 million tons of waste generated in Britain annually, 63% is construction debris. More than 50,000 buildings are lost through demolition every year and, although more than 90% of the resulting waste material is recovered (MPA 2019) much of this is recycled (MPA 2020) into a less valuable product or material, rather than being reused.

Maintaining existing buildings and retrofitting them attracts a higher Value-Added Tax (VAT) rate of 20%. Current practices (early 2022) make it cheaper to demolish and rebuild, since the VAT rate ranges only from 0-5%. Such a distorted VAT policy is incompatible with tackling the climate crisis, the biodiversity crisis, and reducing demand for sand. Instead, such a fiscal policy incentivises demolition and financially penalises retrofitting efforts.

India : 'Stubble burning', the annual process of burning of crop residues across farms in the Indo-Gangetic plains is highly contentious and a major contributor to regional air pollution (Abdurrahman et al. 2020). Yet farmers are either unaware of alternatives or cannot afford to dispose of crop residues in an alternate manner. Research on how to convert such waste crop residue into building material is therefore highly relevant.

Building materials manufactured by repurposing and upcycling waste streams in India attract a Goods and Services Tax (GST) rate from 5 % to 12%. In comparison, materials for concrete construction such as concrete blocks and cement attract a GST of 18 to 28% (India, Ministry of Finance 2021). Two high-potential start-ups have benefited from this policy incentive, with their founders recognised on the 'Forbes 30 under 30 - Asia' Lists in 2019 and 2021 respectively.

- GreenJams produces Agrocrete®, a building material made of crop residues and a proprietary binder made from industrial by-products (Greenjams n.d.). The product is carbon negative and offers a cheaper construction cost. Raw materials are tested through regular X-ray Fluorescence analyses to check for heavy metal oxides and other toxic substances. GreenJams has received various grants from state and central government schemes such as Punjab Agri Business Incubator and Nidhi Prayas. The company has also attracted private equity funding. Their goal is to scale-up to cover 1 billion sq. ft of built area using Agrocrete® within 5 years.
- Strawcture Eco produces AgriBioPanels™, made of more than 90% straw and a proprietary binding adhesive (Strawture Eco 2021). The panels are suitable for a wide variety of applications, mitigate natural resource depletion, prevent air pollution, while building a value chain supporting farmers' livelihoods. The products are ISI-certified, fire resistant, moisture resistant, termite proof, formaldehyde-free, UV resistant, carbon negative and offer great acoustic insulation. E.g., The acoustic panels were used to build the library and multi-purpose hall at the Heritage International School, Gurugram in India. The panels have also been used in prominent Indian hospitals including Jayadeva Hospital, Bengaluru. Rapid construction can reduce costs tremendously as was the case for Vistex Hospital, a 6,000 square feet facility built in under 80 days in Patna, Bihar. The company is working on extending its manufacturing base across India to ramp-up and streamline production.

Replicability

It should be noted that although Portland cement attracts a 28% GST, river sand and other naturally occurring sand still attract only a 5% GST, despite the immense destruction caused by the scale and pace of river sand mining. Such a policy is weighted in favour of business-as-usual. In enabling a paradigm shift to scale up regenerative, bio-based alternatives, added incentives providing clear market direction are highly welcomed.

In general, in mature economies with a built infrastructure, it is essential to prioritise reuse rather than new build. In emerging economies, where infrastructure is still being built up, tax incentives to upcycle materials is a step towards sustainable sand supplies. As these examples demonstrate, there is tremendous potential in managing our material flows and upcycling current waste streams to reduce the demand for sand and eliminate it altogether, where feasible and cost-efficient

Jayadeva Hospital, Bengaluru, India

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Two high-potential start-ups have benefited from an Indian policy incentive

In general, in mature economies with a built infrastructure, it is essential to prioritise reuse rather than new build.

In emerging economies, where infrastructure is still being built up, tax incentives to upcycle materials is a step towards sustainable sand supplies.

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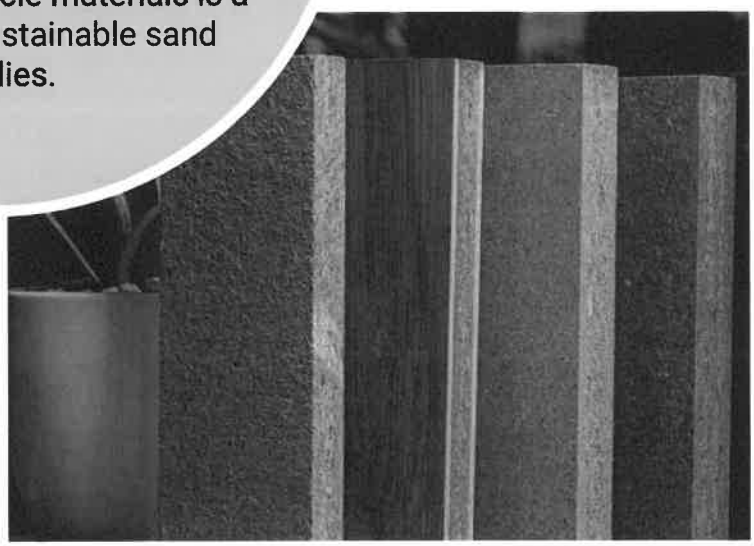
AgriBioPanelsTM



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Recommendation 4 : Integrate policy and legal frameworks strategically

Summary

Strategic and integrated policy and legal frameworks should support responsible sand sourcing and management, including promoting alternatives. National and subnational policy and law play essential roles in shaping behaviour and outcomes across different stakeholders in the production and consumption of sand resources, and their alternatives. These institutions function to balance different needs, set sustainable and equitable goals, and shape legal, international, political, market, and social dynamics to pursue these. Coherence in purpose, related line ministry functions, implementation and intended outcomes across sectors and stakeholders is key to finding this balance.

To succeed, they must be in tune with local, national, and regional realities while responding directly to the need for accelerated transitions to a wiser stewardship and use of sand resources. The drivers of sand over extraction and consumption are thorny. Resources to address these are often limited, thus there's a need to do more with less and find strategic leverage points, with the goal of avoiding or reducing competition across multiple and many worthy objectives.

Rationale

Clear calls have come for an evolution in policy and legal institutions shaping sand extraction practices and major uses because current approaches often cannot regulate these shared resources in strategic, coherent, and equitable ways (UNEP 2019).

Sand extraction falls between the gaps between mineral, environment, water, marine and land use policy, and legislative frameworks in many countries. Mineral resource regulatory regimes are the focus of much sand policy discussions even though sand material flows are inadequately addressed in this domain. High-consumption volume sand is conceived to be a low-value development mineral and of a lower priority compared to high-value export minerals. Moreover, some of the most problematic extraction is that which occurs in dynamic environments like rivers, lakes and coasts governed by areas of policy and law like environmental legal regimes, water resources policy and management, coastal zone management, infrastructure, urban and land use planning, fisheries management, and biodiversity policy, which often do not address sand extraction governance and management adequately, if at all. Concession and permitting systems can be highly complex and difficult to comply with (Recommendation 5); and monitoring (Recommendation 6) and enforcement difficult to implement and under-resourced.

A key assumption underpinning Recommendation 4 is that integrating policy and supporting legal frameworks,

- **horizontally**, across national ministry objectives and their separate strategy and implementation mechanisms to create cross-sectoral goals and approaches;
- **vertically**, through jurisdictional levels of global, regional/transboundary, sectoral, national, and subnational policy and law; and,
- **intersectionally**, with the recognition of interdependence and complex patterns of interaction that link intended and unintended effects of policy and legal action and inaction

will encourage policymakers and other actors to examine established practices, consider different needs to be met and ask how diverse populations are affected. These considerations will help guide transitions towards sustainability through policy and legal interventions that advance societies in positive directions, are implementable and just (Lafferty et al. 2003 ; Briassoulis 2017).

An approach like this to integration across policy domains[10] can help when uncertainty is high, different values are in play, consensus on problems and interventions is low, and collaboration, co-decision and joint action is needed to make progress (Hoppe 2018). Combining assessment processes in mineral, environmental and land use regimes, for instance, could inform a more ordered resource exploitation while protecting local needs. It can support strategic anticipation of materials demand and allocation of resources across a full range of needs in society (Recommendation 1); in the case of sand and its alternatives, that means securing necessary construction and industry resource inputs while ensuring co-

10 Policy domains are also referred to as "Policy areas", "policy sectors", "subsystems", "dimensions", "programs.

benefits of keeping sand flowing through ecological systems are not lost (Recommendation 10). Joined up approaches also help identify the worst impacts of sand extraction and regulate, incentivise, and coordinate the actions needed by many different players to mitigate them. They can change incentives and barriers to feasible alternatives becoming mainstream options in aggregates and other use markets, considering local secondary availability and consequences of such policy change (Recommendation 8). When pursued in conjunction with principles of justice and equity (Recommendation 2), such efforts also assess the implications of policy and regulatory action or inaction for different groups in society, today and in future.

Box 7 : Case Study - Why intersectionality matters in the formulation of strategic integrated policy & law (the case of Andhra Pradesh).

Intersectionality currently appears under-discussed in policy integration theory. It is discussed as an outcome, or as a means to improve policy formulation, but not specifically as an input to policy integration design and process. The case of Andhra Pradesh helps illustrate why intersectionality is a key ingredient along with vertical and horizontal integration efforts in governing sand resources.

Andhra Pradesh is a state in the south-eastern coastal region of India. Illegal sand mining has been reported in several districts within the states (Pallavi et al. 2013). In order to improve formalisation and legalisation, the state Government of Andhra Pradesh aimed to centralise the management of its sand resources and sand mining activities under the control of the Andhra Pradesh Mineral Development Cooperation. They took a strongly integrated and well-intentioned approach and linked this integration measure with an ambitious scheme to provide alternative livelihoods to women through the Development of Women and Children in Rural Areas (DWCRA). The DWCRA was created to empower and improve the quality of lives of women in rural communities living below the poverty line, namely by creating self-help groups for the women to identify sustainable opportunities to generate income.

The state government gave mining rights to the DWCRA women groups, who were responsible for managing and overseeing the delivery of sand purchased through a government online portal. Several pilot projects have been initiated in the state since 2014 (BusinessLine 2014). Out of the net profits earned, 25% would be directed to the DWCRA groups (Bikkina et al. 2017). Additionally, a monthly salary would be provided to the women. This initiative was the first to be implemented in India, aligned with the state's *Pedarikam Pai Gelupu*, or *Triumph Over Poverty* campaign.

Despite the initiative's ambition to reduce poverty and provide women with more opportunities, it has been plagued with many challenges that the state would need to address to fully realise its potential. Women reported delays in receiving their payments, some even resorting to paying with their own money to meet logistics requirements (ibid.). Health and safety were also a concern, where the women reported obstacles presented by political rival groups and risks to their personal safety from truck drivers at night. In addition, the women were not given proper training, even though training in matters such as financial planning, bookkeeping, and logistics and supply chain management were part of the state's New Sand Policy mandate.

The case of Andhra Pradesh therefore showcases an excellent instinct to both horizontally connect sand mining regulation improvements with gender and poverty outcomes, and to vertically integrate under one agency for improved implementation. However, this initiative still produced muddy outcomes because a missing intersectional lens. Taking into account the constraints and conditions that women face in this region as they seek economic independence and security would have allowed for these to be factored into the choice and design for intervention. Upfront considerations of women's experiences in this context might not have solved every problem, but it could have created opportunities to plan for actions to mitigate these risks and for a more secure progress on the multiple goals of improved sand resource management, poverty reduction and gender equity.

Key actions

Five parallel actions for strategic and integrated policy and legal frameworks in sand and sustainability are relevant across most countries[11].

Action 4.1 : Refine how policy problems and goals are understood ; set, and share common visions and rationalising mandates

The fragmented treatment of this resource in the policy and laws of many countries is explained by particularities of geologies and geographies; sources, types, and applications; and, in ways policy institutions have evolved to mediate access and use of these materials over long time frames in those places. Building a common understanding of the resource in the context of contemporary sustainability challenges is important before moving to update institutions. Five key tasks are:

- Analysing interdependencies connecting the production and consumption of sand and its alternatives to major issues of climate resilience, biodiversity, green and circular economy planning, urban and infrastructure, aggregates and construction, and waste management in context[12].
- Facilitating a transparent and shared overview of resource demand, availability, and materials flows, including understanding major use sectors and demand volumes; extraction sources, volumes, and methods for primary extraction; actual and latent availability from alternative sources; and demand reduction potential and realities.
- Identifying relevant policy domains, institutions, organisations, and mandates in context and characterising policy failures and successes with inputs from multiple stakeholders.
- Reviewing language, definitions, frameworks, and terminology to address fuzzy or lacking legal definitions which affects evaluation, design and implementation of policies and laws in many countries (UNEP/GRID-Geneva 2022a).
- Initiating cross-sectoral and multi-actor and stakeholder discussions to define problems and update agreed goals, objectives, and key results.

Action 4.2 : Clarify who has a stake along the value chain and how actor goals, objectives and interests relate to one another

Successful framework and intervention design will depend on understanding who is affected by different scenarios for production and consumption of sand and its alternatives. This requires qualifying and quantifying effects distributed over different groups in society, upstream and downstream geographies, and time – taking their goals, vulnerabilities, and adaptive capacities into account if outcomes are to be both sustainable and equitable. Three core tasks are relevant:

- Identifying who is involved in and affected by consumption and production of sand and its alternatives today and into the future (Reed et al. 2009) using less traditional scales of ecosystems and ecosystem services (Sousa et al. 2020), key sectors and their value chains as well as cross-sector opportunities for circularity (UNEP 2022a), and the SDGs (Bendixen et al. 2021) for assessing sand consumption and production impacts to understand upstream and downstream consequences of policy action and inaction to supplement established EIA procedures (Recommendation 7).
- Identifying what institutions and actors have mandates and interests, power, and influence across policy domains critical to driving sand resources demand and utilisation (Hertin et al. 2003).
- Analysing compatibility between stated values, goals, and interests across stakeholder groups in national policy institutions, considering their influence on the agenda and conditions for effective integration of policy and legislative action (Candel 2021).
- Negotiating new goals, objectives, and key results within sustainability framings with viewpoints across different stakeholder groups, including an open consideration of the changes likely needed in environmental, natural resource and other institutions to support such goals.

11 The list of actions were produced through 1) knowledge synthesis of integration actions prepared by the lead author in (Bréthaut et al. 2019) and 2) and cross-referencing these actions against the outputs of a dialogue process co-hosted by UNEP/GRID-Geneva Global Sand Observatory and the Extractives and Development Sector programme of the German Federal Institute for Geosciences and Natural Resources (BGR) from July to September 2021. Policy actors, scholars and other practitioners who have recently produced place-based explorations on sand and gravel sustainability were brought together for online discussions on 1) policy structures, failures & successes in sand and gravel governance and management around the world, and 2) defining a just transition to a responsible sand governance and management. 38 participants discussed their experiences in 5 global regions and 20 countries including: Southern and West Africa; India; Lower Mekong Countries.

12 Emerging frameworks for Sustainable Development Goal interdependencies analysis are applicable here. For a recent review, see Alcamo et al. (2020).

Action 4.3 : Design policy and regulatory institutions to coordinate actors that recognise the mix of formal and informal 'rules in use'

Structural factors inside and outside of formal policy institutions shape real-world behaviours and outcomes when it comes to policy integration (Ostrom 2011). Organisational forms and incentives for regulatory authorities (and individuals within) are particularly influential on success and failure. Three key tasks include:

- Understanding gaps in existing institutional regimes over different geographic and jurisdictional scales, stakeholders, and timeframes. Given the largely local and often informal nature of sand resource extraction, trade and use materials flows, the grey areas between legal and illegal, regulated, or unregulated, formal, and informal are to be treated carefully here.
- Reviewing existing policy structures to identify opportunities for: setting cross-sectoral policy directions and revising supporting legal frameworks accordingly; establishing or reinforcing administrative bodies with regulatory authority at appropriate levels; creating and reinforcing actor networks at strategic levels of decision making that affects materials demand and flows and improving monitoring and statistics.
- Assigning roles, responsibilities, and appropriate resources for a coherent regulatory environment in five critical areas : resource availability assessments, resource allocation and access regulation, alternatives production and adoption, impact assessment and monitoring.

