

**BEFORE THE HON'BLE NATIONAL GREEN
TRIBUNAL WEST ZONE SITTING AT PUNE**

ORIGINAL APPLICATION NO.03 OF 2023

Sandip S/o Sheshrao Jadhav

VERSUS

1] The State of Maharashtra and ors

**OBJECTIONS TO THE JOINT COMMITTEE
REPORT**

I, Sandip S/o Sheshrao Jadhav, Age-30 yrs Occu:-
Agriculturist, R/o Village Pathri, Taluka Fulambri,
District Aurangabad (M.S.) do hereby state on oath
that I have been read over the contentions of the
report of joint committee and proceed to file the
following objections to the said report.

1] I say that, I have gone through the report of the
joint committee as well as the reports of the testing of
water and soil conducted in the past. I have handed
over the report of the joint committee and the reports
of testing of water and soil from the affected site to the
Surveyor Shri Dr. Abhinav Mane Ph.D. IIT Bombay of
"VGeotech Experts" Aurangabad. The surveyor has

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SHIVKUMAR B. PATIL
Notary Govt. of India
Reg. No. 6724

analysed the report of joint committee as well as the past reports of testing of water and soil from year 2018 onwards and prepared a comprehensive report on 02/12/2023 which is annexed herewith and is marked as **“ANEXURE-A.”**

2] I say that, the Maharashtra Pollution Control Board Aurangabad has tested the soil and water samples in the year 2018 from the affected site and adjacent block numbers and the reports are reproduced at internal page Nos.2 to 9 of the report prepared by “VGeotech Experts”. The reports of water testing are from internal page Nos.10 to 21 of the report prepared by “VGeotech Experts”. The soil and water testing report shows that there are traces of copper, Nickel, Nitrate Nitrogen, Zink, PO₄, lead, chromium Hexa. All these heavy metal traces are beyond permissible limits.

3] I say that, the Maharashtra Pollution Control Board Aurangabad has tested the well water samples in the year 2018 from the affected site and adjacent block numbers and the reports are



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reproduced at internal page Nos.26 to 47 of the report prepared by "VGeotech Experts". The water testing report shows that the parameters like Total Dissolved Solids (TDS), calcium hardness, Magnesium, chlorides are beyond permissible limits.

4] I say that, the Maharashtra Pollution Control Board Aurangabad has tested the well water samples in the year 2020 from the affected site and adjacent block numbers and the reports are reproduced at internal page Nos.22 to 25 of the report prepared by "VGeotech Experts". The water testing report shows that the parameters like Total Dissolved Solids (TDS), calcium hardness, Magnesium, chlorides are beyond permissible limits.

5] I say that, as per the order passed by the Hon'ble Tribunal, the Joint Committee conducted inspection. The report is from internal page Nos.48 to 52 of the report prepared by "VGeotech Experts". However, the parameters like TDS, Alkalinity, Chlorides, hardness and dissolved Oxygen were tested for well water and no tests for detection of heavy



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metals (like lead, copper, chromium, iron, were conducted by the joint committee. There are several ill effects of the existence of heavy metals' traces in soil and water on the health of the persons and animals residing there at the site.

6] I say that, the joint committee report shows the reports of soil samples wherein the heavy metals like copper and Zink were found in excess of permissible limits. Those reports are reproduced at internal page Nos.48 to 54 of the report prepared by "VGeotech Experts"

7] I say that, the report prepared by "VGeotech Experts" at page No.55 shows the report of Taluka Agricultural Officer wherein the traces of phosphorus, potassium were found beyond permissible limits.

8] I say that, the Maharashtra Pollution Control Board Aurangabad has conducted testing of soil samples as well as water samples from Gat No.144 in the year 2018. I was found in the test results that the heavy metals like Chromium, copper, lead, Nickel, Nitrate Nitrogen, Zink, PO₄ beyond



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permissible limits.

9] I say that, the Maharashtra Pollution Control Board Aurangabad has conducted testing of water samples from wells in the year 2020 from the affected area. However, no heavy metal tests were conducted. The calcium hardness, Magnesium, TDS, Chlorides, Alkalinity were found beyond permissible limits. These reports are at internal page Nos.59 to 64 in the report of "VGeotech Experts" for ready reference.

10] I say that, the ill effects of the heavy metals traces and other metals in the soil as well as water sources on human are narrated by the "VGeotech Experts" in his report at internal page No.70. Those are summarized in tabular form as under:-

Sr No.	Metals	Ill Effects
1	Copper	1] Copper Toxicity 2] Wilson's Disease 3] Gastrointestinal Distress
2	Nickel	1] Allergic Reactions 2] Respiratory Issues 3] Carcinogenic Potential
3	Nitrate Nitrogen	1] Blue Baby Syndrome 2] Interference with Oxygen Transport



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		3] Infant health issues
4	Zinc	1] Gastrointestinal Distress 2] Interference with Nutrient Absorption 3] Suppression of Immune function
5	Lead (Pb)	1] Neurological damages 2] Anemia 3] Kidney Damage
6	Chromium Hexa	1] Carcinogenic Potential 2] Respiratory issues
7	Nitrite Nitrogen	1] Methemoglobinemia 2] Interference with Oxygen Transport 3] Cancer risk
8	PO ₄	1] Kidney damage 2] Cardiovascular Complications 3] Bone and mineral imbalance

11] I say that, the surveyor of "VGeotech Experts" namely Dr Abhinav Mane is Ph. D. in VGeotechnical Engineering from IIT Bombay and is an expert in his field and has prepared detailed report. On internal page No.65 of his report, the surveyor has given his conclusive remarks. The Site contamination and relevant actions were proposed by the surveyor. The surveyor has also proposed for appropriate methods of investigation of soil. The surveyor has proposed soil exploration and sampling methods of contaminant soil. The surveyor has also assessed the



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damage occurred to the site of the applicants along with the remedial measures and cost towards the proposed action. The expenses estimated have been shown at internal page Nos.92 to 93.

12] I say that, the joint committee report is not elaborate on the remedial actions, the cost of remedies, the effects of the heavy metals and other ingredients in excess AND MOST IMPORTANTLY THE QUANTUM OF DAMAGES.

13] I say that, applicant namely Govind Bhalchadra Kulkarni in OA No.79/2023 has expired on 07/11/2023 due to cancer which was detected after he consumed the contaminated water for long time period of 4 to 5 years. Then wife of applicant Bhagwan Bala Jadhav in OA No.53/2023, namely Padmabai Bhagwan Jadhav has suffered Brain Tumor after she consumed contaminated water for long time period of 4 to 5 years. Then the son of the applicant Sandip Sheshrao Jadhav in OA No.03/2023 namely Sangharsh Sandip Jadhav who is of 8 years age, is suffering from Fribral conclusions of Brain and



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due to which he is seriously affected in his daily life routine. The cattle and pet animals of the applicants have expired due to consumption of contaminated water and the crop/food cultivated in the contaminated soil. The live cattle and pet animals are also suffering from various illnesses due to polluted environment.

14] I say that, the joint committee has not assessed any quantum of damage which has occurred to health of applicants and their family members.

15] I say that, the joint committee has not assessed the damage occurred to live stock due to contaminated and polluted environment.

16] I say that, this objection may be read in OA No.53/2023 as well as OA No.79/2023.

Hence this objection as mentioned in above terms.




Sandip S/o Sheshrao Jadhav
APPLICANT

BEFORE ME

Through 

Adv Hrishikesh V. Tungar


SHIVKUMAR R. PATIL
Notary Govt. of India
Reg. No. 6724

VERIFICATION

I, Sandip S/o Sheshrao Jadhav, Age-30 yrs
Occu:-Agriculturist, R/o Village Pathri,
Taluka Fulambri, District Aurangabad (M.S.)
do hereby state on oath that I have been read
over the contentions of this objections from
paragraph Nos.1 to 13 in Marathi. Those have
been stated as per my instructions. I have
understood the same correctly. Those are true
and correct to the best of my personal
knowledge and belief.

Hence verified on this 8th December, 2023 at
Aurangabad.

Id by

Deponent

Hishi

Sandip S/o Sheshrao Jadhav

[H.V. Turgar]
Adv



AFFIDAVIT

Solemnly affirmed before me
by Shri/Smt. *Sandip Sheshrao Jadhav*
R/o *Pathri*
Taluka *Fulambri* Dist. *Ad*
Identified by *H.V. Turgar Adv*
I know him personally known *Age 30 yrs*
10/11/23

BEFORE ME

[Signature] 08/12/2023

SHIVKUMAR BASWANTRAO PATIL
Advocate & Notary Govt. of India
Reg. No. 6724



NOTED & REGISTERED
SR.No. *10931*
THIS DOCUMENT CONTAINS
09 PAGES

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LIST OF DOCUMENTS

Sr No.	Documents	Annexures	Page Nos.
1	Copy of report prepared by "VGeotech Experts"	A	11 To 106

DATE:-05/12/2023

PLACE:-AURANGABAD


**HRISHIKESH V. TUNGAR
ADVOCATE FOR APPLICANT**

FINAL REPORT

SOIL CONTAMINATION REPORT

To: Governing Authority

Site Location: Pathri, Phulambri, Dist. Chh. Sambhajinagar
(Aurangabad)

Job no. : 000012
Report no.: VGEO/AWB/SCR/000012
Date : 02/12/2023



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Submitted by:

Dr. Abhinav Mane
Ph.D., IIT Bombay



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Chapter 1-Introduction:

This report present the overall summary of the test conducted on the contaminated soil at the Pathri village by Maharashtra Pollution Control Board as well as Joint Committee. The purpose of present report is to summarize and find out the severity of contaminants available in the soil as well as in water and at the same time appropriate methodology of investigation is also discussed in this report. The possible damages occurred, its evaluation and possible expenses required to recover or to reinstate this site to original position are also discussed in the present report. A sample case study is also given which discusses what the governing authorities have done in case of contamination in that particular case study. However, the purpose of present report is completely technical and to find out the damages, severity of damages and also discussion on appropriate methodologies to investigate the site, to reinstate the site in original position and to find propose the appropriate indices to which the possible damages should be calculated.

Chapter 2-Overall Soil samples testing results obtained from MPCB in 2018

Sample ID: Soil sample

Location: Section no.1 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Copper	Mg/kg	67.66	1-12	WHO
2	Nickel		15.77	0.05	
3	Nitrate Nitrogen		964.32	10-50	
4	Zinc		109.07	12-60	
5	Concentration of po4		45.37	1	
6	Lead (Pb)		4.73	0.3-10	
7	Cadmium		0.13	0.002-0.5	
8	Chromium (Hexa)		6.0	0.002-0.2	
9	Nitrite Nitrogen		2.50	10-30	

Sample ID: Soil sample

Location: Section no.2 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	BDL	0.002-0.5	WHO
2	Chromium (Hexa)		1.6	0.002-0.2	
3	Copper		139.94	1-12	
4	Lead (Pb)		7.63	0.3-10	
5	Nickel		25.58	0.05	
6	Nitrate Nitrogen		915.74	10-50	
7	Nitrite Nitrogen		1.36	10-30	
8	Zinc		117.69	12-60	
9	Concentration of po4		43.08	1	

Sample ID: Soil sample

Location: Section no.3 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	BDL	0.002-0.5	WHO
2	Chromium (Hexa)		1.6	0.002-0.2	
3	Copper		183.97	1-12	
4	Lead (Pb)		6.81	0.3-10	
5	Nickel		32.16	0.05	
6	Nitrate Nitrogen		957.70	10-50	
7	Nitrite Nitrogen		1.53	10-30	
8	Zinc		121.12	12-60	
9	Concentration of po4		40.98	1	

Sample ID: Soil sample

Location: Section no.4 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	BDL	0.002-0.5	WHO
2	Chromium (Hexa)		1.7	0.002-0.2	
3	Copper		177.22	1-12	
4	Lead (Pb)		6.19	0.3-10	
5	Nickel		30.32	0.05	
6	Nitrate Nitrogen		933.12	10-50	
7	Nitrite Nitrogen		1.55	10-30	
8	Zinc		109.44	12-60	
9	Concentration of po4		37.66	1	

Sample ID: Soil sample

Location: Section no.5 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.13	0.002-0.5	WHO
2	Chromium (Hexa)		2.6	0.002-0.2	
3	Copper		227.43	1-12	
4	Lead (Pb)		10.07	0.3-10	
5	Nickel		34.86	0.05	
6	Nitrate Nitrogen		951.82	10-50	
7	Nitrite Nitrogen		1.44	10-30	
8	Zinc		135.74	12-60	
9	Concentration of po4		40.46	1	

Sample ID: Soil sample

Location: Section no.6 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	BDL	0.002-0.5	WHO
2	Chromium (Hexa)		3.1	0.002-0.2	
3	Copper		188.49	1-12	
4	Lead (Pb)		10.32	0.3-10	
5	Nickel		32.38	0.05	
6	Nitrate Nitrogen		685.90	10-50	
7	Nitrite Nitrogen		1.87	10-30	
8	Zinc		123.57	12-60	
9	Concentration of po4		47.47	1	

Sample ID: Soil sample

Location: Section no.7 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	BDL	0.002-0.5	WHO
2	Chromium (Hexa)		6.2	0.002-0.2	
3	Copper		195.08	1-12	
4	Lead (Pb)		5.87	0.3-10	
5	Nickel		26.68	0.05	
6	Nitrate Nitrogen		252.40	10-50	
7	Nitrite Nitrogen		1.48	10-30	
8	Zinc		106.04	12-60	
9	Concentration of po4		40.73	1	

Sample ID: Soil sample

Location: Section no.8 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.20	0.002-0.5	WHO
2	Chromium (Hexa)		4.6	0.002-0.2	
3	Copper		151.30	1-12	
4	Lead (Pb)		10.10	0.3-10	
5	Nickel		25.05	0.05	
6	Nitrate Nitrogen		530.32	10-50	
7	Nitrite Nitrogen		1.40	10-30	
8	Zinc		118.39	12-60	
9	Concentration of po4		29.41	1	

Sample ID: Combine Soil sample

Location: Section no.9 in the Farm of MSSPM +Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.13	0.002-0.5	WHO
2	Chromium (Hexa)		3.6	0.002-0.2	
3	Copper		161.75	1-12	
4	Lead (Pb)		9.68	0.3-10	
5	Nickel		30.19	0.05	
6	Nitrate Nitrogen		619.30	10-50	
7	Nitrite Nitrogen		2.33	10-30	
8	Zinc		149.55	12-60	
9	Concentration of po4		25.17	1	

Sample ID: Combine Soil sample

Location: Section no.10 in the Farm of MSSPM +Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.07	0.002-0.5	WHO
2	Chromium (Hexa)		2.6	0.002-0.2	
3	Copper		209.73	1-12	
4	Lead (Pb)		5.34	0.3-10	
5	Nickel		37.19	0.05	
6	Nitrate Nitrogen		651.22	10-50	
7	Nitrite Nitrogen		1.17	10-30	
8	Zinc		83.97	12-60	
9	Concentration of po4		47.59	1	

Sample ID: Soil sample

Location: Section no.1 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.20	0.002-0.5	WHO
2	Chromium (Hexa)		3.93	0.002-0.2	
3	Copper		155.20	1-12	
4	Lead (Pb)		10.74	0.3-10	
5	Nickel		28.17	0.05	
6	Nitrate Nitrogen		401.02	10-50	
7	Nitrite Nitrogen		2.16	10-30	
8	Zinc		114.17	12-60	
9	Concentration of po4		53.80	1	