Action 4.4 : Improve alignment between public actor goals, objectives, interests, and mandates in practice

For policy actions to be compatible, non-conflicting, coordinated, complementary and mutually-reinforcing, improving alignment between goals, objectives, interventions, and resourcing, among other factors, is critical (Runhaar et al. 2014). Four key tasks include:

- Evaluating policy and legal instrument options for integration including but not limited to: mainstreaming action to normalise responsible sand sourcing and management into the routine activities of other policy domains (Scott et al. 2021); adjusting property rights regimes; reforming or instituting legal systems and legislative frameworks to clarify roles and responsibilities administrative bodies for the procedures and rules of decision-making, monitoring, enforcement and sanctions. Cross cutting mandates have led to neglect and lack of accountability on individual institutions.
- Simplifying policy and legal complexity.
- Creating enabling conditions and incentives for alternative materials experimentation, production, and market access for net positive sustainability outcomes.
- Resourcing authorities appropriately, including checking budget and financial incentives line-up with implementation and enforcement roles.

Action 4.5 : Evaluate if policy actions are compatible, non-conflicting, coordinated, complementary and mutually reinforcing in reality

Current evaluation for sand-related policy activities falls short in many areas (UNEP 2019). 'Fit-for-purpose' approaches are ones that recognise the complexity inherent in local to regional sand value chains, the plural values in play, the imperative for systems transformation and the need for decolonised and culturally responsive evaluations. Three tasks for establishing appropriate evaluation commissioning and execution include:

- Defining clearly what good integration outcomes look like in the policy context in question.
- Revisiting guidelines and commissioning procedures for government policy evaluations to allow complexity-informed approaches[13].
- Creating opportunities in policy evaluation procedures to promote learning and adaptive planning across government levels, national line ministries and internationally, and operationalise sense-making and adaptive governance under uncertainty (Rowe 2021).

13 One example is: HM Treasury (2020).

Box 8 : Case study - Multi-stakeholder Governance Approach in Makueni County in Kenya

A multi-stakeholder governance approach is essential in implementing strategic and integrated policy and legal frameworks governing sand resources. One sub-national example is Makueni County in Kenya.

Background

Artisanal sand mining has historically been part of the economic bedrock of Makueni County, employing youth. Yet, unrestricted sand mining contributed to dried riverbeds and water scarcity, school dropouts, teenage pregnancies, drug and substance abuse, increased criminality, and violent conflicts over access and control of sand resources.

However, following strong citizen-led protests (Environment Justice Atlas 2018) against open-access sand mining in some parts of the County, the Makueni County Sand Conservation and Utilization Authority (henceforth the Sand Authority), was formed under the Makueni County Sand Conservation and Utilization Act (2015 ; Kenya, Makueni County Sand Conservation and Utilization Authority 2016). The Act's legal framework targets exclusively sand conservation and utilisation, i.e., the removal, extraction - or harvesting, as it is sometimes referred to in African sand resources discussions - of sand and restoration of degraded sites. This is operationalised through a dedicated government agency and a conservation fund.

The main responsibilities of the Sand Authority are to :

- Enforce the ban on sand exports destined for utilisation outside the county.
- Regulate, licence, and monitor all sand utilisation activities within the county. It manages the mandatory EIA process and designates authorised extraction sites. Concession depends on the volume extracted, and only applies to sand mining above two tons. One reason for this volume threshold is to ensure that local communities can still access sand for residential construction purposes.
- Manage revenue and restoration projects. 50% of revenues derived from authorised sand extraction activities serve restoration and conservation activities. They include construction of sand dams in river zones previously exposed to environmental damages resulting from sand extraction.

Sand dams constructions in Makueni County, Kenya

© Halinishi Yusuf

Integrating communities into sand resources' management

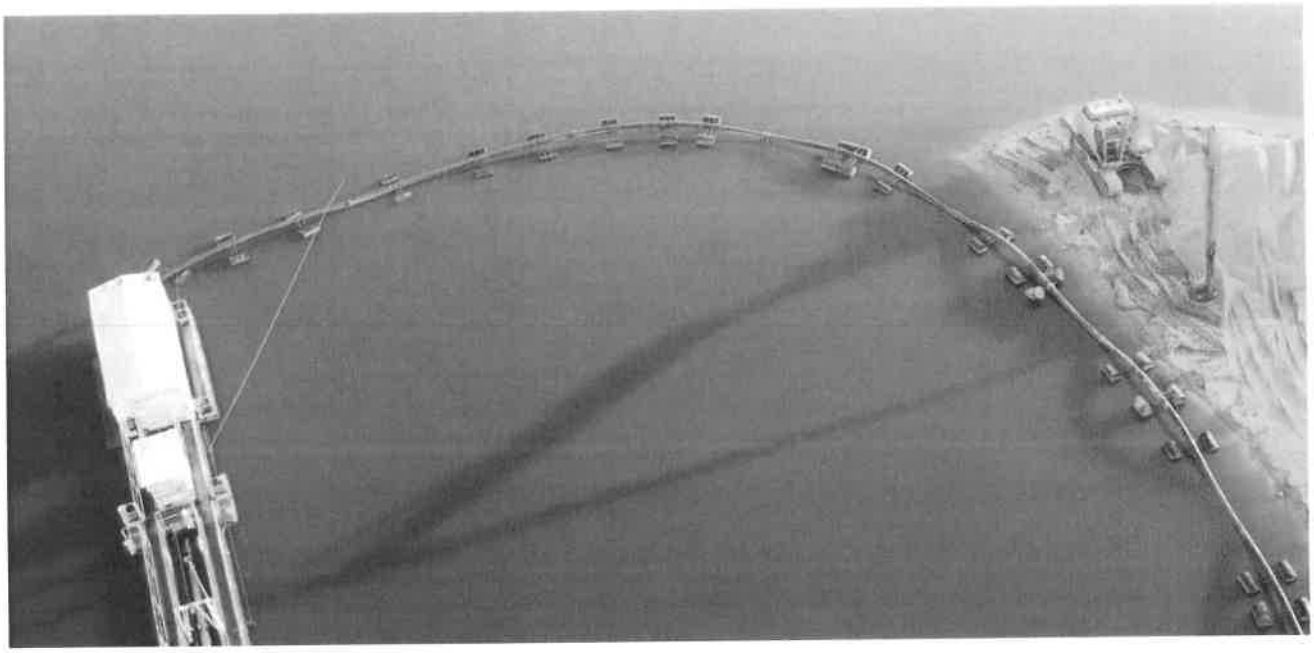
The Sand Authority's participatory committees, namely the Ward Sand Management Committee and Sub County Sand Management Committee, are composed of civilians from various interest groups. These committees identify suitable sand extraction sites, help monitor harvesting and report suspicious and/or unauthorised sand activities to the Sand Authority. Their efforts in awareness raising help demonstrate to communities the benefits of regulated sand extraction (e.g., access to better water quality, reduced risks of drought, stable employment, social cohesion).

In line with this multi-stakeholder governance approach, the Sand Authority implements a national gender representation quota in its operations and decision-making (Republic of Kenya 2010). In ensuring women's effective participation and equal opportunities for leadership, the Two-Thirds Gender Rule applies across management and board committees, construction, and materials procurement policies. In the construction of Makueni County's sand dams, local communities, particularly women, supply raw materials and are engaged as remunerated semi-skilled or casual labourers.

Replicability

Following the formation of the Sand Authority, the county has witnessed less violent conflicts over access and control of sand resources and a fall in school dropout rate. Water availability and riparian vegetation increased, facilitating the reuptake of small-scale agribusiness.

Yet, Makueni County's strategic integration of policy and legal frameworks faces significant challenges. The absence of a coordinated approach to regulate sand mining in Kenya's sub-national government institutions limits the socio-economic and environmental benefits in Makueni County. Given sand resources' transboundary nature, it is essential that sub-national government actions are complementary to achieve sustainability goals.



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Recommendation 5 : Establish ownership and access to sand resources through mineral rights and consenting

Summary

Having recognised naturally occurring sand as a nationally strategic resource, each country should understand its sand resources and develop strong governance through integrated policies managed by an authority with powers to guide (and devolve as required). To achieve the just, sustainable, and responsible sourcing of sand, a key step to delivery is the creation of an effective mineral ownership and access framework, extending onshore and offshore, which will also allow for a locally acceptable commercial mechanism for cost recovery.

Naturally occurring sand deposits are widespread, lie across and below the land surface and seabed, and have been valued for generations. Historically, access to sand deposits has evolved according to local needs, traditional practice, and national constitutions. This has resulted in a wide range of informal and formal approaches to accessing sand resources across the world which are in tune with the scale of extraction. Informal, consensual, or legalised access and extraction of sand resources is often dependent on a combination of separate interests related to property rights and regulation, but in countries where larger-scale extraction has occurred, a formal governance framework has often evolved. Adapting and applying the design principles established in existing sand ownership and access frameworks, in combination with new approaches to the management of natural resources, e.g., water (IUCN 2018), provides a sound foundation for improving the governance of sand resources.

Box 9 : Learning from another natural resource - water rights and allocations.

Water resources have many similarities to sand resources - recent significant increases in demand have led to major changes in historical patterns of usage and the value of water. Often, water rights and allocation practices already exist but may be unclaimed, unrecognised and sit within immature or weak legal frameworks. Water resources have other similarities to sand resources including their distribution - extending underground and across jurisdictions (e.g., along rivers); suffering localised depletion; having no mechanisms for taking a strategic overview, being subject to a range of competing demands; a limited knowledge of the resource and a wide range of public and private stakeholders. Water has been recognised as a strategic resource before sand, and as a result water resource rights and allocation have been explored and investigated over the past two decades and longer. Water resource management provides perspectives, analogies and approaches that may be usefully applied to the sustainable development of sand resources, including the mapping of rights (Miller et al. 1997), application of principles-based approaches[14], models of constitutional reforms[15] and a range of economic instruments (Rey et al. 2019).

14 For example: the Dublin Principles (Solanes and Gonzalez-Villarreal 2008).
15 For example: Magawana (2021)

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Rationale

Naturally occurring sand is found across the earth's surface and extend underground, as three-dimensional bodies of sediment which respect no anthropogenic boundaries such as territories, jurisdictions, administrations, product markets or habitats. We therefore have to impose an 'unnatural' governance regime which crosses space and depth (below the earth's surface) related to territories and is unconnected to natural processes of erosion and deposition (see Box 1). Sand ownership and access has been traditionally delivered through a system of informal or formal mineral rights (awarded by a government or the mineral owner) which may be associated with regulation and consenting frameworks.

Until recently, sand sourcing for development has often been a local issue, typically operating within the environmental capacity of the area. Arrangements for accessing sand resources have been:

- fit-for-purpose, effectively serving the local and regional needs of economies and communities, and
- environmentally acceptable with impacts constrained by the relatively small scale of extractive activities.

The rapid increase in population (especially in Asia and Africa), an appetite for an increase in living standards driving urban development, the growth and upscaling of infrastructure, combined with an adaptation to climate change (Recommendation 1) has driven the demand for sand to unprecedented levels. Satisfying this demand has led to increased sand extraction from both existing sand deposits and from new, previously unexploited deposits[16].

The growth in sand extraction has created an imbalance—a market failure—testing both existing sources and the established supply structures which have not been created to ensure sustainable development at the current elevated levels of demand. This demand has also amplified and exposed our weak understanding of the distribution, scale, and quality of our sand resources.

In some places, governance regimes designed to oversee the management of sand as a strategic natural asset address the balance of supply, planning and environmental management of activities associated with sand resource extraction, and have evolved in step with the increased development of the resource (see Box 8). In contrast, countries where formal legal ownership and consenting frameworks are weak or do not exist, access to resources has grown organically and may be strongly influenced by personal factors where resources are utilised in an unsustainable and potentially highly damaging way until their depletion.

Taking an economic perspective, ineffective management of sand supply may result in delay and cost. Where this demand is not being satisfied, the illegal, uncontrolled, and unregulated supply of sand associated with criminal activity may develop, with significant adverse social and environmental impacts. Furthermore, the conflation of conflicting ministries, immature legislation and traditional practices aggravate the current unsustainable situation.

One option that can be taken as a first step in the sustainable management of sand sources and supplies is the creation of an ownership and access framework which can be delivered as three interconnected actions. Under these terms, sand resource development would require enforceable agreements with both the owner of the mineral rights, and a consent which permits the sand extraction to proceed.

16 For example, marine sands for reclamation and coastal adaptation.

Key Actions

Action 5.1 : Create a legal framework to establish mineral ownership rights on a national scale extending onshore and offshore

- Mineral rights underpin the governance and management of sand resources by establishing ownership of the resources that is lying on, or under, the land (or seabed), and the granting of a right to directly benefit from its extraction[17].
- Mapping and understanding the existing range of mineral rights, responsibilities and practices provides the basis for recognising existing interests and considering options. E.g., should rights lie under private, common (community) or state (government) ownership ?
- The establishment and introduction of a comprehensive national, enforceable legal framework for mineral rights can allow controlled access to sand resources.

The establishment of mineral rights is one part in regulating access to sand resources. Resource management is required as uncontrolled access to these rights driven by market forces is not necessarily aligned with a sustainable development ambition. Whereas access to sand is a traditional right in some places, obtaining the agreement to extract and use a sand resource from its owner is often the subject of a legal and commercial arrangement. Awards of rights by owners to developers wishing to extract sand may be exclusive (to a single extractor) or non-exclusive (to several extractors)[18]. It is important to recognise that the value of obtaining rights to sand resources is influenced by many factors, including its location, quality, and scarcity (relating to its use), extractability, proximity to emerging development and the availability of alternative resources. If commercial rights to extract sand are secured, the successful bidder has an established advantage over competitive suppliers with a less attractive stock.

Action 5.2 : Create a locally acceptable commercial mechanism (royalty or levy)[19] through a mineral rights framework that enables recovery of operating costs

- Sand resources are managed publicly by the government or through a private mineral ownership model.
- The commercial right to access sand resources is intended to produce benefits and/or financial returns to the mineral owner.
- A royalty or levy should be applied for the use of state-owned minerals or private mineral owners at a level (for example by volume) that fully recovers national sand resource management costs.

In countries where sand resources are managed publicly by the government, or where a private mineral ownership model is established and enforceable, sand resources may either be allocated to projects by government or alternatively the commercial right to access sand resources should take place through a transparent open process where competition is intended to produce benefits and financial returns to the mineral owner. Motivation of mineral owners vary – for example financial returns may be aligned to recover resource management costs (often state-owned minerals) or to maximise returns (private owners). Looking ahead, as the strategic value of sand as a critical resource is recognised, the costs incurred for the national management of sand resources should be recovered from users that benefit from the sand resources. For example, in the case of government (public project) procurement of sand resources, the costs of sand management should be funded internally within the government. In contrast, a proportion of the fees for the private right to extract sands should also contribute to the national management of sand resources[20].

Action 5.3 : Establish a national regulatory and consenting regime based on a sound understanding of sand resources and principles of sustainable management, applicable onshore and offshore

- Development of sand resources should be contingent on successfully obtaining an independently assessed consent, i.e., a permit to extract.
- The consenting framework should recognise and balance the wider interests of government and sustainable sourcing.
- Such a consenting framework should be established independently of a mineral rights framework (Action 5.2).

Sand regulation and consenting frameworks often form a complex administrative landscape with a range of cross-cutting and interfering responsibilities and interests[21].

17 Subsurface mineral rights may be separate from land ownership
18 In some places sand is deliberately carved out of a mineral rights regime as it has been traditionally viewed as a low value product.
19 Fees or a levy are commonly proportional to extraction – for example charged on a tonnage basis.
20 Private commercial rights to extract sand may require a bi-lateral negotiation or have to be won through open market competitions using mechanisms such as tendering, where invariably the highest bidder wins the non-exclusive or exclusive right to extract sand from: a defined area, period, total volume, rate of extraction and royalty rate (price per ton or equivalent), and in accordance with a consent and subject to local conditions applied by a regulator – for example planning, social (e.g., disturbance by trucks, noise etc..) and environmental restrictions.
21 E.g. In the UK, sand resources are cross governed by multiple national line ministries. In the absence of a formal national mineral strategy, the UK mineral industry proposed a Minerals Strategy in 2018, which sets out the social, environmental, and economic issues that will need to be addressed to ensure sustainable supplies of minerals to 2050 (MPA 2018)

In combination with a rights framework (which may be commercial), development of sand resources should also be subject to consent which recognises and balances the wider interests of government and sustainable sourcing. A consent provides the legal permission to extract a sand resource given by the relevant competent authority operating within the context of local, regional, and national government policies. A number of relevant policies may link sand supply with (i) economic development (e.g., construction and specialist products); (ii) environmental protection (e.g., EIA[22] and conservation) and (iii) planning (e.g., zoning of preferred resource development areas balancing the full range of socio-economic interests applied on a local to national scale to ensure a long-term sand supply and regional allocation of sand sourcing targets).