Sample ID: Soil sample

Location: Section no.2 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.26	0.002-0.5	WHO
2	Chromium (Hexa)		5.14	0.002-0.2	
3	Copper		193.01	1-12	
4	Lead (Pb)		8.71	0.3-10	
5	Nickel		30.79	0.05	
6	Nitrate Nitrogen		1.99	10-50	
7	Nitrite Nitrogen		696.00	10-30	
8	Zinc		125.32	12-60	
9	Concentration of po4		117.12	1	

Sample ID: Soil sample

Location: Section no.3 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.46	0.002-0.5	WHO
2	Chromium (Hexa)		5.52	0.002-0.2	
3	Copper		181.01	1-12	
4	Lead (Pb)		10.89	0.3-10	
5	Nickel		30.24	0.05	
6	Nitrate Nitrogen		776.62	10-50	
7	Nitrite Nitrogen		1.44	10-30	
8	Zinc		116.04	12-60	
9	Concentration of po4		59.05	1	

Sample ID: Soil sample

Location: Section no.4 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.33	0.002-0.5	WHO
2	Chromium (Hexa)		5.39	0.002-0.2	
3	Copper		185.23	1-12	
4	Lead (Pb)		8.10	0.3-10	
5	Nickel		30.11	0.05	
6	Nitrate Nitrogen		725.54	10-50	
7	Nitrite Nitrogen		1.70	10-30	
8	Zinc		92.36	12-60	
9	Concentration of po4		40.20	1	

Sample ID: Soil sample

Location: Sludge accumulated in the Farm of Shri Bhagwan Suradkar, Gat no.123, At Pathri, Tal.Phulambri, Dist. Aurangabad

Sr. No.	Parameters	UoM	Results	Permissible Limit	Code of reference
1	Cadmium	Mg/kg	0.46	0.002-0.5	WHO
2	Chromium (Hexa)		4.82	0.002-0.2	
3	Copper		54.70	1-12	
4	Lead (Pb)		7.65	0.3-10	
5	Nickel		15.45	0.05	
6	Nitrate Nitrogen		497.72	10-50	
7	Nitrite Nitrogen		2.13	10-30	
8	Zinc		284.77	12-60	
9	Concentration of po4		42.47	1	

Chapter 3-Overall Dug Well samples testing results obtained from MPCB in 2018

Sample ID: Water sample

Location: Dug well in the Farm of Shri Sanjay Khandu Navgire, Gat no.123, Pathri, Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results (Mg/lit)	Permissible Limit	Code of reference
1	BOD	1	3.0	20	WHO 2006
2	Chloride		40	250	
3	COD		8	250	
4	Conductivity		1002	1400	
5	Copper		0.22	0.05	
6	DO		7.2	4	
7	Iron		0.22	0.3	
8	Lead		0.00	0.01	
9	Magnesium Hardness		120.0	50	
10	Nickel		0.00	0.05	
11	Nitrate Nitrogen		0.8	45	
12	Nitrite Nitrogen		0.0	0	
13	pH		8.3	6.5-8.5	
14	Phosphate		0.08	12	
15	Potassium		1.4	55	
16	Sodium		3.2	200	
17	Sulphate		13.7	400	
18	Suspended Solids		20.0	2000	
19	TKN		1.7	20	
20	Total Alkalinity		184	200	
21	Total Dissolved Solids		732	500	
22	Total Hardness		220	200	
23	TRC		0.0	0.2	
24	Total Solids		752.0	500	
25	Tot Ammoniacal Nit		0.7	0.5	
26	Turbidity		0.0NTU	1	
27	Zinc		0.0	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Bashirabi Ibrahim Shaha, Gat no.73, At Dongargaon (Kawad), Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	2.8mg/lit	20	WHO 2006
2	Calcium Hardness		80.0mg/lit	75	
3	Chloride		35.0mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		879.2	1400	
6	Copper		0.02mg/lit	0.05	
7	DO		7.3mg/lit	4	
8	Iron		1.97mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		100.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrite Nitrogen		0.0mg/lit	0	
14	pH		8.3	6.5-8.5	
15	Phosphate		0.09mg/lit	12	
16	Potassium		1.0mg/lit	55	
17	Sodium		3.0mg/lit	200	
18	Sulphate		34.2mg/lit	400	
19	Suspended Solids		20.0mg/lit	2000	
20	TKN		1.1mg/lit	20	
21	Total Alkalinity		182.0mg/lit	200	
22	Total Dissolved Solids		560.0mg/lit	500	
23	Total Hardness		180.0mg/lit	200	
24	Total Solids		580.0mg/lit	500	
25	Tot Ammoniacal Nit		0.4mg/lit	0.5	
26	Turbidity		0.0NTU	1	
27	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well at Gat no.144 of Mitrasadhana Shikshan Prasarak Mandal, Pathri,
Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	11.0mg/lit	20	WHO 2006
2	Calcium Hardness		162.0mg/lit	75	
3	Chloride		959.7mg/lit	250	
4	COD		44.0mg/lit	250	
5	Conductivity		1500	1400	
6	Copper		0.09mg/lit	0.05	
7	DO		2.1mg/lit	4	
8	Iron		0.00mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Magnesium Hardness		158.0mg/lit	50	
11	Nickel		0.00mg/lit	0.05	
12	Nitrate Nitrogen		0.8mg/lit	45	
13	Nitrite Nitrogen		0.0mg/lit	0	
14	pH		8.2	6.5-8.5	
15	Phosphate		0.10mg/lit	12	
16	Potassium		3.8mg/lit	55	
17	Sodium		8.0mg/lit	200	
18	Sulphate		77.8mg/lit	400	
19	Suspended Solids		28.0mg/lit	2000	
20	TKN		2.8mg/lit	20	
21	Total Alkalinity		180.0mg/lit	200	
22	Total Dissolved Solids		1428.0mg/lit	500	
23	Total Hardness		320.0mg/lit	200	
24	Tot Ammoniacal Nit		0.9mg/lit	0.5	
25	Turbidity		0.0NTU	1	
26	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Sayed Shabbir Syed Usman Gat no.112, Pathri,
Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	3.2mg/lit	20	WHO 2006
2	Calcium Hardness		104.0mg/lit	75	
3	Chloride		34.1mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		931.1	1400	
6	Copper		0.12mg/lit	0.05	
7	DO		7.2mg/lit	4	
8	Iron		0.00mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		96.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.8mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.3	6.5-8.5	
16	Phosphate		0.07mg/lit	12	
17	Potassium		1.2mg/lit	55	
18	Sodium		3.2mg/lit	200	
19	Sulphate		31.2mg/lit	400	
20	Suspended Solids		18.0mg/lit	2000	
21	TKN		1.1mg/lit	20	
22	Total Alkalinity		160.0mg/lit	200	
23	Total Dissolved Solids		672.0mg/lit	500	
24	Total Hardness		202.0mg/lit	200	
25	Total Solids		690.0mg/lit	500	
26	Tot Ammoniacal Nit		0.2mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Bhagwan Shankar Suradkar, Gat no.123, Pathri,
Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	6.0mg/lit	20	WHO 2006
2	Calcium Hardness		224.0mg/lit	75	
3	Chloride		859.7mg/lit	250	
4	COD		28.0mg/lit	250	
5	Conductivity		1533	1400	
6	Copper		0.43mg/lit	0.05	
7	DO		7.1mg/lit	4	
8	Iron		0.93mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		296.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.3mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.2	6.5-8.5	
16	Phosphate		3.2mg/lit	12	
17	Potassium		6.0mg/lit	55	
18	Sodium		53.5mg/lit	200	
19	Sulphate		0.0mg/lit	400	
20	Suspended Solids		24.0mg/lit	2000	
21	TKN		2.8mg/lit	20	
22	Total Alkalinity		400.0mg/lit	200	
23	Total Dissolved Solids		1402.0mg/lit	500	
24	Total Hardness		520.0mg/lit	200	
25	Total Solids		1426.0mg/lit	500	
26	Tot Ammoniacal Nit		0.9mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Madhukar Namdeo Pagare, Gat no.124, Pathri,
Tal.Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	2.8mg/lit	20	WHO 2006
2	Chloride		30.0mg/lit	250	
3	COD		8.0mg/lit	250	
4	Conductivity		543.2	1400	
5	Copper		0.50mg/lit	0.05	
6	DO		7.2mg/lit	4	
7	Iron		1.21mg/lit	0.3	
8	Lead		0.00mg/lit	0.01	
9	Mercury		0.000mg/lit	0.001	
10	Magnesium Hardness		118.0mg/lit	50	
11	Nickel		0.00mg/lit	0.05	
12	Nitrate Nitrogen		0.4mg/lit	45	
13	Nitrite Nitrogen		0.0mg/lit	0	
14	pH		8.3	6.5-8.5	
15	Phosphate		0.00mg/lit	12	
16	Potassium		2.0mg/lit	55	
17	Sodium		4.0mg/lit	200	
18	Sulphate		38.2mg/lit	400	
19	Suspended Solids		18.0mg/lit	2000	
20	TKN		0.6mg/lit	20	
21	Total Alkalinity		200.0mg/lit	200	
22	Total Dissolved Solids		422.0mg/lit	500	
23	Total Hardness		240.0mg/lit	200	
24	Total Solids		440.0mg/lit	500	
25	Tot Ammoniacal Nit		0.2mg/lit	0.5	
26	Turbidity		0.0NTU	1	
27	Zinc		0.01mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shrimati Sindhubai Bhaskar Pagare, Gat no.124, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	3.0mg/lit	20	WHO 2006
2	Calcium Hardness		160.0mg/lit	75	
3	Chloride		24.1mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		567.2	1400	
6	Copper		0.03mg/lit	0.05	
7	DO		7.1mg/lit	4	
8	Iron		0.00mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		130.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.6mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.3	6.5-8.5	
16	Phosphate		0.08mg/lit	12	
17	Potassium		2.0mg/lit	55	
18	Sodium		4.0mg/lit	200	
19	Sulphate		35.9mg/lit	400	
20	Suspended Solids		18.0mg/lit	2000	
21	TKN		0.6mg/lit	20	
22	Total Alkalinity		302.0mg/lit	200	
23	Total Dissolved Solids		440.0mg/lit	500	
24	Total Hardness		290.0mg/lit	200	
25	Total Solids		458.0mg/lit	500	
26	Tot Ammoniacal Nit		0.2mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Bore well near house of Shri Dr. Pramod Eknath Jadhav, Gat no.143, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	3.2mg/lit	20	WHO 2006
2	Calcium Hardness		80.0mg/lit	75	
3	Chloride		34.1mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		584.5	1400	
6	Copper		0.44mg/lit	0.05	
7	DO		7.0mg/lit	4	
8	Iron		0.34mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		110.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.5mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.4	6.5-8.5	
16	Potassium		2.0mg/lit	55	
17	Sodium		4.0mg/lit	200	
18	Sulphate		40.5mg/lit	400	
19	Suspended Solids		20.0mg/lit	2000	
20	TKN		1.1mg/lit	20	
21	Total Alkalinity		192.0mg/lit	200	
22	Total Dissolved Solids		462.0mg/lit	500	
23	Total Hardness		190.0mg/lit	200	
24	Total Solids		482.0mg/lit	500	
25	Tot Ammoniacal Nit		0.2mg/lit	0.5	
26	Turbidity		0.0NTU	1	
27	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Dr. Pramod Jadhav, Gat no.142, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	2.6mg/lit	20	WHO 2006
2	Calcium Hardness		102.0mg/lit	75	
3	Chloride		30.0mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		532.1	1400	
6	Copper		0.51mg/lit	0.05	
7	DO		7.3mg/lit	4	
8	Iron		1.53mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		98.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.3mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.3	6.5-8.5	
16	Phosphate		0.10mg/lit	12	
17	Potassium		1.6mg/lit	55	
18	Sodium		3.4mg/lit	200	
19	Sulphate		42.4mg/lit	400	
20	Suspended Solids		16.0mg/lit	2000	
21	TKN		1.1mg/lit	20	
22	Total Alkalinity		254.0mg/lit	200	
23	Total Dissolved Solids		436.0mg/lit	500	
24	Total Hardness		200.0mg/lit	200	
25	Total Solids		452.0mg/lit	500	
26	Tot Ammoniacal Nit		0.3mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.00mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Tejrao Gyanoji Jadhav, Gat no.139, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	2.8mg/lit	20	WHO 2006
2	Calcium Hardness		136.0mg/lit	75	
3	Chloride		34.1mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		928.3	1400	
6	Copper		0.37mg/lit	0.05	
7	DO		7.3mg/lit	4	
8	Iron		0.00mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		128.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.3mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.2	6.5-8.5	
16	Phosphate		0.13mg/lit	12	
17	Potassium		1.6mg/lit	55	
18	Sodium		3.4mg/lit	200	
19	Sulphate		34.2mg/lit	400	
20	Suspended Solids		20.0mg/lit	2000	
21	TKN		2.2mg/lit	20	
22	Total Alkalinity		260.0mg/lit	200	
23	Total Dissolved Solids		630.0mg/lit	500	
24	Total Hardness		264.0mg/lit	200	
25	Total Solids		650.0mg/lit	500	
26	Tot Ammoniacal Nit		0.6mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.01mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Bhagwan Bala Jadhav, Gat no.140, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL.No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	3.2mg/lit	20	WHO 2006
2	Calcium Hardness		104.0mg/lit	75	
3	Chloride		30.0mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		916.4	1400	
6	Copper		0.67mg/lit	0.05	
7	DO		7.0mg/lit	4	
8	Iron		0.00mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		120.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.7mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.3	6.5-8.5	
16	Phosphate		0.09mg/lit	12	
17	Potassium		1.4mg/lit	55	
18	Sodium		3.2mg/lit	200	
19	Sulphate		31.1mg/lit	400	
20	Suspended Solids		18.0mg/lit	2000	
21	TKN		1.7mg/lit	20	
22	Total Alkalinity		232.0mg/lit	200	
23	Total Dissolved Solids		696.0mg/lit	500	
24	Total Hardness		224.0mg/lit	200	
25	Total Solids		714.0mg/lit	500	
26	Tot Ammoniacal Nit		0.5mg/lit	0.5	
27	Turbidity		0.0NTU	1	
28	Zinc		0.02mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Sample ID: Water sample

Location: Dug well in the Farm of Shri Sheshrao Gyanoji Jadhav, Gat no.141, Pathri, Tal. Phulambri, Dist. Aurangabad.

SL. No.	Parameter	Instance	Results	Permissible Limit	Code of reference
1	BOD	1	3.0mg/lit	20	WHO 2006
2	Calcium Hardness		106.0mg/lit	75	
3	Chloride		31.0mg/lit	250	
4	COD		8.0mg/lit	250	
5	Conductivity		852.7	1400	
6	Copper		0.28mg/lit	0.05	
7	DO		7.1mg/lit	4	
8	Iron		1.17mg/lit	0.3	
9	Lead		0.00mg/lit	0.01	
10	Mercury		0.000mg/lit	0.001	
11	Magnesium Hardness		116.0mg/lit	50	
12	Nickel		0.00mg/lit	0.05	
13	Nitrate Nitrogen		0.3mg/lit	45	
14	Nitrite Nitrogen		0.0mg/lit	0	
15	pH		8.3	6.5-8.5	
16	Potassium		1.2mg/lit	55	
17	Sodium		3.0mg/lit	200	
18	Sulphate		39.3mg/lit	400	
19	Suspended Solids		18.0mg/lit	2000	
20	TKN		2.2mg/lit	20	
21	Total Alkalinity		216.0mg/lit	200	
22	Total Dissolved Solids		670.0mg/lit	500	
23	Total Hardness		222.0mg/lit	200	
24	Tot Ammoniacal Nit		0.4mg/lit	0.5	
25	Turbidity		0.0NTU	1	
26	Zinc		0.05mg/lit	5	