At national scale, very often there are also separate policies for the management of terrestrial and offshore resources and activities[23]. In addition, in some places some consenting decisions are made by a national authority and in other places decisions are made locally[24]. Typically, a responsible authority (regulator) grants operational consents within a legal framework, monitors extraction, and delivers enforceable regulation. Consent to extract sand deposits is commonly subject to a series of conditions including limitations of volumes, timing, extent, extraction techniques, environmental disturbance as well as the restoration of sites. Successful consenting requires:

- The creation of local, regional, and national government policies and a competent authority that will ensure continued supply of all (onshore and offshore) sand will be delivered through the sustainable development of resources; and
- Regulation and consenting controls to be delivered through planning, taking account, and balancing the full range of socio-economic interests (e.g., the identification of preferred sand resource development areas, resource management to ensure a long-term sand supply and regional allocation of sand sourcing targets), environmental assessment of development proposals and monitoring of environmental performance.

Box 10 : Alternative Naturally Occurring Sources & Marine Sands

In many places, increasing demand has led to sand extraction at unprecedented levels from both existing sand deposits and from new, previously unexploited deposits, for example, marine sands for use in reclamation and coastal adaptation.

Significant volumes of sand resources occur in saline and submarine environments often lying close to the shoreline in deltas and estuaries[25] at shallow depths of a few metres but also extend many tens of kms offshore where deposits typically lie at depths of up to 100 m. Traditionally, these deposits have been inaccessible and difficult to extract, and despite commonly lying close to centres of population, have been extracted only locally and in limited volumes. As a result, typical management frameworks around rights and development of marine deposits are immature and less well developed than adjacent land-based sand deposits[26].

As pressure has mounted on existing terrestrial sand resources, the last two decades has witnessed a dramatic upsurge in the demand for marine sands in use for construction, land reclamation, beach nourishment and coastal adaptation:

- **In construction, marine sands may be used alone or blended with marine gravels, land-based gravels or crushed rock to make concrete and other concrete products;**
- **Expansion of coastal cities and ports through land reclamation is based on the supply of marine sands that can be efficiently delivered in substantial volumes by dredgers, which have evolved and scaled-up to the extent that tens of thousands of tons of sand can be delivered to a site daily; and**
- **Threats to low lying coastal communities and infrastructure from climate change has resulted in the denudation of beaches, which are now routinely supplied with marine sands to replace losses and enhance coastlines' resilience.**

Although several countries have highly developed regulatory marine sand extraction regimes, practices vary widely across the world. In many countries different laws apply offshore and although the state often owns the seabed out to the limit of its EEZ, many countries have not asserted their mineral rights beyond their territorial seas and introduced legislation around the extraction and management of their marine sand resources.

22 Noting that if costs are a constraining factor, EIA of a proposed development may also be undertaken at a regional scale or on a strategic basis.
23 Across the Exclusive Economic Zone (EEZ).
24 According to the principle of subsidiarity – where decisions are made locally (Recommendation 2).
25 Estuaries form where rivers meet the sea and deltas consist of river sand deposits lying in estuaries.
26 Noting the IUCN's call for the urgent global management of marine and coastal sand resources (IUCN 2016).

Recommendation 6 : Map, monitor and report sand resources

Summary

Recognising unprecedented demand for sand to fulfil strategic needs, resource mapping is required, locally, but also at (supra)regional scales. Extraction in huge volumes causes adverse impacts on the environment (SDG 2, 6, 13, 14, 15), and affects economic and social development. Jointly weighing geological, environmental, and socio-economic parametres is therefore paramount for informed decision-making. More systematic comprehension of connections and mutual dependencies within a coupled human-natural system further serves achieving sustainability in an interconnected world. Data and science are hence critical for decision-making.

The sustainable management of sand resources requires a thorough and careful balancing of available quantity and quality of sand versus rapidly changing societal and economical needs. Sand is, in volume, the main solid material used by humans; yet there are, for most countries, no reporting mechanisms in place to monitor its use, locations of extraction and demand by sectors. Comprehensive knowledge on occurrence and distribution, composition, and dynamics, in combination with environmental impact of extraction, is therefore critical for developing long-term strategies for optimised resource use. Multiple criteria, including technical feasibility, further constrain the total 'theoretical' availability (resource) into extractable quantities (reserve) requiring suitable resource management tools for realistic predictions of a safe and secure supply.

With increasing development needs, society will need more and more sand. Meanwhile, other activities grow as well, with spatial planning best serving allocation of space. Quantification of strategic needs, and an assessment of environmental and socio-economic impacts (Recommendation 1), are the basis to set country- and region-specific policies, put in place legal and economic measures and develop technical alternatives. These needs call for transparent data and analytical frameworks to inform decision-making.

Rationale

Globally, the sand supply base is not known, and only aggregate production estimates are available (Table 5). However, long-term availability and supply of naturally occurring sand and gravel should not be taken for granted, which is already exemplified by shortages on the short- to medium-term (Ioannidou et al. 2019). This is related to the uneven distribution of geological resources: (1) deposition being region- to site-specific in terms of quantity, and (2) the sand quality being largely dependent on the geological process of its formation (e.g., fluvial, coastal, marine, or glacial processes). However, irrespective of the geology, there is increasing competition for space to extract and areas with restrictions are only increasing (e.g., for nature conservation). From the above, there is a growing need for data-driven resource management using most appropriate tools. Spatial planning is highly recommended to cope with multiple (sub)surface-related activities.

Very few countries know with enough detail the extraction quantities per year, the uses, and related environmental and socio-economic issues. A lack of data and information, combined with several other socio-political drivers such as limited regulation, often lead to illegal/informal/unregulated sand mining having potentially large negative environmental and social impacts. By providing data and maps of sand resources and land use, alternatives can be considered, and choices can be made to opt for a fair and just sand product.

Table 5 : Global aggregates production estimates (Mt : million metric tons) for the years 2020-2021

	2020 Mt	2021 Mt	Change
World	42,211	44,300	+4.9%

Source : Global Aggregates Information Network (O'Brien 2021)

Key actions

Action 6.1 : Invest in strategic resource mapping to secure long-term and safe supply of sand

- Recognise that sand resource needs are diverse and application/actor-specific, with growing environmental conditions to be fulfilled, requiring multidisciplinary mapping of resource quality and quantity.
- Secure long-term and safe supply through strategic planning, identifying short- to long-term availability while safeguarding natural capital.
- Build capacity for implementation at the regional scale, calling upon Geological Survey Organisations to coordinate the actions, and build versatile databases allowing actor-specific resource evaluation. Remote sensing capabilities should be further exploited to deliver resource-relevant information, especially in areas with no data.

Recognising that globally sand resources in many areas are yet unmapped, while the needs are unprecedentedly rising, there is momentum to engage in strategic resource mapping. Geological Surveys are best placed to coordinate the actions given their knowledge on the geology, mapping know-how and increasing structural initiatives for joint mapping (e.g., OneGeology (British Geological Survey 2020); the envisaged Geological Service for Europe (Vidovic et al. 2020), USGS Earth Mapping Resources Initiative (Day 2019). To increase data availability, a centralised registration of subsurface information (e.g., boreholes) when executing public works (Meulen et al. 2013) can be legally mandated. On a global scale, public-private partnerships can be set-up to share data and information (e.g., similar to (Seabed 2030 n.d.) for bathymetry). Governments can stimulate strategic planning to ensure maximum security to the extractive industry while safeguarding natural capital (Recommendation 6). State-of-the-art mapping technology allows multidisciplinary resource mapping depicting most efficiently a vast range of geological and environmental parametres at once. Remote sensing (e.g., via ESA-Copernicus (European Union's Earth Observation Programme 2021), (NASA-NEO n.d.)) delivers increasingly resource-relevant data, and global coordinated Earth Observation efforts such as the GEO/GEOSS initiative (Group on Earth Observations n.d.) could play a major role. Examples include the mapping of near surface geology (European Association of Remote Sensing Companies 2020), sand distribution patterns (Conger et al. 2009) sustainable aggregate supply (Lavender 2021), and remote identification of sandy coastlines worldwide (Luijendijk et al. 2018). Although resource quantity estimates still require on-site geological approaches, morphological and topographical analyses of remotely sensed digital elevation models may allow a first delineation of important sand resource areas. To fulfil future needs, reliable quality and quantity estimates for land, rivers and sea are needed due to growing land-use constraints and depletion of easily accessible terrestrial sand resources. These estimates are best based on common classification standards and derived from coherent modelling approaches. Seamless land-sea 3D geological models are optimal, fed by a multitude of resource-relevant information (Box 11). Overall, the better the models and the maps, the better the environment can be safeguarded.

Action 6.2 : Conduct monitoring and research to mitigate environmental impacts (Also refer to Recommendation 9)

- Implement a holistic environmental impact assessment (EIA) process for larger sand mining projects to identify the effects on the environment and on human health and welfare.
- Design monitoring programs adapted to the nature and dynamicity of the environment.
- Fund research to build understanding of the processes underlying environmental changes to avoid and minimise adverse impacts.
- Capture traditional and local knowledge to safeguard valuable ecosystem services upon which livelihoods are built.

Many environmental impacts can be avoided or minimised with increased understanding of the environment. However, to support effective management, there is a need to collect scientific evidence on how sand mining is affecting ecosystem services and functions, threatening biodiversity, and how these impacts interact with other activities or threats (Koehnken et al. 2020). In river and shallow marine environments, knowledge on system dynamics is important to understand the up- and downstream effects of extraction. Hydrology, sand budgets, geomorphology, and ecology interconnect and matter within impact assessments, and therefore require a historical perspective, human use management, and hydrological connectivity at the catchment scale (Newson et al. 2021). This calls for holistic environmental impact assessment frameworks based on best available knowledge.

Action 6.3 : Develop multi-criteria resource evaluation tools that are based on availability, environmental and socio-economic impacts

- Improve classification of sand resources at a regional scale, including the socio-economic and environmental dimension (e.g., following the United Nations Framework Classification (UNFC) for mineral resources).
- Embed such classifications into multi-criteria decision-support systems to allow for the consideration of diverse and complex interests and build knowledge bases supporting long-term adaptive resource and environmental management.
- Project strategic needs into scenario analysis for strategic planning and decision making.
- Increase efficiency in resource use, e.g., targeting the right quality for the desired purpose. Valuable coarse sands should not end up in low-end products, and undesired admixtures (minimising waste) should be avoided pro-actively.
- Promote spatial planning to minimise conflict in a multi-use environment (e.g., sealing of significant resource reserves by other human activities). Multiple use of the subsurface further requires subsurface planning and management.

Strategic resource allocation and decision-making best builds on a synthesis of mapping and monitoring, as well as socio-economic evaluation against strategic needs in a multi-use context (e.g., securing resource supplies for new infrastructure, but also grand nourishment schemes to safeguard low-lying coastal areas). Considering processing needs and transportation cost (i.e., related to distance, and CO^2 emissions) further stimulates local consumption.

Multi-criteria decision-support tools, and particularly the international resource classification standard UNFC-2009 (UNECE 2010), allow to combine information on environmental and socio-economic viability, technical feasibility, and degree of confidence in a structured way (UNECE n.d.). UNFC is particularly promoted as a valuable tool for a holistic assessment of natural resources, with recent case studies on sand use, both for land and the marine environment[27]. Spatial planning is recommended for the optimal allocation of space. When based upon reliable estimates of the quantity and quality of the resource, the sealing of significant resource reserves by other human activities, including other subsurface applications (e.g., energy, CO^2 storage), can be avoided. The objective is to ensure that extraction takes place in a safe, secure, affordable, and environmentally friendly manner.

Action 6.4 : Recognise that naturally occurring sand and sand resources also require integrative and predictive science to meet society's needs

- Invest in gaining a more systematic comprehension of linkages between the use of sand resources, and its environmental and socio-economic outcomes to achieve sustainability in an increasingly interconnected world (Torres et al. 2021).

Securing the provision of sand resources is widely overlooked in existing vision documents on mineral resources, as well as in resource monitoring frameworks. Still, given the huge volumes involved, and the strategic needs, a similar call for more integrative science, holistic environmental assessments and prediction capabilities exists[28]. A greater interdisciplinary integration should aim at understanding the interconnectedness between ecosystem components, whilst transdisciplinary research involving non-natural sciences and stakeholders is needed to address the sustainable transitions in the sand-supply network, i.e., how society can cope with doubling demands, whilst still securing supply, maximise resource efficiency and aligning with the planetary boundaries and SDGs (Torres et al. 2021).

27 See for example the European Union's Horizon 2020 research and innovation programme GeoERA, project Mintell4EU (GeoERA 2018).
28 See for example U.S. Geological Survey 21st-Century science strategy 2020–2030 : https://pubs.er.usgs.gov/publication/cir1476 (US Geological Survey 2021)

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Action 6.5 : Develop strategic resource accounting and reporting along the full production-consumption chains going from extraction, use in products (e.g., concrete), transportation to end-of-life

- Agree on common language on terms and definition allowing consistent accounting and reporting at the regional to global scale (UNEP/GRID-Geneva 2022a ; 2022b).
- Improve the way sand and gravel is considered in the UN's System of Environmental-Economic Accounting (SEEA), as well as in trade and goods classifications.
- Improve how sand and gravel are considered in resource accounting frameworks such as Material Flow Analysis (MFA)[29].
- Develop an integrated environment-social framework based on Life Cycle Assessment (LCA) for the sand and gravel industry including full supply, use and end-of-life chains.
- Develop Life Cycle Impact assessment methods to clearly assess the environmental damages induced by sand extraction in fragile environments.
- Develop risk assessment frameworks to help countries identify potential hotspots from a resource-economic-social-environmental perspective.
- Develop reporting frameworks to help countries monitor and report on sand extraction and use.

To deal with increasing sand consumption, there is a need for better data, better reporting, and analytical frameworks. Such a holistic perspective allows carefully evaluating potential solutions and understanding undesirable side-effects, e.g., a displacement of the problem along supply chains or elsewhere in the world, as well as the generation of other types of environmental impacts (e.g., additional emissions of GHGs increasing climate change). Such an understanding requires developing publicly available, clearly documented datasets and assessment procedures following the FAIR principle (findable, accessible, interoperable, and reusable) and best practices for data quality. Developing such an understanding also means that reported data (e.g., by countries and industries) and modelled data (e.g., by research institutions) should be used in parallel.

From an impact assessment perspective, a suite of environmental systems analysis tools exists (e.g., SEAA, MFA, LCA) (Finnveden et al. 2005). These require understanding and generating an inventory of the full production-consumption chains going from sand extraction, use in products (e.g., concrete), transportation to end-of-life. Furthermore, the inventory of sand flows should be connected to environmental and social impact assessment methods to quantify the induced impacts in terms of climate change, biodiversity losses or use of child labour, for example.

29 E.g. in the Global Material Flows Database from the IRP : https://www.resourcepanel.org/global-material-flows-database (IRP n.d.)