Note: Conductivity unit= microsiemence/cm

Chapter 4-Overall Water samples testing results obtained from MPCB in 2020**Sample ID:** Water sample**Location:** Well water sample of Shri Bhagwan Shankar Suradkar

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		8.5	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	5.8	4	
3	BOD		9.1	20	
4	C.O. D		28.0	250	
5	T.D. Solids		2290.0	500	
6	Ca Hardness		102.0	75	
7	Mg Hardness		100.0	50	
8	Total Hardness for demo		202.0	200	
9	Chlorides		619.8	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		140.0	200	
12	Suspended Solids		14.0	2000	

Sample ID: Water sample**Location:** Well water sample of Shri Sanjay Khandu Navgire

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		8.4	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	5.2	4	
3	BOD		15.9	20	
4	C.O. D		64.0	250	
5	T.D. Solids		1270.0	500	
6	Ca Hardness		80.0	75	
7	Mg Hardness		80.0	50	
8	Total Hardness for demo		160.0	200	
9	Chlorides		349.9	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		160.0	200	
12	Suspended Solids		12.0	2000	

Sample ID: Water sample**Location:** Well water sample of Shri Dr. Pramod Eknath Jadhav

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		8.4	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	6.2	4	
3	BOD		9.7	20	
4	C.O. D		32.0	250	
5	T.D. Solids		1180.0	500	
6	Ca Hardness		80.0	75	
7	Mg Hardness		100.0	50	
8	Total Hardness for demo		180.0	200	
9	Chlorides		269.9	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		142.0	200	
12	Suspended Solids		10.0	2000	

Sample ID: Water sample**Location:** Well water sample of Shri Sheshrao Gyanoji Jadhav

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		7.9	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	6.9	4	
3	BOD		4.5	20	
4	C.O. D		12.0	250	
5	T.D. Solids		620.0	500	
6	Ca Hardness		82.0	75	
7	Mg Hardness		80.0	50	
8	Total Hardness for demo		162.0	200	
9	Chlorides		60.0	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		160.0	200	
12	Suspended Solids		16.0	2000	

Sample ID: Water sample

Location: Well water sample of Shri Ganesh Bhagwan

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		7.5	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	7.0	4	
3	BOD		4.2	20	
4	C.O. D		24.0	250	
5	T.D. Solids		630.0	500	
6	Ca Hardness		82.0	75	
7	Mg Hardness		58.0	50	
8	Total Hardness for demo		140.0	200	
9	Chlorides		22.5	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		140.0	200	
12	Suspended Solids		14.0	2000	

Sample ID: Water sample

Location: Well water sample of Shri Dinesh Vinayak Jadhav

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		7.8	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	7.1	4	
3	BOD		3.8	20	
4	C.O. D		12.0	250	
5	T.D. Solids		615.0	500	
6	Ca Hardness		78.0	75	
7	Mg Hardness		58.0	50	
8	Total Hardness for demo		136.0	200	
9	Chlorides		70.0	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		102.0	200	
12	Suspended Solids		12.0	2000	

Sample ID: Water sample**Location:** Well water sample of Mitra Sadhana Shikshan Prasarak Mandal

Sr.No.	Parameter	UoM	Results	Permissible Limit	Code of reference
1	pH		7.8	6.5-8.5	WHO 2006
2	Dissolve Oxygen	Mg/lit	7.0	4	
3	BOD		4.0	20	
4	C.O. D		24.0	250	
5	T.D. Solids		1490.0	500	
6	Ca Hardness		76.0	75	
7	Mg Hardness		64.0	50	
8	Total Hardness for demo		140.0	200	
9	Chlorides		379.9	250	
10	Oil & Grease		BDL	0.2	
11	Total Alkalinity		140.0	200	
12	Suspended Solids		8.0	2000	

Chapter 5-Overall Environmental Analysis Report Sheet obtained from MPCB in 2018**Sample ID:** Water sample**Location:** 1792: - Well water sample of Shri Bhagwan Shankar Suradkar, G. no.123, Mauje Pathri, Tal. Phulambri.

1793: - Well water sample of Shri Sanjay Khandu Navgire, G. no.123, Mauje Pathri, Tal. Phulambri.

1794: - Well water sample of Shri Dr. Pramod Eknath Jadhav, G. no.143, Mauje Pathri, Tal. Phulambri.

1795: - Well water sample of Shri Sheshrao Gyanoji Jadhav, G. no.141, Mauje Pathri, Tal. Phulambri.

Lab Report No.	E-60	E-61	E-62	E-63
Code No.	1792	1793	1794	1795
Parameter	Dug well			
pH	6.91	7.18	7.48	7.17
DO	5.92	6.16	6.63	6.49
BOD	4.4	4.0	3.2	3.6
COD	36.0	28.0	20.0	24.0
S. S	8.0	8.0	8.0	8.0
T.D. S	1392.0	910.0	606.0	680.0
Chloride	495.0	174.0	118.0	54.0
Sulphate	5.70	17.7	21.0	4.40
Conductivity	1892.0	1350.0	902.0	1021.0

Sample ID: Water sample

Location: 1796: - Well water sample of Shri Bhagwan Balaji Jadhav, G. no.140, Mauje Pathri, Tal. Phulambri.

1797: - Well water sample of Shri Dinesh Vinayakrao Jadhav, G. no.143, Mauje Pathri, Tal. Phulambri.

1798: - Well water sample of Mitra Sadhana Shikshan Prasarak Mandal & Foster Development, G. no.144, Mauje Pathri, Tal. Phulambri.

Lab Report No.	E-64	E-65	E-66
Code No.	1796	1797	1798
Parameter	Dug well		
pH	6.92	7.52	7.22
DO	6.36	6.71	5.62
BOD	3.8	3.0	5.0
COD	28.0	12.0	48.0
S. S	8.0	8.0	10.0
T.D. S	764.0	366.0	2002.0
Chloride	55.0	51.0	532.0
Sulphate	10.60	9.53	23.2
Conductivity	1029.0	476.0	2834.0

Sample ID: Water sample

Location: 1762: - Well water sample of Shri Sheshrao Gyanoji Jadhav, G. no.141, Mauje Pathri, Tal. Phulambri.

1764: - Well water sample of Shri Dr. Pramod Eknath Jadhav, G. no.143, Mauje Pathri, Tal. Phulambri. Dr. Pramod Eknath Jadhav

Lab Report No.	E-21	E-23
Code No.	1762	1764
Parameter	Dug well	
pH	7.44	7.11
Turbidity	0.5001	0.499
Conductivity	1001.0	934.1
DO	6.28	6.32
BOD	3.4	3.4
COD	16.0	16.0
S. S	8.0	8.0
T.D. S	924.0	626.0
Chloride	90.0	118.0

Sample ID: Water sample

Location: 1765: - Well water sample of Shri Bhagwan Shankar Suradkar, G. no.123, At Pathri, Tal. Phulambri.

1767: - Well water sample of MSSPM, Foster Development, G. no.144, At Pathri, Tal. Phulambri.

1768: - Well water sample of Shri Dinesh Jadhav, G. no.143, At Pathri, Tal. Phulambri.

Lab Report No.	E-24	E-26	E-27
Code No.	1765	1767	1768
Parameter	Dug well		
pH	7.21	6.61	7.43
Turbidity	1.27	0.737	0.498
Conductivity	1691.0	1805.0	960.9
DO	5.80	6.0	6.70
BOD	5.6	4.8	3.2
COD	48.0	28.0	12.0
S. S	10.0	8.0	10.0
T.D. S	1544.0	1616.0	872.0
Chloride	286.0	282.0	92.0

Sample ID: Water sample

Location: 1763: - Well water sample of Shri Bhagwan Bala Jadhav, G. no.140, At Pathri, Tal. Phulambri.

1766: - Well water sample of Shri Sanjay Khandu Navigire, G. no.123, At Pathri, Tal. Phulambri.

Lab Report No.	E-22	E-25
Code No.	1763	1766
Parameter	Dug well	
pH	7.21	7.11
Turbidity	0.601	1.43
Conductivity	1725.0	1698.0
DO	5.65	5.50
BOD	4.4	4.8
COD	60.0	68.0
S. S	16.0	18.0
T.D. S	1638.0	1630.0
Chloride	475.0	465.0

Sample ID: Water sample

Location: Code 1654: - Well water sample of Gat. no.144

Code 1655: - Well water sample of Shri Bhagwan Shankar Suradkar.

Lab Report No.	E-66	E-67
Code No.	1654	1655
Parameter	Result	Result
pH	7.75	7.60
Fluoride	0.88	0.90
D.O	5.85	6.31
B.O. D	31.0	22.0
C.O. D	92.0	68.0
Total Dissolved Solids	1606.0	1412.0
Sulphate	69.08	53.43
Calcium	156.0	264.0
Magnesium	376.0	464.0
Hardness	532.0	728.0
Chloride	40.0	550.0
Oil & Grease	BDL	BDL
Total Alkalinity	230.0	196.0
Suspended Solids	20.0	14.0

Sample ID: Water sample

Location: Code 1656: - Well water sample of Shri Sanjay Navgire, Gat. no.123, At Pathri, Tal. Phulambri.

Code 1657: - Well water sample of Shri Bashirabi Ibrahim Shaha, Dongargaon Kawad, At Gat No. 73, At Pathri, Tal. Phulambri.

Lab Report No.	E-68	E-69
Code No.	1656	1657
Parameter	Result	Result
pH	7.58	7.70
Fluoride	0.80	0.76
D.O	6.74	7.15
B.O. D	8.0	5.0
C.O. D	28.0	20.0
Total Dissolved Solids	1110.0	782.0
Sulphate	36.33	33.80
Calcium	220.0	202.0
Magnesium	222.0	142.0
Hardness	442.0	344.0
Chloride	260.0	112.0
Oil & Grease	BDL	BDL
Total Alkalinity	240.0	260.0
Suspended Solids	12.0	10.0

Sample ID: Water sample

Location: Code 1658: - Well water sample of Shri Sayyed Shabbir Sayyed Usman, Gat. no.112,
At Pathri, Tal. Phulambri.

Code 1659: - Well water sample of Shri Dr. Pramod Eknath Jadhav, At Gat No. 143,
At Pathri, Tal. Phulambri.

Lab Report No.	E-70	E-71
Code No.	1658	1659
Parameter	Result	Result
pH	7.71	8.0
Fluoride	0.43	0.53
D.O	6.87	6.79
B.O. D	6.0	5.0
C.O. D	20.0	12.0
Total Dissolved Solids	616.0	480.0
Sulphate	25.56	40.07
Calcium	104.0	112.0
Magnesium	98.0	98.0
Hardness	202.0	210.0
Oil & Grease	BDL	BDL
Total Alkalinity	360.0	260.0
Chloride	60.0	51.0
Suspended Solids	8.0	10.0

Sample ID: Water sample

Location: Code 1660: - Well water sample of Shri Madhukar Namdev Pagare, Gat. no.124, At Pathri, Tal. Phulambri.

Code 1661: - Well water sample of Shrimati Pagare, At Gat No. 124, At Pathri, Tal. Phulambri.

Lab Report No.	E-72	E-73
Code No.	1660	1661
Parameter	Result	Result
pH	8.35	7.80
Fluoride	0.83	0.67
D.O	6.56	6.58
B.O. D	4.0	4.2
C.O. D	8.0	8.0
Total Dissolved Solids	396.0	562.0
Sulphate	35.56	29.97
Calcium	76.0	138.0
Magnesium	108.0	132.0
Hardness	184.0	270.0
Chloride	50.0	40.5
Oil & Grease	BDL	BDL
Total Alkalinity	204.0	220.0
Suspended Solids	10.0	8.0

Sample ID: Water sample

Location: Code 1662: - Well water sample of Shri Bhagwan Bala Jadhav, Gat. no.143, At Pathri, Tal. Phulambri.

Code 1663: - Well water sample of Shri Sheshrao Jadhav, At Gat No. 141, At Pathri, Tal. Phulambri.

Lab Report No.	E-74	E-75
Code No.	1662	1663
Parameter	Result	Result
pH	7.56	7.54
Fluoride	0.50	0.59
D.O	6.95	6.61
B.O. D	5.0	5.6
C.O. D	16.0	16.0
Total Dissolved Solids	702.0	680.0
Sulphate	30.0	29.69
Calcium	138.0	76.0
Magnesium	122.0	72.0
Hardness	260.0	148.0
Oil & Grease	BDL	BDL
Total Alkalinity	290.0	284.0
Chloride	55.0	45.0
Suspended Solids	10.0	10.0

Sample ID: Water sample

Location: Code 1664: - Bore Well water sample of Pramod Eknathrao Jadhav, Gat. no.143, At Pathri, Tal. Phulambri.

Lab Report No.	E-76
Code No.	1664
Parameter	Result
pH	7.91
Fluoride	0.72
D.O	6.66
B.O. D	5.2
C.O. D	20.0
Total Dissolved Solids	502.0
Sulphate	46.53
Calcium	78.0
Magnesium	146.0
Hardness	224.0
Suspended Solids	10.0
Total Alkalinity	272.0
Chloride	40.0
Oil & Grease	BDL
Potassium	--
Sodium	--
Nitrate	--
Nitrite	--
Conductivity	--
TAN	--

Sample ID: Water sample collected from village Pathri, on 31.8.2018

Sr. No.	Parameters	Drinking water Standard, A-II	Ground water Standard (10500)	Date of collection - 31.08.2018										
				1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664
				Dug well										
1	pH	6-8.5	6.5-8.5	7.75	7.6	7.58	7.7	7.71	8	8.35	7.8	7.56	7.54	7.91
2	Fluoride			0.88	0.9	0.8	0.76	0.43	0.53	0.83	0.67	0.5	0.59	0.72
3	DO	4.0mg/l	---	5.85	6.31	6.74	7.15	6.87	6.79	6.56	6.58	6.95	6.61	6.66
4	BOD	5.0mg/l	Not Specified	31	22	8	5	6	5	4	4.2	5	5.6	5.2
5	COD	---		92	68	28	20	20	12	8	8	16	16	20
6	TDS	---	---	1606	1412	1110	782	616	480	396	562	702	680	502
7	Sulphate			69.08	53.43	36.33	33.8	25.56	40.07	35.56	29.97	30	29.69	46.53
8	Calcium			156	264	220	202	104	112	76	138	138	76	78
9	Magnesium			376	464	222	142	98	98	108	132	122	72	146
10	Hardness			632	728	442	344	202	210	184	270	260	148	224
11	Chloride	600mg/l	---	40	550	260	112	60	21	50	40.5	55	45	40
12	O & G			BDL										
13	Total Alkalinity			230	196	240	260	360	260	204	220	290	284	272
14	SS	---	---	20	14	12	10	8	10	10	8	10	10	10

1654- Well water sample of gat no. 144, near sludge & open washed disposed area.

1656- Well water sample of Shri Sanjay Khandu Navgire, gat no. 123, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1657- Well water sample of Shri Basharabi Ibrahim Shah, Dongargaon Kawad, gat no. 73, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1658- Well water sample of Shri Sayyad Shabir Sayyad Usman, gat no. 112, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1659- Well water sample of Shri Dr. Pramod Eknath Jadhav, gat no. 143, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1660- Well water sample of Shri Madhukar Namdev Pagare, gat no. 124, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1661- Well water sample of Shri Pagare, gat no. 124, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1662- Well water sample of Shri Bhagwan Bala Jadhav, gat no. 143, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1663- Well water sample of Shri Sheshrao Jadhav, gat no. 141, At Pathri, Tal. Phulambri, Dist. Aurangabad.