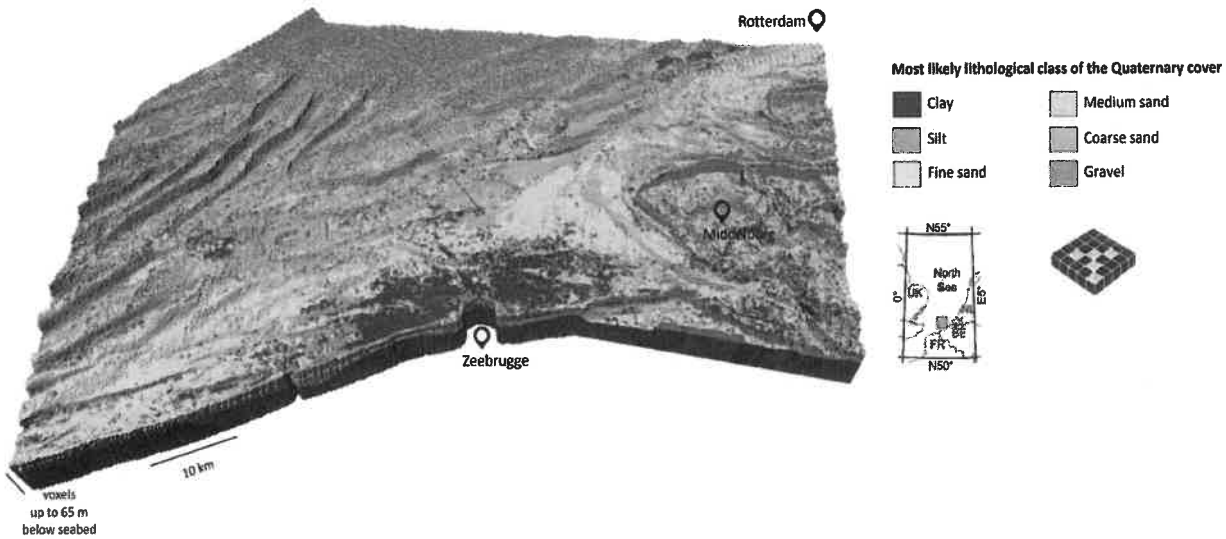
Box 11 : Case study - Innovative 4D management of sand resources in the Belgian and Netherlands part of the North Sea

Socio-economic demands for marine sand resources in the North-East Atlantic have increased at an unprecedented pace (ICES 2021). During the past few years, hundreds of millions of m^3 of offshore sand and gravel have been extracted for coastal maintenance, extensions and industrial use. Future demands will be even higher to anticipate an accelerating sea-level rise and to realise large infrastructural works in coastal and offshore (e.g., to produce energy) settings. Some of these developments are incorporated in Marine Spatial Plans, though their full implementation depends on a sustainable supply of sand.

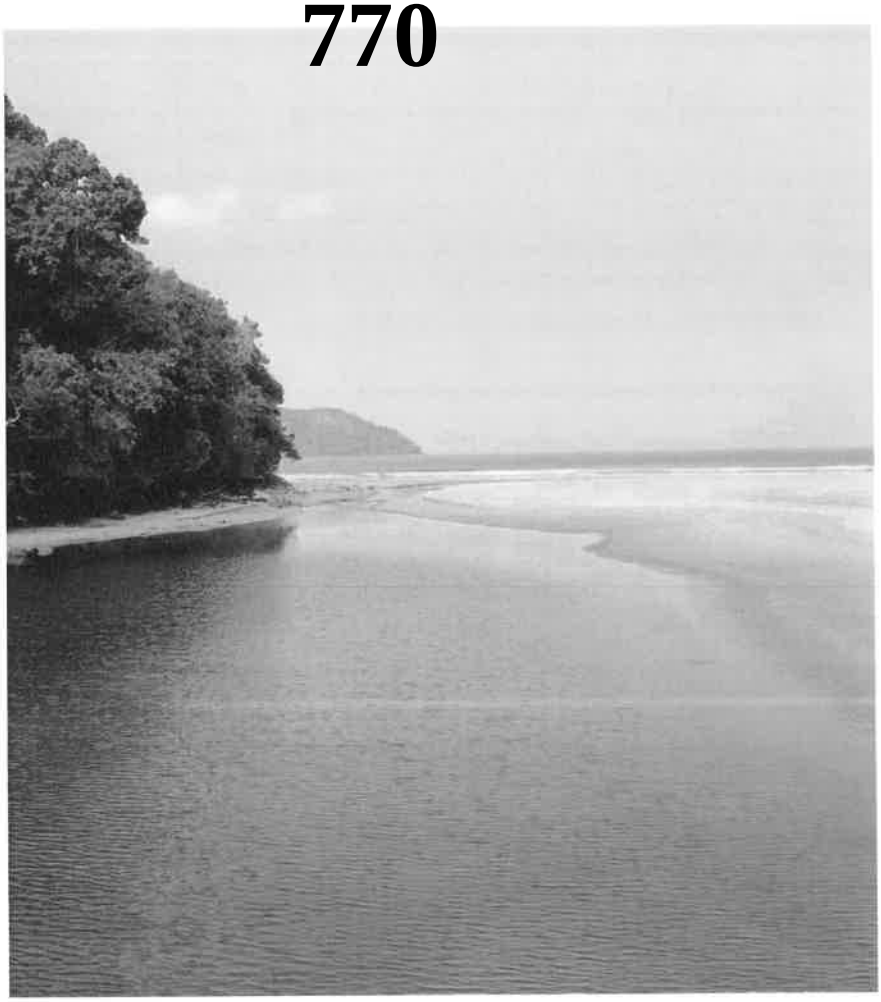
To ensure a safe and secure supply on the long term, a 3D voxel model (volume pixels) was built for the surface and subsurface of the territorial seas and exclusive economic zone of Belgium and the Netherlands (south of Rotterdam) where overall the Quaternary cover is relatively thin (Van Lancker et al. 2017 ; Van Lancker et al. 2019). This approach was chosen because of the high spatial variability in quantity and quality of sand which would be hard to capture in maps. Standardised and harmonised databases were created with metadata allowing the estimation of data-related uncertainty (Kint et al. 2021). Data were entered at the highest detail to maximise classification to any application (e.g., aggregate industry, biodiversity). The methodological workflow for the 3D modelling, using seismics and boreholes in a marine setting (Hademenos et al. 2019), built upon extensive voxel modelling experience on land (Stafleu et al. 2014). The 3D models were further coupled to 4D numerical environmental impact models to quantify environmental impact under various scenarios of extraction. Data, models, and their uncertainties, were embedded in an end-user driven decision support system (DSS) allowing querying the full 3D resource volume and integrating it with third-party data. From a management perspective, the DSS allows for long-term resource management, balancing quality, and quantity data against various applications, while minimising environmental impact (Wyns et al. 2021). For Belgian waters, a renewed policy is now in place, which imposes a lower limit of extraction based on resource thickness and characteristics, as well as criteria related to seabed integrity and hydrographic conditions (Degrendele et al. 2021 ; Federal Public Service Economy, Continental Shelf Service n.d.).

The model (Map 1) provides information on the quality and quantity of the Quaternary sediments, confirming the predominance of fine sands in the coastal zone, shifting towards medium sands in the offshore region. Products are further valorised into the European Marine Data and Observation Network (European Commission 2021a), comprising information on mineral resources, including their volumes where available. DSS application development is further projected in the future expansion of the (The Geological Surveys of Europe 2021). Meanwhile, 3D geological modelling and the move towards 4D has become mainstream in Geological Surveys worldwide (Culshaw et al. 2021).

Map 1 : Transnational subsurface resource model of the Quaternary sediments of the territorial sea and exclusive economic zone of Belgium and the Netherlands (south of Rotterdam).



Source : (Van Lancker et al. 2019 p.32)



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Recommendation 7 : Establish best practices, national standards, and a coherent international framework

Summary

Various practices, standards and guidelines exist on how to extract and use sand whilst minimising the environmental impacts. Yet, these practices, standards and guidelines are not sufficiently shared and tested at the multilateral level. Unlike water, there is currently no integrated holistic approach to sand as part of both the natural and the built environment, as an extractive resource and as a building block for new products. Some steps towards integration have been made through a growing number of guidelines on nature-based solutions. However, any updated and integrated guidelines or standards should take into consideration the value that sand brings to natural processes and other uses. Changing where and how we extract, remove, or use sand can significantly help with the preservation of our environment and make our industries more efficient and sustainable.

Key Actions

Action point 7.1 : Establish, centralise, and encourage the use of best practices for the primary sources of sand.

While best practices and guidelines with common themes already exist for various countries and regions, there is a need for a centralised database for the primary sources of sand (Table 6). It is recommended to governments, local authorities, and the extraction industries to:

- **Collect and share best practices, guidelines, and monitoring plans for primary sources of sand** including (1) rock quarries (2) terrestrial sand deposits (3) the riverine and lacustrine environment, (4) the beach systems and (5) the marine environment (Table 6). While acknowledging that regulatory frameworks differ by national, regional, and local contexts, the principles driving good practices can still provide a sound basis for application across countries and natural environments.
- **Ban sand extraction for the purpose of mining sand as a resource in the active beach-nearshore sand system**, which includes the beach and the part of the nearshore environment involved in the sediment transport to and from the beach. This environment is particularly vulnerable to the impacts of sand mining and of great importance in terms of coastal resilience, the environment, and the coastal economy.
- **Establish an international standard on sand extraction in the marine environment**[30]. Unlike terrestrial sand extraction, coastal and marine dredging projects are usually awarded through public tenders open to international companies. Having an international standard which can be used across the globe in public tenders could therefore strongly improve extractive practices (see also Recommendation 9) and strengthen global efforts to protect the marine environment.

30 The marine environment is a dynamic environment consisting of both inactive and active deposits (Box 1).

Table 6 : Primary sources of sand	
Rock quarries	Crushed rock is the most important alternative to sand and gravel extracted from the natural environment. The environmental impact of extraction tends to be relatively localised but can have important impacts on aquifers and/or habitats for endangered species. Rock quarries and crushing facilities are capital intensive and consequentially, are often more closely monitored and regulated. Guidelines and good practices with a clear description of the environmental conditions could further improve sustainable practices around the world[31].
Terrestrial sand sources	Most terrestrial environments are static with notable exceptions (e.g., dunes). For static environments, environmental impacts from extraction tend to be localised. Extractive practices range from labour intensive sand pits to capital intensive sand quarries. The very low capital and technical threshold to extract this terrestrial resource makes sand extraction challenging to control for public authorities. Large-scale uncontrolled extraction could have significant environmental consequences to e.g., groundwater and agricultural land. Good guidance and training at local level on how to avoid and/or minimise negative impacts is necessary and could help local authorities monitor extractive activities and train miners on the ground[32]. Some countries, including India, already provide such guidelines (India, Ministry of Environment, Forest and Climate Change 2016).
The riverine and lacustrine environment	River extraction, and any activity altering the sediment transport or the hydrodynamic conditions, can induce changes to the river with far reaching consequences up-stream, down-stream, and in-situ. River extraction tends to be relatively cheap and accessible, using shovels, pumps, or excavators. Even when licenced, the over-extraction of the riverine environment tends to be difficult to monitor. In-channel sand mining is therefore banned in many countries and extraction from floodplains tends to be restricted. Where sand extraction from rivers cannot be avoided, EIAs and strict guidelines should be provided in combination with close (and often costly) monitoring to ensure that (1) the river remains in equilibrium with its environment, (2) water quality does not deteriorate, (3) no excessive riverbed and bank erosion is induced and (4) induced sediment deposition remains limited in particular around existing infrastructure. Some countries already provide such guidelines, including Malaysia (Salahuddin 2009 ; Malaysia, Environment Protection Department 2012) and India (India, Ministry of Environment, Forest and Climate Change 2016).
The active beach-nearshore sand system	The active beach-nearshore sand system includes the beach and the part of the nearshore environment involved in the sediment transport to and from the beach. Sand resources are essential for coastal dynamics. This environment is therefore very sensitive to the environmental impacts of sand extraction. A healthy and functioning coastal area is generally the most cost-effective and long-term defence in coastal resilience strategies (Figure 2). Moreover, coastal areas are important to maintain fish stocks, provide a habitat to plants and many endangered species, and are of key economic value for many industries. Thus, sand mining within this system has severe consequences. Guidelines for minimising the impact of dredging activity in the context of coastal restoration, coastal resilience and necessary infrastructure works should be in place and adopted across coastal regions, all of which could benefit from an environmental standard.
The marine environment[33]	Marine sand extraction changes the bathymetry, i.e., the depths and shapes of underwater terrain. If done without the necessary precautions and expertise, this can alter sediment transport, the strength or direction of water currents and the size or direction of marine waves. Marine sand extraction can thus lead to wide scale environmental changes, including sand supply to coastal areas. Furthermore, sand extraction at the seabed impacts the flora and fauna, micro-organisms, marine food chain, biodiversity, and fisheries (Peduzzi 2014). The implications for marine and coastal environments are recognised by the IUCN, calling for "the urgent global management of marine and coastal sand resources" (IUCN 2020c). Marine sand mining for any use other than marine and coastal works is banned in several countries. Marine extraction is capital intensive, tends to be highly specialised and is often an integral part of infrastructure and coastal management. Good guidance already exists but also needs to be implemented[34].

31 See namely the guidance produced for the cement and aggregates sector (IUCN 2020a)
32 See namely IRMA's certification process for responsible mining (Initiative for Responsible Mining Assurance 2021).
33 The riverine environment includes the river channels, the riverbanks, the levees, estuaries, deltas, and floodplains.
34 Ample guidance documents exist: (International Council for the Exploration of the Sea 2003; British Marine Aggregate Producers Association and The Crown Estate 2013; Group of Experts on the Scientific Aspects of Marine Environmental Protection 2019).

Action point 7.2 : Promote regular updates of technical standards for materials and building infrastructures

The traditional role of technical standards is to make sure products meet certain quality requirements for specific purposes. These standards often result from different building/production traditions, which are strongly tied to locally available raw materials. However, the availability of accessible sand resources evolves constantly as a result of new technologies, spatial planning, and the depletion of local resources. Various standards have lost connection with the local availability of sand resources, and this comes at an environmental cost. For example, in some sand-scarce regions, national standards explicitly call for the use of naturally occurring sand without allowing or encouraging the use of alternative materials such as recycled materials (Recommendation 8).

Moreover, it is also common in infrastructure projects to refer to older outdated standards which restrict the use of new technologies and/or materials.

It is therefore recommended that governments and standards organisations:

- Ensure that national standards are updated regularly, remain sustainable in their geographical context, and allow for new and more sustainable practices.
- Ensure that national standards are performance-based, rather than prescriptive in terms of technical and environmental criteria.
- Include environmental experts and providers of new technologies in the standards making process.
- Encourage the latest technical standards to be applied by the industry.
- Encourage the industry to consider local environmental impacts and resource availability, even when working in accordance with required technical standards.

Action point 7.3 : Identify best practices for industry and infrastructure that recognise the environmental and economic value of sand

The use of sand and the natural sediment cycle is currently dealt with in a very siloed way; each industry or sector considers its own needs without taking into account the bigger picture. Available sand resources are, as a consequence, not used optimally and/or without environmental and socio-economic considerations and the needs of other sectors. Sand resources are not only impacted through direct use, but also through indirect use and modifications to the natural pathways of sand such as in rivers. It is recommended that governments and the industry at large:

- **Identify practices to minimise the environmental impact of infrastructure that alter the natural pathways of sand.** The impoundment of the sediment by infrastructure along rivers and coastlines is often undesired and has a profound environmental impact. For example, the sedimentation behind dams reduces the global annual supply of sediment from land to ocean by 25-30% and negatively affects the operation of those dams (Vörösmarty et al. 2003 ; Walling 2012). Various solutions exist for different types of infrastructure. Often, they result in a higher upfront cost or operational costs but usually will generate long term gains.
- **Use sand of particular value efficiently by reserving it for high quality applications and the environment.** Currently, high quality sand/substitute streams are often used for applications which do not have stringent requirements. To ensure that high quality sand/substitutes are used efficiently, they should be reserved for applications that rely on it to function, including ecosystem services (Recommendation 9). For instance, sand with a very high silica content should be reserved for industrial applications over construction applications, and marine deposits closely matching the sand along the coast should be prioritised for long-term coastal resilience.
- **Build with nature (Green vs. Grey engineering).** Sand has key functions in nature and drives important natural processes (Box 12). NbS makes intentional use of these natural processes to strengthen engineering performance and preserve certain ecosystem services linked to sand (Recommendation 9). Replacing grey engineering with green engineering is the 'no regrets' option. It is natural and environmentally friendly, reduces the use of concrete, can be done in collaboration with local communities, requires low (if any) maintenance, has aesthetic value, stores carbon, supports biodiversity and usually is cost effective (Spalding et al. 2014). The NbS concept has international standing and has been adopted as a global standard by leading global organisations including the IUCN (2020b). Over the past two decades, a growing number of excellent guidelines have been developed on specific topics including those for fragile and dynamic environments (e.g., the International Guidelines on Natural and Nature-Based Features for Flood Risk Management).

Action point 7.4 : Co-design a framework for international standards and guidelines

Sand is the most extracted material resource worldwide, yet one of the least regulated (UNEP 2019). There is a need to integrate standards, guidelines and best practices into a consistent and holistic regulatory framework that recognises sand's environmental, social and economic value. It is therefore recommended to:

1. Establish an international regulatory framework to provide a common vision and enhance the coverage of environmental issues related to sand resources, including through the formulation of guidelines and international standards.
2. Support the adoption of the said framework by member states.
3. Set out environmental priorities for international standards and guidelines on sand extraction and use.

Certain UN frameworks and initiatives already exist which can facilitate this process:

- The 2030 Agenda (UN 2015), in particular aimed at SDG 12 *Ensure sustainable consumption and production pattern* and its target 12.2 "By 2030, achieve the sustainable management and efficient use of natural resources".
- Strategy for Private Sector Engagement (UNEP/EA.4/Res.4) 'Addressing environmental challenges through sustainable business practice'.

Box 12 : Examples of Grey Engineering vs Green Engineering

Building walls to stabilise slopes requires high engineering and large volumes of concrete

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The use of vetiver plants to stabilise slopes. Root systems of vetiver can reach up to 3 m deep. The roots hold the soil, reducing erosion and landslides. Water is absorbed by the roots and it evaporates by the canopy, removing excess water from the soil.

© Shutterstock/Taihern

Concrete armor unit

© Southern Dredging and Marine

Oyster reefs protects coastlines

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Hybrid infrastructure (also referred to as grey-green infrastructure) makes use of ecosystems in a hybrid approach, limiting the size and/or quantity of grey infrastructures needed (Spalding et al. 2014).

Recommendation 8 : Promote resource efficiency & circularity

Summary

Reducing the demand for naturally occurring sand resources, substituting with viable alternatives, and recycling products, and designing products and buildings to extend their usable lifespan will be essential to keep the use of sand within sustainable limits.

Rationale

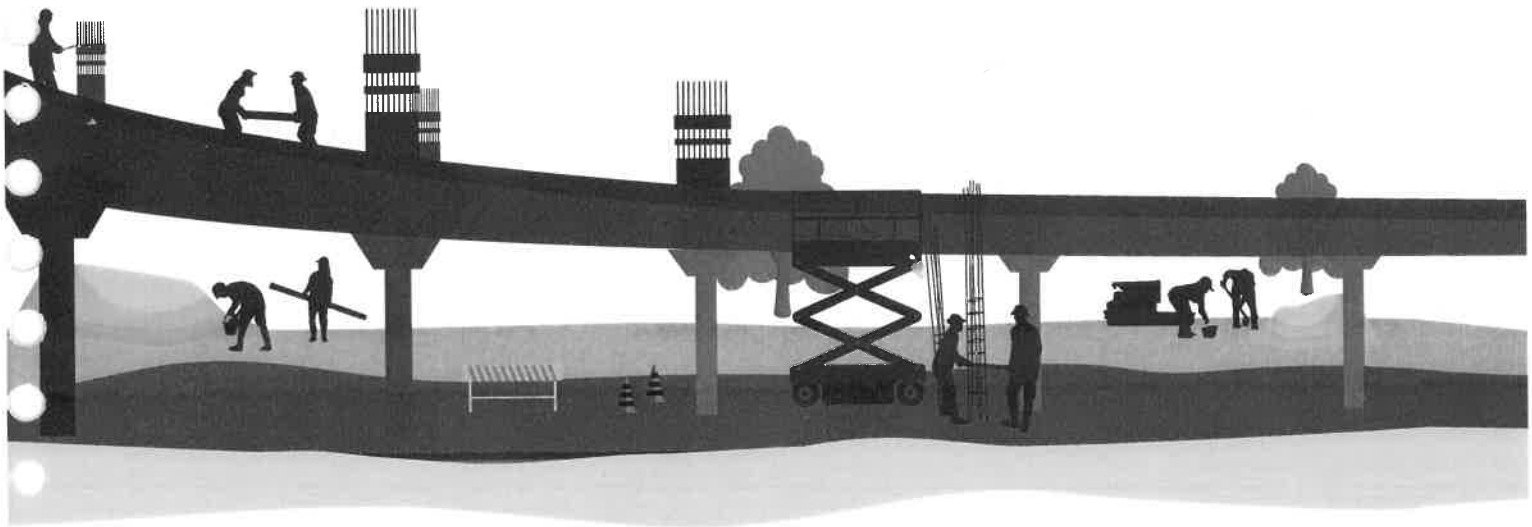
Unlike many other raw mineral materials, sand and gravel are recyclable countless times for many of its applications without a loss in quality. Moreover, there are various alternatives to naturally occurring sand.

When applied to the sand value chain, circularity could be achieved through, first and foremost, *(i) reducing the demand for sand and products derived from sand; (ii) replacing naturally occurring sand with alternative materials; (iii) reusing sand and products made of sand at the highest value possible; (iv) recycling sand and products made of sand that cannot be reused.* Combined, these are important steps in making the entire value chain more sustainable.

Sand and gravel are very broad groups of materials which are usually extracted and used locally. They are versatile, but depending on their use, can be subject to stringent requirements. The type of sand used depends on the chemical and physical characteristics needed for a certain application. In general, there are five major factors determining whether a material can be recycled and/or considered a viable alternative to naturally occurring sand and gravel:

1. Technical performance
2. Regulation
3. Environmental impact
4. Cost
5. Market proximity

Depending on the local market conditions, there are different opportunities to use policy, regulation, and good practice to help shape desired outcomes using these five key factors. Implementing resource efficiency and circularity in the sand value chain is critical to innovative sustainable infrastructure (SDG 9) and cities (SDG 11), and to ensure sustainable consumption and production (SDG 12).



Key actions

Action 8.1 : Reduce the net extractive demand for sand sourced from the natural environment

A combination of solutions will be required to reduce the net extractive demand for sand tied to the local context, i.e., demand for infrastructure and regional availability of alternatives

- Decouple infrastructure from material (sand) consumption and ensure better infrastructure and city planning to minimise the need for sand. Overdevelopment and dependence on housing as an investment strategy, or building massive infrastructures that are underutilised (e.g., Ciudad International Airport) are some examples of locking sand into the built environment.
- Explore NbS that can reduce the quantity used in sand-containing products (Recommendation 6).
- Design buildings so that they can be adapted, recycled, or reused without much effort to extend the lifespan of these buildings or their components. Renovating or changing the function of a building usually requires construction material but has a smaller environmental footprint than demolishing a whole building and rebuilding anew.
- Review engineering standards to avoid overdesign while still ensuring infrastructure integrity.

Action 8.2 : Mainstream technically proven alternative materials

For a material to be a viable alternative (see Table 7 for examples) to sand and gravel derived from the natural environment, the resulting product or construct must demonstrate a strong technical performance over its lifetime. Given concerns with technical performance, alternatives to sand often struggle to be considered a viable alternative, despite meeting the technical specifications.

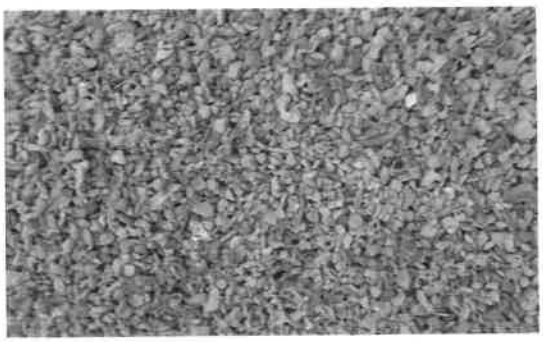
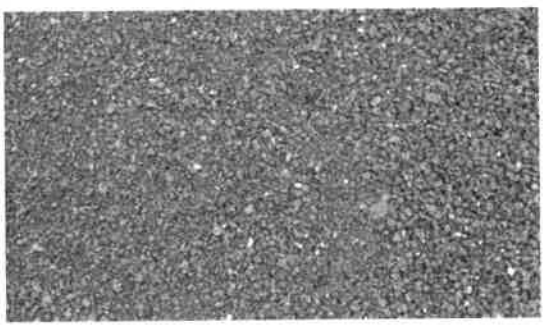
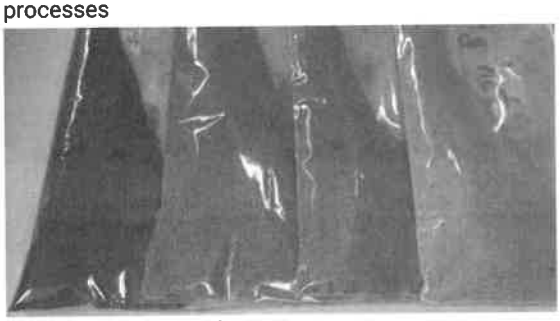
Technical standards and government guidelines, such as specifications for infrastructure works are therefore essential. These documents safeguard the quality of sand and gravel products used, setting out which materials can be used for engineering applications. For historical reasons, many of these specifications and technical standards are tailored to primary material, such as naturally occurring sand and gravel, and in certain cases crushed rock. The testing procedures referred to in these documents are also often not fit-for-purpose when applied to recycled materials, by- or co-products of other industrial or extractive processes. This effectively excludes or hampers the use of alternatives or recycled material.

In certain regions, it is still a common practice that large infrastructure projects or public works specify the material to be sourced directly from the natural environment.

Mainstreaming technically proven alternative materials can be done by:

- Listing the type and source of alternative materials, including standardised testing procedures tailored to those alternative materials or indicating special additional requirements.
- Setting-up global and national institutes that canvas and approve how various alternative materials can be used. This should include knowledge transfer on new technologies that enable the use of these new alternatives (e.g., new cementing agents), which are linked to standard institutes and insurance mechanisms.
- Putting in place a clear framework for potential alternatives to become a tested and recognised alternative material.
- Enable and encourage safe and responsible experimentation with new materials in large-scale infrastructure works, using promising alternative sources of sand and gravel in close cooperation with regulatory bodies, universities, professional organisations, and various industries.

Table 7 : Examples of existing viable alternatives to naturally occurring sand

Sources of sand	Description
Crushed rock © UNEP/GRID-Geneva/Vander Velpen	Crushed rock is a primary raw material, and it is the main alternative in the construction and industries using industrial grade sand. Although it is an alternative, it remains a primary resource that requires extraction and results in environmental impacts. Crushed rock often requires blending with naturally occurring sand. Moreover, it is also not always available where it is needed most, requiring dedicated transport infrastructure —often rail or sea—to provide the economies of scale needed to allow it to access its markets.
Recycled aggregates  © Gemax BV/Cuperus	Aggregates resulting from the processing of inorganic material previously used in construction (Comité Européen de Normalisation 2008).
Recycled materials  © Gemax BV/Cuperus	Materials originating from waste sources other than the sand and gravel value chain. The source material usually requires treatment to become fit for the intended use. Products resulting from treatment are sand, gravel or aggregates, both in varying qualities. One example is the production of aggregates from incinerator bottom ash. By classifying and removing metals, good grade material can be obtained to replace sand in road construction. Other materials include recycled ceramics, expanded slack, expanded perlites, treated dredging spoil, and cleaned excavated soil.
Co- and by products of industrial & extractive processes  © University of Queensland/Golev	Co- and by-products from industrial and extractive processes are a group of secondary materials, derived from the manufacturing or synthesising of another material, and could be used to replace sand and/or gravel. An example is ore-sand, a deliberate by-product from the crushing, grinding and mineral processing of different mineral ores to achieve the required properties of sand (Golev et al. 2022). Other examples include metallurgical and mineral slags. Some of the by-products need further treatment in order to meet specifications.

Box 13 : Construction and Demolition Waste (C&DW)

C&DW consists of more than 80% inert material, and it can be recycled as long as the hazardous and non-inert waste materials are separated from inert material during demolition. Inert C&DW is a feedstock to produce recycled aggregates.

Recycling inert C&DW is a relatively low-cost operation and it has already been implemented in cost-effective and technical performant ways, with little to no environmental impacts. Examples include the use in road construction, new concrete and asphalt production.

Usually, gate fees are requested, depending on the quality of input material and outlet options. Recycling can be encouraged by governments by imposing a ban on landfilling or, alternatively, setting high landfill taxes. It is key that dumping C&DW outside waste management facilities is prevented at all times.

Recycling does not always need to happen at a large scale. Crushing mineral C&DW can even be applied locally using simple mobile crushers. Building a network of facilities for local processing enables the availability and feasibility of crushing technology. It is key that prior to processing, hazardous materials such as asbestos and tar contaminated materials are removed, preferably before demolition. Nonetheless, C&DW not processed into recycled aggregates cannot be used responsibly for any applications as the environmental and technical quality cannot be guaranteed.

Countries with high quality C&DW recycling implement similar mechanisms to achieve this. It is possible to recycle more than 90% when the following requirements are fulfilled: 1) a ban on landfilling; 2) production of good quality recycled aggregates by the industry; and 3) the prescribed use of recycled materials, for instance in road construction. The European recycling industry published a roadmap setting out principles and actions to scale-up the recycling of C&DW (Fédération International du Recyclage 2019).

Action 8.3 : Implement regulatory policies and cost incentives that facilitate the use of secondary materials over primary materials

In some cases, sand can be readily reused without the need for treatment (e.g., excavated/dredged sand reused on site). Several products made of sand are suitable for one or more cycles of new use without requiring further treatment before ending up in a waste stream (e.g., glass bottles, concrete products). Concrete structures that are demolished can be salvaged for new buildings. When demolition is unavoidable, make an inventory of the old concrete structure and a plan to integrate them into a new building, on site or elsewhere.

Sand and gravel derived products can usually be treated to recover sand resources which can re-enter the economy as recycled material. This is true for sand and gravel in both industrial and construction applications. Major gains can especially be made within the construction industry both in terms of resource efficiency and avoiding waste. Recycling construction and demolition waste (C&DW) is therefore primordial (Box 13).

Recycling products derived from sand and gravel, and the production of co/by-products have four important functions: (1) create substitutes for sand and gravel; (2) retain the value of sand and gravel products over multiple use cycles; (3) ensure that waste is well managed; and (4) lower the risk of environmental pollution by waste.

New incentives are needed to encourage the production and uptake of substitutes of sand and gravel. Regulation is a main instrument to initiate this. International conventions, such as the Basel and London conventions, together with waste directives, regulation, and taxation against waste generation, landfill or marine dumping/ placement provide a strong starting point (Basel Convention n.d. ; International Maritime Organisation n.d.).

Recycling and replacing naturally occurring sand and gravel will be essential to solve many of the challenges in managing wastes from products derived from sand and to close the material loop. This can be achieved by implementing the following minimum requirements:

- Prevent fly tipping or the dumping of sand and gravel derived products and wastes, such as construction and demolition waste, dredging spoil or glass.
- Ban landfilling, or put a significant cost on landfilling of mineral waste, and in the case of the dredging industry, marine dumping/placement.
- Better plan selective demolition and deconstruction (in the case of demolition waste).
- Encourage the reuse of sand and gravel where possible by prescribing this practice into public works and procurement.
- Encourage reuse and/or the uptake of recycled aggregates, by-products, and coproducts and of recycled sand and gravel, for instance by prescribing them in green public procurement and public works.
- Encourage industry to invest in recycling facilities close to the source of waste.

Box 14 : Case-study - Recycling of construction and demolition waste in Mexico City

In Latin America, awareness is rising that C&DW should be well-managed. Mexico City is a frontrunner in this development. Official data shows that around 30,000 tonnes of C&DW (including excavated soil) are generated daily in Mexico's metropolitan area. This large volume used to find its way to both regulated (landfills) and unregulated applications (rivers, dams, natural protected areas - illegal dumping). Significant environmental damage to the ecosystem was a main driver in Mexico City's changing C&DW policy. Another driver was the strong business case for recycling. An initiative to build a recycling facility closer to the places where waste is generated reduced transport distance by 80%. Although gate fees are higher than landfill fees, recycling is now the preferred option. The first recycling facility processes up to 250 tons C&DW per hour, with another recycling plant running on pure inert C&DW. Seven other recycling plants are planned for construction in Mexico.