1664- Bore Well water sample of Shri Dr. Pramod Eknath Jadhav, gat no. 143, At Pathri, Tal. Phulambri, Dist. Aurangabad.

Sample ID: HW samples collected from village Pathri, on 25.10.2018

Sr. No.	Parameters	Standard (The HW Rules, 1989- Schedule-2)	Date of collection - 25.10.2018									
			254	255	256	257	258	259	260	261	262	263
			HZW									
1	Copper	5000mg/kg	67.66	139.94	183.97	177.22	227.43	188.49	195.08	151.3	161.75	209.73
2	Nickel	5000mg/kg	15.77	25.58	32.16	30.32	34.86	32.38	26.68	25.05	30.19	37.19
3	Nitrate Nitrogen	20000mg/kg	954.32	915.74	957.7	933.12	951.82	685.9	252.4	530.32	619.3	651.22
4	Zinc	20000mg/kg	109.07	117.69	121.12	109.44	135.74	123.57	106.04	118.39	149.55	83.97
5	Concentration of po4	---	45.37	43.08	40.98	37.66	40.48	47.47	40.73	29.41	25.17	47.59
6	Lead	5000mg/kg	4.73	7.63	6.81	6.19	10.07	10.32	5.87	10.1	9.68	5.34
7	Cadmium	50mg/kg	0.13	BDL						0.2	0.13	0.07
8	Cr. Hexa	50mg/kg	6	1.6	1.6	1.7	2.6	3.1	6.2	4.6	3.8	2.6
9	Nitrite Nitrogen	20000mg/kg	2.5	1.36	1.53	1.55	1.44	1.87	1.48	1.4	2.33	1.17

254-Location No.1, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

255-Location No.2, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

256-Location No.3, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

257-Location No.4, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

258-Location No.5, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

259-Location No.6, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

260-Location No.7, Soil Sample from the farm of MSSPM, Gat No. 144, At Pathri, Tal. Phulambri

261-Location No.8, Soil Sample from the farm of MSSPM, Gat No. 144, At Pathri, Tal. Phulambri

262-Location No.9, Combine Soil Sample from the farm of MSSPM & Foster Development Sanstha, Gat No. 144, At Pathri, Tal. Phulambri

263-Location No.10, Combine Soil Sample from the farm of MSSPM & Foster Development Sanstha, Gat No. 144, At Pathri, Tal. Phulambri

Sample ID: Well Water samples collected from village Pathri, on 2.11.2018

Sr. No	Parameters	Drinking water Standard, A-II	Ground water Standard (10500)	Date of collection - 2.11.2018											
				1695	1696	1697	1698	1699	1700	1701	1702	1703	1704	1705	1706
				Dug well											
1	BOD	5.0mg/l	Not Specified	11	3	2.8	3.2	6	2.8	3	3.2	2.6	2.8	3.2	3
2	Chloride	600mg/l	---	959.7	40	35	34.1	859.7	30	24.1	34.1	30	34.1	30	31
3	COD	---	Not Specified	44	8	8	8	28	8	8	8	8	8	8	8
4	Conductivity	---		1500	1002	879.2	931.1	1533	543.2	567.2	584.5	532.1	928.3	916.4	852.7
5	Copper			0.09	0.22	0.02	0.12	0.43	0.5	0.03	0.44	0.51	0.37	0.67	0.28
6	DO	4.0mg/l	---	2.1	7.2	7.3	7.2	7.1	7.2	7.1	7	7.3	7.3	7	7.1
7	Iron			0	0.22	1.97	0	0.93	1.21	0	0.34	1.53	0	0	1.17
8	Lead			0	0	0	0	0	0	0	0	0	0	0	0
9	Magnesium Hardness			158	120	100	96	296	118	130	110	98	128	120	116
10	Nickel			0	0	0	0	0	0	0	0	0	0	0	0
11	Nitrate-Nitrogen			0.8	0.8	0	0.8	0.3	0.4	0.6	0.5	0.3	0.3	0.7	0.3
12	Nitrite-Nitrogen			0	0	0	0	0	0	0	0	0	0	0	0
13	pH	6 -8.5	6.5-8.5	8.2	8.3	8.3	8.3	8.2	8.3	8.3	8.4	8.3	8.2	8.3	8.3
14	Phosphate			0.1	0.08	0.09	0.07	0	0.08	0.08	0	0.1	0.13	0.09	0

15	Potassium			3.8	1.4	1	1.2	3.2	2	2	2	1.6	1.6	1.4	1.2
16	Sodium			8	3.2	3	3.2	6	4	4	4	3.4	3.4	3.2	3
17	Sulphate			77.8	13.7	34.2	31.2	53.5	38.2	35.9	40.5	42.4	34.2	31.1	39.3
18	SS	---	---	28	20	0	18	24	18	18	20	16	20	18	18
19	TKN			2.8	1.7	1.1	1.1	2.8	0.6	0.6	1.1	1.1	2.2	1.7	2.2
20	Total Alkalinity			180	184	182	160	400	200	302	192	254	260	232	216
21	TDS	---	---	1428	732	560	672	1402	422	440	462	436	630	696	670
22	Total Hardness			320	220	180	202	520	240	290	190	200	264	224	222
23	TRC			0	0	0	0	0	0	0	0	0	0	0	0
24	Total Solids			0	752	580	690	1426	440	458	482	452	650	714	0
25	TAN			0.9	0.7	0.4	0.2	0.9	0.2	0.2	0.2	0.3	0.6	0.5	0.4
26	Turbidity	---	41	0	0	0	0	0	0	0	0	0	0	0	0
27	Calcium Hardness			162	0	80	104	224	0	160	80	102	136	104	106
28	Zinc			0	0	0	0	0	0.01	0	0	0	0.01	0.02	0.05

1695-Dug well at Gat No. 144 of Mitrasadhana Shikshan Prasarak Mandal, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1696-Dug well in the farm of Shri Sanjay Khandu Navgire, Gat No. 123, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1697-Dug well in the farm of Shri Basharabi Ibrahim Shah, Gat No. 73, At Dongargaon Kawad, Tal.Phulambri, Dist. Aurangabad.

1698-Dug well in the farm of Shri Sayyad Shabir Sayyad Usman, Gat No. 112, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1699-Dug well in the farm of Shri Bhagwan Shankar Suradkar, Gat No. 123, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1700-Dug well in the farm of Shri Madhukar Namdeo Pagare, Gat No. 124, At Pathri,
Tal.Phulambri, Dist. Aurangabad.

1701-Dug well in the farm of Shrimati Sindhubai Bhaskar Pagare, Gat No. 124, At Pathri,
Tal.Phulambri, Dist. Aurangabad.

1702-Dug well in the farm of Shri Dr. Pramod Jadhav, Gat No. 143, At Pathri, Tal.Phulambri,
Dist. Aurangabad.

1703-Dug well in the farm of Shri Dr. Pramod Eknath Jadhav, Gat No. 143, At Pathri,
Tal.Phulambri, Dist. Aurangabad.

1704-Dug well in the farm of Shri Tejrao Gyanoji Jadhav, Gat No. 139, At Pathri, Tal.Phulambri,
Dist. Aurangabad.

1705-Dug well in the farm of Shri Bhagwan Bala Jadhav, Gat No. 140, At Pathri, Tal.Phulambri,
Dist. Aurangabad.

1706-Dug well in the farm of Shri Sheshrao Gyanoji Jadhav, Gat No. 141, At Pathri,
Tal.Phulambri, Dist. Aurangabad.