This high recycling rate in Mexico City is made possible by new legislation, which requires contractors to have a contract with a recycling facility discarding the waste adequately. Mexico City's recycled product market is further stimulated by the requirement for constructors to show proof (a legal invoice) that recycled materials are used in their construction works. These recycled materials include recycled aggregates, pre-mixed concrete based on recycled material and asphalt produced with reclaimed asphalt (Asociación Mexicana de Reciclaje de Residuos de Construcción y Demolición S.C n.d.).

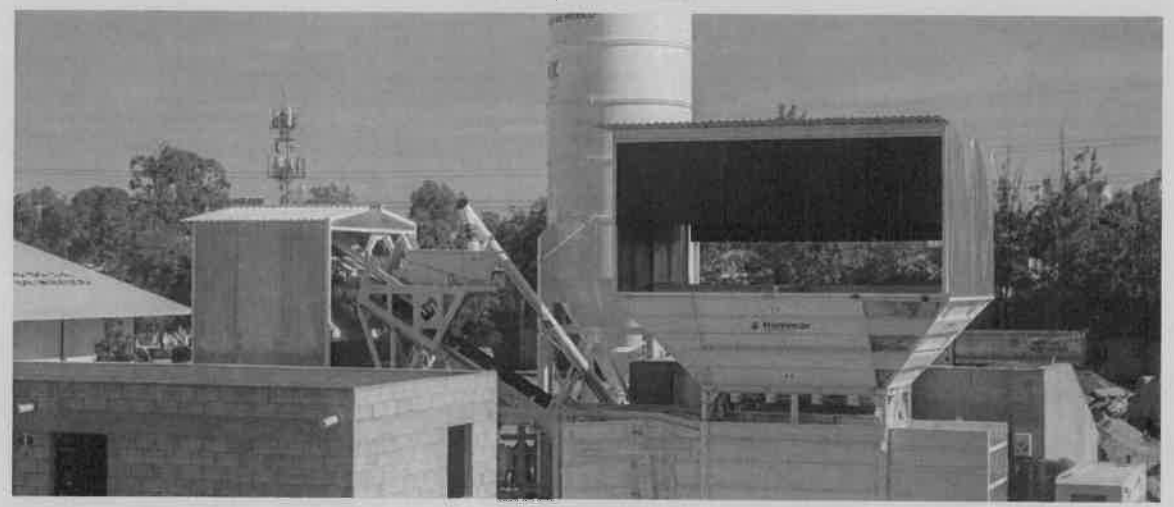
Centro Integral de Reciclaje Miguel Hidalgo, México.

© Asociación Mexicana de Reciclaje de Residuos de Construcción y Demolición S.C

C&DW processing belt at a recycling plant, México.

© Asociación Mexicana de Reciclaje de Residuos de Construcción y Demolición S.C

Recycling plant, México.



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Action 8.4 : Put in place a robust regulatory framework and testing procedures to provide environmental guarantees

Environmental, health and safety risks in using alternative sources for sand and gravel, are often an important concern. Providing sufficient environmental guarantees, trusted by public authorities and the general public, that both the alternative material and the procedure through which it is produced, are environmentally sound and do not pose health or safety risks are major challenges to overcome.

Public authorities should help producers of alternative sand resources by putting in place a robust regulatory framework and testing procedures which:

- Evaluate the environmental risk from leaching and dispersion. The immediate risk can vary considerably depending on whether the sand or an alternative is processed further (e.g., melting glass), whether it is used as a loose material or enclosed in membrane/ matrix/bitumen, and the environmental conditions where it is used.
- Evaluate the presence of hazardous elements.
- Minimise the use of materials which impede the recycling of a given product. The use of certain alternative materials complicates the recycling and/ or might set free pollutants. This may be the case for trace metals that may leach. A negative example of using waste materials is when plastics are used in applications such as road construction, which can significantly increase the risk of spreading microplastics. Mixing in plastics also prevents the recycling of the material.

Action 8.5 : Consider sustainability factors and externalities costs of not using alternative materials in sand procurement

Primary sand and gravel are often cheaper to purchase than alternatives such as recycled sand and co- and by-products. However, extracting primary materials, instead of using recycled materials and co- or by-products, usually comes with an environmental cost. This avoided environmental cost is often not reflected in the alternative material's purchase price, making it less competitive. However, in densely populated areas, transport costs from more remote primary resources outweigh the cost of recycling local sand and gravel materials, reflecting the gradual change in cost consideration.

Governments can incentivise the use of alternatives for sand through implementing sustainable public procurement (UNEP 2021b). Governments should consider end-of-life and externality costing, giving more weight to sustainability factors and performance-based criteria when awarding contracts, rather than basing procurement decisions on the lowest-cost bid (ibid.).

Box 15 : Case study - Introducing ore-sand as an alternative aggregate at scale

Awareness of sand sustainability is generating clear calls for alternatives at scale. Among secondary sources, one stands out globally – mineral ores. Currently large volumes of sand- and aggregate-like materials are produced by crushing mineral ores for the extraction of metals (and other commodities), which are then discarded as part of mine waste rock and tailings (Golev et al. 2022). The global mining industry thereby generates billions of tonnes of waste that could potentially be recovered every year (Franks et al. 2021).

Attempts to give mining residues a second life have been made in the past, and suitability for certain applications has been proven. However, serious uptake has been impeded because : 1) these residues must be technically and economically competitive with conventional materials and 2) they were residues, rather than by-products or co-products that required their own optimisation to achieve specific properties during mineral processing (Golev et al. 2022). Thus, a step-change in mineral processing towards alternative aggregate recovery could help the world address the sustainability challenges of both mine tailings production and sand extraction.

Ore-sand is a type of processed sand sourced as a co-product and/or by-product of mineral ores. Typically, it is a result of mechanical crushing and grinding, different physical and physicochemical beneficiation processes for mineral concentrates recovery, including optimisation of these processes and additional processing stages to achieve the required properties (ibid.). Importantly, ore-sand is a deliberate product produced by design, rather than repurposing of existing waste materials. Given that certain ore bodies are associated with minerals and potentially harmful and hard to remove trace elements, a thorough evaluation of the mineral ores is required to guarantee the production of ore-sand which is safe to use.

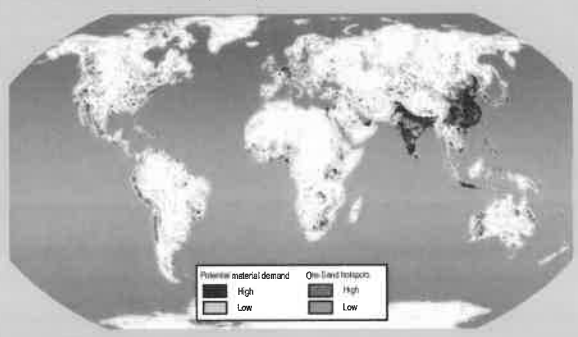
An example of one of the first dedicated ore-sand recovery projects at scale is Vale Sand. Vale is a Brazilian multinational corporation and one of the world's largest producers of iron ore. In 2013, Vale initiated the Quartz Project to investigate whether sand by-products could drastically reduce the amount of tailings requiring storage at its mine sites (Vale S.A. 2016). After two high profile tailings storage facility failures, Vale accelerated the innovation and development of ore-sand in its motivation to find an alternative waste management solution. In 2021, Vale received its first environmental licence for sand by-product, and launched several large-scale initiatives for the reuse of ore-sand for road construction, concreting, and bricks manufacturing (Vale S.A. 2020).

The University of Queensland's Sustainable Minerals Institute (SMI) and University of Geneva (UNIGE) are undertaking research on ore-sand, using Vale Sand as a case study (Golev et al. 2022). The properties of ore-sand vary depending on the type of mineral ore and the processing. The results of the study have demonstrated that ore-sand from iron ore is typically a fine sand, with low trace element content, which has the potential to offset sand demand by blending with naturally occurring sands. In scaling such alternative aggregates, relative economic and technical advantages, approval from regional and natural regulatory bodies, partnerships with customers supporting demonstration of the material and a sustainability agenda are essential. The minerals sector, construction industry, and policy makers will need to continue to work closely to investigate the potential opportunities and barriers for adopting alternative aggregates, such as ore-sand, at scale.

Ore sand stockpile and transportation, Vale's Brucutu mine, Brazil.

© Vale S.A

Map 2 : A map showing mining locations (red) and areas where there is a significant demand for construction sand (blue).



Source: Adapted from (Golev et al. 2022)

© Unsplash/Curioso Photography

Recommendation 9 : Source responsibly

Summary

Responsible sourcing is an approach through which an organisation actively and consciously sources and procures products and services for their operations in an ethical, sustainable, and socially conscious way. Supply cha-in responsibility works as an incentive for economic actors to not only adjust their own production process to the highest social and environmental standards, but to consider where the material they use comes from and what happens to their product afterwards. Although the sectors using sand resources can be diverse, the supply chain's structure provides a number of opportunities for the responsible production and consumption of sand to be more accountable:

1. **Ensuring that sand resources purchased are extracted and transported in a socially and environmentally sound manner and that it is the right quality for the application (Responsible Sourcing).**
2. **Ensuring that the production process is up to the best possible environmental and social standards, including the raw materials it uses (Responsible Production).**
3. **Ensuring the product is designed in a way it can be properly re-used, repaired, or recycled at end-of-life and that there is a system in place to treat it with the highest resource efficiency and the lowest carbon footprint possible (Responsible End-of-life).**

Rationale

The supply chain needed to provide society with the required volumes of sand resources in a sustainable way is often not properly considered in planning and decision making, and this is particularly true for infrastructure, construction, and marine works. In general, the sand resources supply chain for construction and infrastructure is structured as follows:

Project funders – The entities that are ultimately funding and supporting the supply chain. The funds they provide to deliver projects pay for the mineral products and the sand resources. While some funding will be derived from private investment, a significant amount of funding for construction activity comes from public investment, ultimately funded by a government.

Client – The entity who is responsible for contracting the delivery of a project using funds that have been provided. In some cases, the client may also be the funder, such as a project is being directly funded and delivered by a government. The client may be a public body, or a private commercial interest.

Contractors/material specifiers – Commercial entities who have been appointed by the client to deliver construction projects, and in doing so responsible for procuring the sand resources and/or mineral products to support their delivery. Very often this will involve various layers of primary contractors and subcontractors.

Mineral product manufacturers – Commercial entities who purchase the sand resources to make added-value products, such as ready-mix concrete and concrete products (but may also include glass, asphalt etc.), which are then procured by contractors or their sub-contractors.

Mineral resource producers – Those responsible for extracting sand resources so they can be sold. Some interests may be commercial entities, while others may be more artisanal producers.

Despite the strategic importance of a sustainable supply chain, the responsibility tends to be pushed down the chain, thus reducing accountability. Sustainable production and sourcing are unlikely to happen where there is no benefit or advantage to those responsible for extraction or manufacturing to demonstrate sustainable practices. Likewise, if there are no legal or commercial consequences to punish irresponsible and unsustainable practices, it will be difficult to hold actors along the supply chain accountable.

However, at every stage of the supply chain, there are different opportunities to use policy, regulation, and good practice to shape desired outcomes. Although there are few legislative mechanisms that require the use of sustainable supply chains, there is a growing number of management frameworks that allow the supply chain for construction materials, including sand resources and concrete, to be assessed, audited, and certified to demonstrate responsible sourcing practices (Box 16). Responsible sourcing supports sustainable consumption and production (SDG 12), specifically Taraget 12.2 "By 2030, achieve the sustainable management and efficient use of natural resources", and promote inclusive and sustainable industrialisation (SDG 9).

Box 16 : Case study - Responsible Sourcing Frameworks

The concept of responsible sourcing is already well-established for other natural resources and products, most notably fair-trade food. In addition, frameworks are also available to support the procurement of construction materials.

Responsible sourcing frameworks can be required by the funder or contractor delivering a construction project, in order to influence expectations and behaviours in procuring the raw materials and associated products required through the supply chain. By defining standards and expectations, any party looking to supply a project is required to provide evidence of the source of the materials. This includes not only the products themselves—such as ready-mix concrete or concrete products—but also the raw materials used to produce them. Conversely, those producing construction products may choose to adopt responsible sourcing frameworks to provide reassurance to those procuring their products. The principal driver of these frameworks is to improve the transparency of the sustainability credentials throughout the concrete supply chain, allowing materials to be recognised in "green" procurement policies and building rating systems.

- One example is the BES 6001 developed by BRE Global (BRE Global 2016), an independent international certification body, which defines a Framework Standard for the Responsible Sourcing of Construction Products. This framework provides manufacturers and distributors with a process through which construction products can be independently assessed and certified as being responsibly sourced. In order to achieve this, the Framework Standard defines a series of compulsory requirements that companies, or those in their supply chain, need to meet to demonstrate their products are being sourced responsibly. These include organisational management (environmental, quality and health and safety working practices), supply chain management (material traceability & health and safety), environmental impact (including GHG emissions, water use, transport) and social requirements (employment and skills and local communities).
- An alternative approach has been developed by the Concrete Sustainability Council (n.d.), whereby concrete industry partners from Europe, USA, Latin America, and Asia have developed their own global responsible sourcing certification system. The independent certification process includes the whole concrete supply chain : cement producers, aggregates suppliers and concrete manufacturers and requires consideration of ethical and legal compliance, human rights, indigenous people rights, environmental and social impact, and traced materials. The system is designed to help concrete, cement and aggregate companies demonstrate they are minimising impacts and operating in an environmentally, socially, and economically responsible way.

While predominantly developed to meet the needs of "green" procurement, the principles and mechanisms provided by these frameworks could be applied to any development situation where greater transparency is required around the responsible sourcing credentials of all aggregate resources (including sand) and the value-added products produced from them.

Key actions

Action 9.1 : Instruct funders of major infrastructure projects to recognise their role in responsible sourcing

- Funders of major infrastructure projects have a powerful opportunity to influence outcomes and drive behaviours in the production, supply, and consumption of sand resources – particularly through the use of responsible sourcing frameworks. Major infrastructure projects are generally funded through:
  - ◊ Public investment, where the government invests directly in the infrastructure that supports its economy ; or
  - ◊ External investment by organisations that fund growth and development such as the World Bank, Sovereign Wealth Funds, or other forms of global investment – Hedge Funds, Pension Funds or loans and grants from other governments. In both cases, major projects will need to be supported and permitted by the national administrations.

As sand should be considered a strategic resource (Recommendation 1), strategic planning is essential to ensure the right sand resources are available in the right place and at the right time to support outcomes that are both cost effective and sustainable (Recommendation 5). But to do this, greater visibility is required about the sand resource needs that are necessary to deliver the desired outcomes (see also Action 10.4, 3.2 and 3.4).

Action 9.2 : Adopt a responsible sourcing framework

- Responsible sourcing frameworks provide a means to address the sourcing of sustainable sand resources from the top of the supply chain, with project funders and/or clients defining requirements that can cascade through the supply chain.

Although sand represents a strategic development resource, the availability and supply of the construction materials that will be required to realise construction projects will often be assumed by those who fund them. As a consequence, the sand resources and concrete products used may end up being the cheapest but are unlikely to be the most sustainable because supply will be reactive rather than properly planned.

In order to measure the environmental impact of construction activity, the industry has to start including indicators that go beyond the immediate impacts at the site of construction, taking into account the full supply chain of the materials used. The responsibility for sourcing the sand resources used in the construction sector is generally passed down to the mineral resource producers and/or manufacturers.

It can be easy to focus attention on those parties who are responsible for extracting sand resources, as in many cases this is where the direct social, economic and environmental consequences arising from the removal of a finite geological resource can arise – particularly if the activity is not subject to sufficient regulation or management. However, it is important to recognise that the production of these raw materials represents only the very first step in a much larger supply and value chain for construction activity, which in turn is related to economic growth.

Action 9.3 : Require 'construction material resource and supply chain plans' for all new major infrastructure projects

- Construction material resource and supply chain plans can provide greater transparency and scrutiny of the sand resources needed and by proactive planning for the necessary resources' sustainability criteria can be taken into consideration.

Across both developed and emerging economies, the availability of sand resources to support the sustainable delivery of major infrastructure projects is largely assumed. The preparation of construction material resource and supply chain plans as an integral part of the funding and permitting of major infrastructure and construction projects would allow greater understanding of the raw materials needed to deliver them, and where these resources can be sourced from to ensure the most sustainable and cost-effective solutions. In turn, this would help to ensure greater transparency around the wider supply chain that is integral to the successful delivery of projects, particularly if such reports are independently reviewed and audited. This approach would help drive more sustainable behaviours throughout the supply chain that supports major projects, and which ultimately is responsible for consuming the largest volumes of raw material.

Alongside the source and quantities of raw materials required, the construction material resource and supply chain plan provide an opportunity for greater scrutiny and guidance around how resources are being used. For example, are secondary and recycled materials available and being used to minimise the requirement to use new sand resources? If new sand resources are being used, are high quality resources only being used where they are necessary? Such an approach would also allow greater oversight of the efficiency with which resources are being consumed.

Action 9.4 : Implement the principle of supply chain accountability

- The responsibility and accountability for ensuring the sand resources supporting construction and infrastructure projects come from appropriate sources needs to be clearly defined.

Too often, the responsibility for doing this will be devolved to contractors, who then pass the responsibility on to sub-contractors, who in turn pass it on to suppliers. This results in the transparency and accountability for responsible sourcing becoming lost through the supply chain. To avoid this, the funders of major projects should be instructed to define clear ownership and accountability for responsible sourcing, with audit mechanisms in place to track performance throughout every level of the supply chain. One example is the EU's push to enshrine mandatory due diligence and sustainability reporting on supply chains into binding legislation through its Corporate Sustainability Reporting Directive (European Commission 2021b).

Action 9.5 : Encourage companies to sign-up to the United Nations Global Compact

- Having a large national business community signed up to the United Nations Global Compact is a clear expression of commitment to positive change and enables the participation in international dialogue.

The United Nations Global Compact, the world's largest corporate sustainability initiative, defines supply chain responsibility as operating in ways that, at a minimum, meets fundamental responsibilities in the areas of human rights, labour, environment, and anti-corruption, throughout the life cycles of goods and services (UN Global Compact n.d.). The Global Compact sets out the ten principles towards which businesses should align, taking action to support broader goals of the SDGs.

Recommendation 10 : Restore ecosystems and compensate remaining losses

Summary

Ensure the restoration of degraded ecosystems where sand mining activities have either directly or indirectly contributed to the degradation, implement compensation mechanisms for remaining losses, and promote nature-based solutions for the restoration of affected rivers, coastal, and land systems.

Rationale

The extraction of natural resources from land, freshwater, and marine areas comes at a price to the natural systems that communities depend on. Sand and overall aggregate mining practices need to incorporate actions to avoid, minimise, restore, and compensate ecological and socioeconomic impacts (mitigation hierarchy), and can even contribute to a net gain in ecosystem services and biodiversity when possible. In addition, sand resources can contribute to restoring and protecting land, freshwater systems or coastal areas from erosion or flooding through NbS, whilst preserving the integrity of the land-sea continuum. Removing obstacles for the implementation of compensation mechanisms and monitoring and reporting systems will be key in ensuring successful outcomes.

In June 2021, the UN launched the Decade for Ecosystem Restoration 2021-2030 to prevent, halt, and reverse the degradation of ecosystems worldwide, contributing to reduce poverty (SDG 1), combat climate change (SDG 13) and prevent a mass extinction of biodiversity (SDG 14 and 15). The extraction of natural resources from land, freshwater, and marine areas comes at a price to the natural systems on which communities depend (Recommendation 1 and 2). Often, the impacts of mining are complex, indirect, and far outside the boundaries of the extraction site for decades into the future, especially when mining projects target sands that play an active role in dynamic ecosystems. Broader human activities during the latest centuries, such as the construction of dams and urban growth, have contributed to undermine the resilience of river and coastal systems starved of sand, whose situation will only accentuate with climate change (Recommendation 1 and 6).

Preserving natural ecosystems is much less costly than restoring and replacing them. Ignoring the large-scale and long-term consequences of mining activities, and how their impacts cumulate with other stressors, comes at a high cost, resulting in expensive and lengthy restoration interventions that rarely lead to a complete recovery (Jones et al. 2018). Such is the case of the restoration of the Mississippi delta, one of the most expensive restoration programs in the world requiring more than US$50 billions of government grants, and a significant drag to Louisiana's economy (Coastal Protection and Restoration Authority of Louisiana 2017).

Transitioning towards a circular economy requires reducing the dependence of natural systems (Recommendation 8). When extraction is deemed necessary, sand resources must be obtained in a sustainable manner in which damage to ecosystems and people is prevented and/or minimised. Thus, actions need to be taken to avoid and minimise future impacts, restore, and compensate for past, ongoing, and predicted damages on biodiversity and ecosystem services, and invest in NbS for addressing water security challenges, flooding risks and climate adaptation.

Key actions

Four core actions look most promising to meet restoration and compensation goals.

Action 10.1 : Advance and apply the latest knowledge on impact assessment, mitigation, and compensation

- Enhance the use of science-based evaluation and monitoring as the basis for impact assessment, planning for mitigation, and compensation.
- Encourage the public reporting of mitigation and monitoring outcomes according to FAIR principles.
- Empower local actors, organisations, and authorities to access and apply the latest available information to inform their decision-making.

Planning and regulatory tools should require that the most up-to-date scientific knowledge informs impact and ecosystem assessments, leading to the design of effective prevention, mitigation and compensation measures, and monitoring plans. Assessments must capture the full extent of mining-related impacts on ecosystems, including impacts beyond mining sites (e.g., erosion downstream, groundwater pollution) and indirect impacts (e.g., changing habitat distribution, increased traffic disturbances). Conscious efforts should be undertaken to improve the knowledge-base and address the remaining gaps around the mining impacts on biodiversity (Torres et al. 2022a) and ecosystem services, and the effectiveness of mitigation and restoration efforts (Hunter et al. 2021 ; zu Ermgassen et al. 2019). This requires ample funding for research activities; collaboration across industry, government and research institutes; and incentives to encourage mining operators to generate scientific data through site-based research.

Monitoring systems should be put in place to evaluate whether mitigation measures, and compensation mechanisms are achieving the target goals. Monitoring must extend for a sufficient period of at least 10 years to assess the effects of compensatory mechanisms (Levrel et al. 2012), although this strongly depends on the scale of the affected system. Monitoring plans should account for the cumulative effects of existing and known future stressors acting on the system.

Both mitigation measures and monitoring outcomes should be routinely publicly reported, enabling the continual improvement of the evidence base behind mitigation[35]. Data should be reported according to FAIR and open practices. National authorities need to ensure that local institutions and organisations are empowered to access, apply, and contribute to the latest available information to make knowledge-based decisions (see Recommendation 2 and Action 1.1).

Action 10.2 : Mainstream the mitigation hierarchy for sand mining projects

The mitigation hierarchy framework (Figure 6) is a well-established tool for making explicit decisions balancing conservation needs with development priorities (Borges et al. 2014). Following this framework, government regulators should:

- Ensure that sand and aggregate mining projects fully consider the risks to biodiversity and ecosystem services through four stages of mitigation: avoidance, minimisation of impacts, restoration, and offsetting.

  a. **Avoidance** measures involve preventing impacts in the planning and design phase of the project, for example by relocating project components, modifying the timing of activities, and modifying the design to avoid or reduce impacts. Non-offset-able impacts to threatened or poorly understood ecosystems and species (i.e., irreplaceable assets), and not acceptable social impacts must be avoided.

  b. At the **minimisation** phase, measures are taken to reduce the duration, intensity and/or the extent of impacts that cannot be avoided. Where possible, thresholds of extraction should be formulated.

  c. **Restoration** involves implementing measures to restore ecosystem functions and complexity following exposure to impacts. Approaches to restoration can be passive, i.e., letting the ecosystem to self-recover, or active through physical interventions to allow the ecosystem to recover in its integrity and the natural processes that underpin it (e.g., environmental engineering).

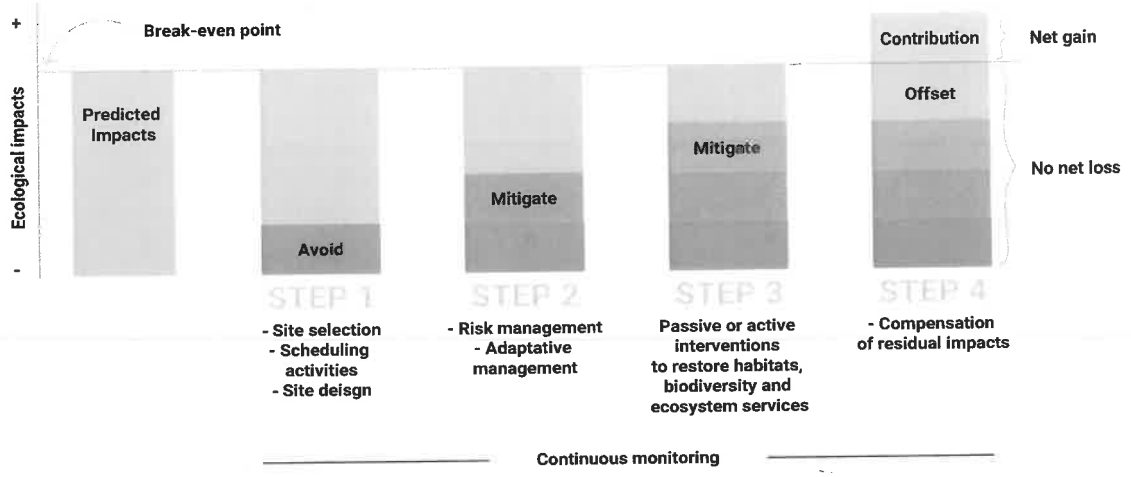
  d. Any significant residual impacts that may remain are offset. **Offsetting** involves compensating for impacts on biodiversity that are unavoidable and cannot be addressed through minimisation or restoration to achieve no net loss or net gain.

Policies and legal instruments that aim at ensuring no net loss/net gain of biodiversity and ecosystem services are increasingly influential, but often lack clear reference scenarios and carry the risk of misuse (Maron et al. 2018). To reduce that risk and strengthen nature positive outcomes, it is important that government regulators:

- Require that alternatives are considered and assessed, and that mitigation and offsets are designed and implemented with clearly specified baselines, reference year, goals, and measurable targets (Maron et al. 2021). To minimise trade-offs between outcomes for biodiversity and ecosystem services, offsets must consider both, and be designed and implemented

35 For example, published in the Conservation Evidence database, or shared through knowledge networks like (ECOSHAPE n.d.) and (SedNet n.d.).

Figure 6: Mitigation Hierarchy



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following a comprehensive assessment of losses and gains that arise from the development and offsetting plans (Sonter et al. 2020).

In addition, actions need to consider that:

- Investments in impact assessment and restoration must be on the scale of volumes extracted and of the sensitivity of the ecosystem in the influence zone of the extraction activities.
- Impacts of mining on species and ecosystems and restoration efforts must be placed thoughtfully within their wider environmental and socioeconomic context and weighted thoroughly against alternative pathways to sand mining.

Regulatory tools should require sand and aggregate operators to assess the importance of biodiversity and ecosystem services at proposed mining sites, and their potential risks for surrounding ecosystems and human communities, and mandate management responses proportionate to their importance. The higher the risk, the more stringent the response must be robust baseline studies should therefore be an integral part of planning and permitting requirements of sand and aggregate mining projects and inform the development of management measures for the inception, operation, and closure of quarries.

Action 10.3 : Promote Nature-based Solutions to ensure an integrated landscape approach in ecosystem restoration

- Assess natural processes in the area of interest and maximise these processes to accomplish restoration goals.
- Use secondary resources, such as dredged sediment or clay, to reduce the need for naturally occurring sand through NbS and its ensuing "building-with-nature applications".
- Identify and amplify opportunities to enhance the benefits of mining and restoration projects for biodiversity and ecosystem services.

The concept of NbS conveys the idea that it is often more effective to work with nature rather than against it. Natural processes and sand resources can be used as an ally in addressing challenges such as land subsidence, coastal erosion, flooding, and impacts from natural disasters, improving the livelihood of local communities. This approach considers the broader natural and social systems of a given project and engages relevant stakeholders from early stages to maximise positive outcomes.

Key for the success of these initiatives is the selection of the right type and source of sand, which should be as similar as possible to the original ecosystem and from a location that ensures that the sand stays in the system and minimises the risks of problem shifts. In many innovative applications, other dredged material, such as mud, have been used in building-with-nature solutions, decreasing the need for sand[36].

In mining projects, the opportunities to enhance the provision of benefits for biodiversity and ecosystem services once in operation or abandoned must be identified and maximised. Many pits and quarries occur in areas where previous human action has caused extensive loss and degradation of habitats such as wetlands, natural grasslands, steppes, dunes, or riverbanks, among many others, resulting in highly homogenous landscapes often dominated by intensive agriculture and forestry. With careful management and monitoring, active and restored sand pits or quarries can contribute to create

36 E.g., Markerwadden project (Natuur Monumenten n.d.)

Box 17 : Case studies - Delivering benefits for nature and people

Although the goal of mining projects is delivering raw materials, there are significant opportunities to maximise the provision of benefits for biodiversity and ecosystem services once the mine is in operation or abandoned. In the UK, quarry restoration makes a significant contribution to long-term nature recovery and conservation (MPA 2021). By 2020, the UK's minerals sector created over 83 km² of priority habitat supporting nature recovery, with a further 110 km² pledged in approved restoration plans. Today, more than 80 restored quarries make up a 'National Nature Park' coordinated by the sector's trade association, the MPA, and it is considered of special interest to nature conservationists and civil society. Although biodiversity features prominently in most schemes, restoration is also about making appropriate use of land with some sites being restored back to agricultural use, or for recreation, or for new development – including housing, commercial and leisure uses. In all cases, the successes of quarry restoration are made possible through constructive partnerships among mineral producers, local authorities, conservation organisations, and others.

Another example of successful partnership is the pioneer rewilding area of Millingerwaard (600 ha) located in the uppermost section of the Rhine Delta (Jepson et al. 2018). In the early 1990s, the area was dominated by intensive agriculture and hydraulic engineering and was poor in biodiversity. Then a rewilding project started to promote the ecological restoration of the riverine landscape. Through this process the spontaneous development of natural, wooded vegetation and sand dunes reduces the free flow of water and may increase flooding in the long-term. To mitigate the flood risk to adjacent inhabited areas, sand is extracted in some floodplains by excavating old river channels. Moreover, sand and clay mining has contributed to finance restoration initiatives, including the purchasing of agricultural land and species reintroductions. A continuous interaction between the Dutch State Forest Service, the mining company and conservation organisations to design sand and clay mining activities with the Living Rivers philosophy has contributed to the reshaping of the floodplain, making it wilder and more attractive to visitors.

A final example is the Spanjaards Duin dune (van der Meulen et al. 2015) area in the Netherlands, home to an ongoing compensation project related to the Port of Rotterdam's expansion. Construction work was predicted to increase traffic emissions, resulting in increased atmospheric nitrogen deposition, which would damage rare and threatened natural dune habitats. As compensation measure, an area of 40 ha of artificial dunes was created in front of the existing dunes of the Delfland coast along the North Sea. The project started with 6 million m³ of beach and dune nourishment. Then, natural processes such as wind action, rainfall, groundwater dynamics, and spontaneous vegetation growth followed to shape the area into natural dune habitats. An extensive monitoring program informs decision-makers if interventions are needed and allows for an adaptive management approach. The compensation habitats should be completely established by 2033.

Restoration at Titterstone Clee Hill in Shropshire (UK)

© Mineral Products Association

Ouse Fen Nature Reserve in Cambridgeshire (UK)

© Hanson UK/RSPB

Millingerwaard rewilding project in (the Netherlands)

© Rijkswaterstaat (only for non-commercial use)

Spanjaards Duin dune area (the Netherlands)

© Deltares/Stéphanie IJff

valuable habitats that can attract rare, restricted, or threatened species (see Box 17). These opportunities are nevertheless context and site-dependent, varying with climatic, ecological, and socio-economic factors, and actions must vary accordingly (Salgueiro et al. 2020).

Action 10.4 : Facilitate the adoption and enforcement of compensation mechanisms

Through compensation schemes, the losses and future costs of sand and aggregate mining activities are compensated and repaired.

- Identify implementation obstacles (e.g., insufficient knowledge of impacts, availability of monitoring systems, or policy and legal barriers) and actions to address them.
- Include the environmental impacts of sand and aggregate mining within the scope of finance environmental safeguard policies, so as to integrate the costs of mining activities in urban and infrastructure projects' financing.
- Ensure that the funds obtained through compensation mechanisms are directed towards environmental and social improvements.

The adoption of compensation mechanisms remains limited in the sand and aggregates industry. Compensation schemes can be implemented via direct negotiation/amicable resolution, policy incentives, legal procedure, the introduction of taxes can generate revenues for the restoration and compensation of environmental and social damages (e.g., Makueni County Sand Conservation and Utilization Authority in Kenya, see Box 8), adapting the concept of benefit sharing, or zoning regulations in space and time.

An opportunity to internalise the costs of mining activities is to account for supply-chain impacts of sand resources when financing urban and infrastructure development projects (Recommendation 8). At present, major multilateral development banks' environmental safeguard policies hold their clients responsible for some supply-chain impacts of the projects they help finance, but often non-living raw materials such as sand are excluded (e.g., the International Finance Corporation, Asian Development Bank) or their consideration remains ambiguous (e.g., the Equator Principles (The Equator Principles Association 2022)). A wording change to adopt the definition of raw materials used in the World Bank safeguards (which includes sand and gravel) would lay the groundwork for internalising the supply-chain impacts of construction mineral consumption into tens of billions of dollars' worth of project financing each year (Torres et al. 2022b) which should significantly increase the budget invested in impact minimisation and restoration.

To ensure the implementation of compensation schemes agreed are honoured in practice, mechanisms should be put in place to assign the relevant funds directly towards the agreed environmental and social improvements. A good example is the "Marine Aggregate Levy Sustainability Fund" introduced by the UK government in 2002 to secure funds to monitor, investigate, and address the environmental impacts of marine aggregate extraction (Söderholm 2011) (see Action 8.1, Action 10.2, and Action 10.4).

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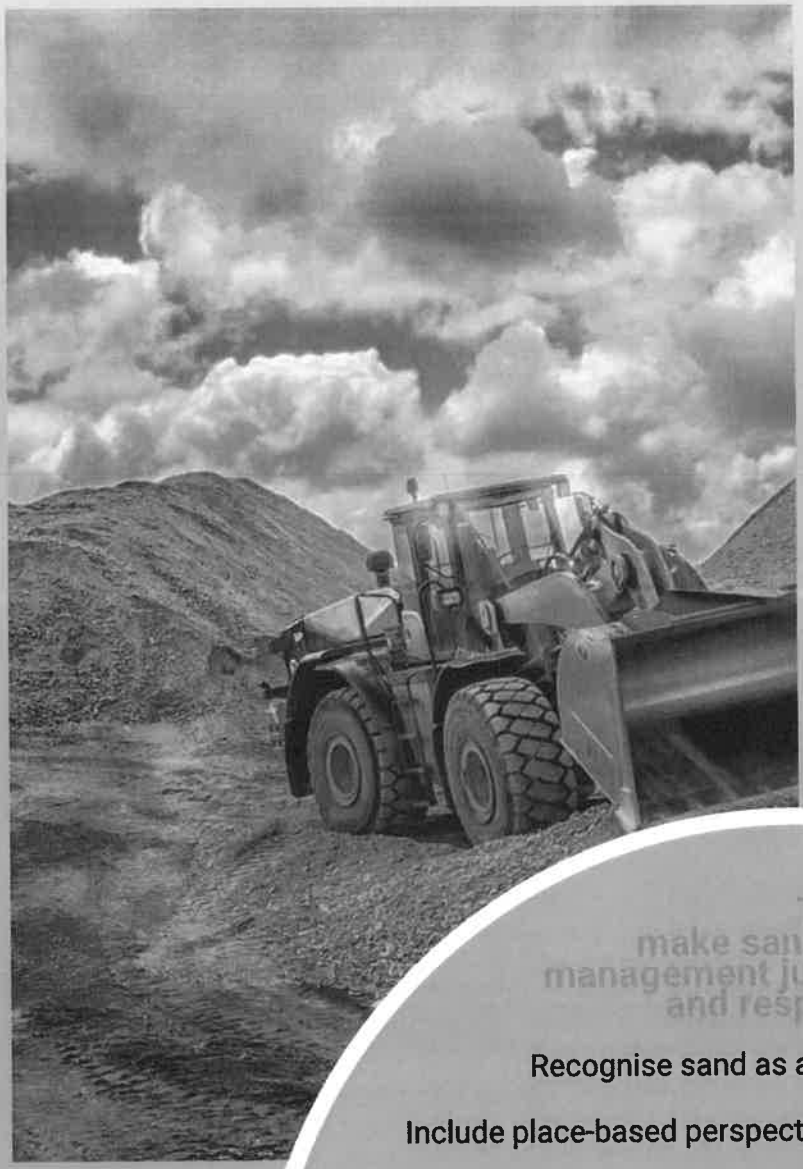
Conclusion



To
make sand resource
management just, sustainable,
and responsible

Recognise sand as a strategic resource

Include place-based perspectives for just sand transitions

Enable a paradigm shift to a regenerative & circular future

Integrate policy & legal frameworks

Create a mineral ownership and access framework

Map, monitor and report sand resources

Establish best practices, national standards, & a coherent international framework

Promote resource efficiency & work towards circularity

Source responsibly

Restore ecosystems degraded by sand mining activities & compensate remaining losses

Conclusion

Despite the recent media interest and actions taken by international organisations, the sand and sustainability challenge remains off the radar for governments, financial institutions, the construction sector, and other key stakeholders.

All this while, sand has become a strategic resource: a vital resource for economic development as well as a key component to climate resilience and ecosystems. It is intricately linked to the 17 SDGs, either because sand is needed to achieve the SDGs, or because its extraction might impede efforts to a more sustainable future. Demand for sand will increase with population growth, rural-to-urban migration, a growing need for infrastructure that is tied to development, not to mention climate change adaptation efforts. Our dependency on sand resources is staggering. Thus, the responsible and just governance and management of sand will be imperative to our ability to achieve the Global Goals by 2030.

This report has illustrated the cost of sand extraction in both static (e.g., terrestrial sand pits) and dynamic (i.e., rivers, marine and coastal) systems, where sand plays critical roles. In several places, the lack of governance on sand resources is creating complications on the ground, such as illegal sand mining that has been, in some circumstances, associated with violence. Communities grappling with depleting resources are also more likely to face the environmental consequences of floods, reduced water availability, biodiversity loss, and socio-economic impacts including loss of livelihoods.

If sand extraction is not carefully managed, it can lead to significant environmental and societal impacts, hampering future developments, as well as generating more costs than benefits (**Recommendation 1**). A transformation in our governance and management of sand resources is therefore necessary to avert a crisis. This transformation must address environmental sustainability alongside justice, equity, technical, economic, and political considerations. It is critical that as a global community, the strides we make towards sustainable development is inclusive and just for all (**Recommendation 2**). Simultaneously, breaking down silos between sectors and embracing diverse materials and models are critical for the shift towards a regenerative and circular economy (**Recommendation 3**).

To make sand resource management just, sustainable, and responsible, we therefore need to:

1. Set-up the institutional structures governing sand resources, which:
    a. Integrate policy and legal frameworks (**Recommendation 4**)
    b. Create an effective mineral ownership and access framework (**Recommendation 5**)
2. Set-up and implement tools and instruments, including:
    a. Map, monitor and report sand resources for transparent, science-based, and data-driven decision-making (**Recommendation 6**)
    b. Establish best practices, national standards, and a coherent international framework (**Recommendation 7**)
    c. Promote resource efficiency and work towards circularity (**Recommendation 8**)
    d. Source responsibly using the principle of supply chain responsibility (**Recommendation 9**)
    e. Restore ecosystems degraded by sand mining activities and compensate for remaining losses (**Recommendation 10**)

Implementation Realities

These 10 recommendations are not exhaustive, but they pave the ways in which we should rethink our relationship with sand. However, some immediate questions remain when implementing these recommendations, including the availability of the human, financial and technical resources required. Meanwhile, changing the status quo of sand resource governance will change outcomes for some individuals and organisations, for better or worse; it is a reality that needs to be well understood.

Regardless of the challenges ahead, these recommendations are key to responsible sand governance and management, while recognising that actions taken should be feasible, effective and suitable with the local context and resources available. Acting on these recommendations, though not without its challenges, is likely to offer the much sought-after synergies within sustainable development- between minerals regulation and land use planning; demand drivers and the scaling up of alternative materials; and just transitions in environmental management and poverty reduction. Introducing new processes might very well generate new business opportunities, including those from recycling construction materials and the innovation known as ore-sand.

Humanity at a crossroads : The need for systems level change

The planet is fast approaching, perhaps even exceeding, the Earth System's limits, which risks shifting the equilibrium away from a 'safe operating space' (Rockstöm et al. 2009) towards an Anthropocene that is less favourable for human living. Humanity is already operating outside of five of the nine planetary boundaries (Persson et al. 2022).

This is not a challenge awaiting the future generations, but one that requires immediate action. The impending sand crisis does not stand on its own; it is interlinked with several of the world's most urgent crises including climate change, the 6th biodiversity extinction, and increasing pollution levels. Hence, small improvements will not suffice; the society as a whole needs to transform and move towards circularity. The current linear extract-produce-use-dump economic system is not compatible with our limited resources. Given the geological time-scale, sand resources should be considered non-renewable.

One example of the systemic thinking required is the case for public transport. Instead of expanding road networks to cope with increasing mobility, we could do better in land planning, and incentivise car drivers and passengers to switch to public transport. Not only is the subway a faster mode of travel, it also reduces the vehicles on the road and the surface areas dedicated to transport. Building the necessary subway infrastructure could also, say, generate demand for alternative construction materials and reduce the carbon footprint of the current building stocks, especially when powered by renewable energy. This is the form of systems thinking that is needed.

Next steps

These 10 recommendations highlight the many ways in which we can ensure better sand governance and management to avert a sand crisis. This report thereby aims to catalyse an international process to consolidate expertise and spur action across sectors. It is still pioneer work and more research is needed; ideally a dedicated monitoring centre would be established to monitor sand resources and activities, disseminate information and best practices, establish standards, enable cross-sector collaboration and facilitate synergies towards solutions for the sand and sustainability challenge.

An embryo for a Global Sand Centre may have just been created. This report is made of words and recommendations; to translate these recommendations into reality, actions are needed.

It is not too late; by deciding to carry out the right actions we can still avert a crisis.

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Appendix

Authors and contributors by chapter

Recommendation 1 : Recognise sand as a strategic resource

Authors **Kate Dawson,** *London School of Economics*
Pascal Peduzzi, *GRID-Geneva, United Nations Environment Programme*

Recommendation 2 : Include place-based perspectives for just sand transitions

Authors **Daniel M. Franks,** *Sustainable Minerals Institute, The University of Queensland*
Alexander 'Bruce' Matheson, *Camborne School of Mines, University of Exeter*
Case study: Kusum Athukorala, *NetWwater*

Recommendation 3 : Enable a paradigm shift to a regenerative and circular future

Authors **Kiran Pereira,** *Sand Stories*
Astrid Smeets and Sybren Wagenaar, *Bureau Brussels*
Stephanie Chuah and Josefine Reimer Lynggaard, *UNEP/GRID-Geneva, University of Geneva*

Recommendation 4 : Adopt strategic and integrated policy and legal frameworks

Authors **Louise Gallagher,** *Senior Consultant*
Halinishi Yusuf, *Makueni County Sand Conservation and Utilization Authority*
Case study : Stephanie Chuah and Josefine Reimer Lynggaard, *UNEP/GRID-Geneva, University of Geneva*

Recommendation 5 : Establish ownership and access to sand resources

Authors **Ian Selby,** *University of Plymouth*
Louise Gallagher, *Senior Consultant*

Recommendation 6 : Map, monitor and report sand resources

Authors **Vera Van Lancker,** *Royal Belgian Institute of Natural Sciences, Ghent University*
Damien Friot, *Ecometrics*
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Recommendation 7 : Establish best practices, national standards, and a coherent international framework

Authors **Arnaud Vander Velpen,** *UNEP/GRID-Geneva, University of Geneva*
Mark Russell, *Mineral Products Association*
Pascal Peduzzi, *GRID-Geneva, United Nations Environment Programme*
Vera Van Lancker, *Royal Belgian Institute of Natural Science, Ghent University*

Recommendation 8 : Promote resource efficiency and circularity

Authors **Geert Cuperus,** *Gemax BV*
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Recommendation 9 : Source responsibly

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Recommendation 10 : Restore ecosystems and compensate for remaining losses

Authors **Aurora Torres,** *Université Catholique de Louvain, Michigan State University*
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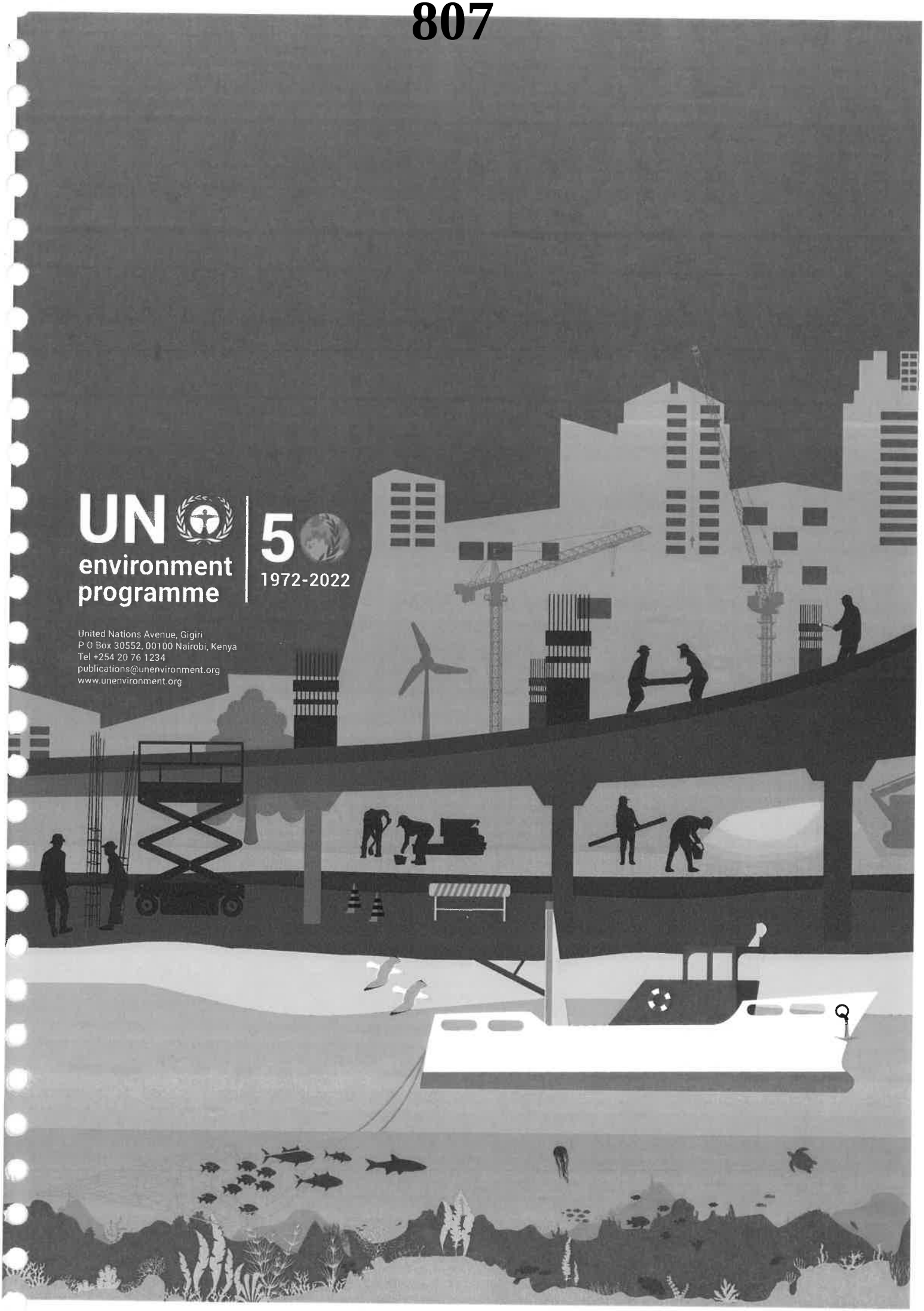

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