Sample ID: HW samples collected from village Pathri, on 2.11.2018

Sr. No.	Parameters	Standard (The HW Rules, 1989- Schedule-2)	Date of collection - 2.11.2018				
			265	266	267	268	269
			HZW				
1	Copper	5000mg/kg	155.26	193.81	181.01	185.23	54.7
2	Nickel	5000mg/kg	28.17	30.79	30.24	30.11	15.45
3	Nitrate Nitrogen	20000mg/kg	401.02	696	776.62	725.54	497.72
4	Zinc	20000mg/kg	114.17	125.32	116.04	92.36	284.77
5	Concentration of po4	---	53.8	117.12	59.05	40.2	42.47
6	Lead	5000mg/kg	10.74	8.71	10.89	8.1	7.65
7	Cadmium	50mg/kg	0.2	0.26	0.46	0.33	0.46
8	Cr. Hexa	50mg/kg	3.93	5.14	5.52	5.39	4.82
9	Nitrite Nitrogen	20000mg/kg	2.16	1.99	1.44	1.7	2.13

265-Location No.1, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

266-Location No.2, Soil Sample from the farm of Foster Development, Gat No. 144, At Pathri, Tal. Phulambri

267-Location No.3, Soil Sample from the farm of MSSPM, Gat No. 144, At Pathri, Tal. Phulambri

268-Location No.4, Soil Sample from the farm of MSSPM, Gat No. 144, At Pathri, Tal. Phulambri

269-Location No.5, Sludge accumulated in the farm of Shri Bhagwan Shankar Suradkar, Gat No. 123, At Pathri, Tal. Phulambri

Sample ID: HW samples collected from village Pathri, on 21.6.2019

Sr. No.	Parameters	Drinking water Standard, A-II	Ground water Standard (10500)	Date of collection – 21.6.2019						
				1762	1763	1764	1765	1766	1767	1768
				Dug Well						
1	pH	6-8.5	6.5-8.5	7.44	7.21	7.11	7.21	7.11	6.61	7.43
2	Turbidity	---	41	0.5001	0.601	0.499	1.27	1.43	0.737	0.498
3	Conductivity	---	Not Specified	1001	1725	934.1	1691	1698	1805	960.9
4	DO	4.0mg/l	---	6.28	5.65	6.32	5.8	5.5	6	6.7
5	BOD	5.0mg/l	Not Specified	3.4	4.4	3.4	5.6	4.8	4.8	3.2
6	COD	---		16	60	16	48	68	28	12
7	SS	---	---	8	16	8	10	18	8	10
8	TDS	---	---	924	1638	626	1544	1630	1616	872
9	Chloride	600mg/l	---	90	475	118	286	465	282	92

1762- Well water of Shri Sheshrao Gyanoji Jadhav, Gat No. 141, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1763- Well water of Shri Bhagwan Balu Jadhav, Gat No. 140, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1764- Well water of Shri Dr. Pramod Eknath Jadhav, Gat No. 143, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1765- Well water of Shri Bhagwan Shankar Suradkar, Gat No. 123, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1766- Well water of Shri Sanjay Khandu Navgire, Gat No. 123, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1767- Well water of MSSPM Foster Development, Gat No. 144, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1768- Well water of Shri Dinesh Jadhav, Gat No. 143, At Pathri, Tal.Phulambri, Dist. Aurangabad.

Sample ID: Well Water samples collected from village Pathri, on 5.8.2019

Sr. No.	Parameters	Drinking water Standard, A-II	Ground water Standard (10500)	Date of collection – 5.8.2019						
				1792	1793	1794	1795	1796	1797	1798
				Dug Well						
1	pH	6-8.5	6.5-8.5	6.91	7.18	7.48	7.17	6.92	7.52	7.22
2	DO	4.0mg/l	---	5.92	6.16	6.63	6.49	6.36	6.71	5.62
3	BOD	5.0mg/l	Not Specified	4.4	4	3.2	3.6	3.8	3	5
4	COD	---		36	28	20	24	28	12	48
5	SS	---	---	8	8	8	8	8	8	10
6	TDS	---		1392	910	606	680	764	366	2002
7	Chloride	600mg/l	---	495	174	118	54	55	51	532
8	Sulphate			5.7	17.7	21	4.4	10.6	9.53	23.2
9	Conductivity			1892	1350	902	1021	1029	476	2834

1792- Well water of Shri Bhagwan Shankar Suradkar, Gat No. 123, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1793- Well water of Shri Sanjay Khandu Navgire, Gat No. 123, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1794- Well water of Shri Dr. Pramod Eknath Jadhav, Gat No. 143, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1795- Well water of Shri Sheshrao Gyanoji Jadhav, Gat No. 141, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1796- Well water of Shri Bhagwan Balaji Jadhav, Gat No. 140, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1797- Well water of Shri Dinesh Vinayakrao Jadhav, Gat No. 143, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1798- Well water of Mitra Sadhana Shikshan Prasarak Mandal & Foster Development, Gat No. 144, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

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Sample ID: Well Water samples collected from village Pathri, on 3.1.2020

Sr. No.	Parameters	Drinking water Standard, A-II	Ground water Standard (10500)	Date of collection – 3.1.2020						
				1841	1842	1843	1844	1845	1846	1847
				Dug Well						
1	BOD	5.0mg/l	Not Specified	9.1	15.9	9.7	4.5	4.2	3.8	4
2	Chloride	600mg/l	---	619.8	349.9	269.9	60	22.5	70	379.9
3	COD	---	Not Specified	28	64	32	12	24	12	24
4	DO	4.0mg/l	---	5.8	5.2	6.2	6.9	7	7.1	7
5	Magnesium Hardness			100	80	100	80	58	58	64
6	pH	6-8.5	6.5-8.5	8.5	8.4	8.4	7.9	7.5	7.8	7.8
7	SS	---	---	14	12	10	16	14	12	8
8	Total Alkalinity			140	160	142	160	140	102	140
9	TDS	---	---	2290	1270	1180	620	630	615	1490
10	Total Hardness			202	160	180	162	140	136	140
11	O & G			BDL						
12	Calcium Hardness			102	80	80	82	82	78	76

1841- Dug Well in the farm of Shri Bhagwan Shankar Suradkar, Gat No. 123, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1842- Dug Well in the farm of Shri Sanjay Khandu Navgire, Gat No. 123, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1843- Dug Well in the farm of Shri Dr. Pramod Eknath Jadhav, Gat No. 143, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1844- Dug Well in the farm of Shri Sheshrao Gyanoji Jadhav, Gat No. 141, At Pathri, Tal.Phulambri, Dist. Aurangabad.

1845- Bore Well water sample of Shri Ganesh Bhagwan Jadhav, Gat No. 140, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1846- Dug Well in the farm of Shri Dinesh Vinayak Jadhav, Gat No. 143, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

1847- Dug Well in the farm of Mitra Sadhana Shikshan Prasarak Mandal & Foster Development, Gat No. 144, Mauje Pathri, Tal.Phulambri, Dist. Aurangabad.

Chapter 6

Overall Analysis of Water samples by Joint Committee report generated on 21/03/2023

Location:

Sample 1: Well in the farm of Bhagwan Shankar Suradkar Gat no. 123

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.4	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	1711.0	500
3	Suspended Solids (SS)		10.0	2000
4	Total Alkalinity		226.0	200
5	Biochemical Oxygen Demand (BOD)		7.0	20
6	Chloride		339.89	250
7	Chemical Oxygen Demand (COD)		32.0	250
8	Dissolved Oxygen		5.7	4
9	Hardness (calcium)		304.00	75
10	Hardness (total)		538.00	200
11	Hardness (Magnesium)		234.00	50
12	Oil & Grease		BDL	0.2

Location:

Sample 2: Well in the farm of Pramod Eknath Jadhav Gat no. 143

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.7	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	1288.0	500
3	Suspended Solids (SS)		12.0	2000
4	Total Alkalinity		172.0	200
5	Biochemical Oxygen Demand (BOD)		30.5	20
6	Chloride		319.90	250
7	Chemical Oxygen Demand (COD)		92.0	250
8	Dissolved Oxygen		4.7	4
9	Hardness (calcium)		260.00	75
10	Hardness (total)		344.00	200
11	Hardness (Magnesium)		84.00	50
12	Oil & Grease		BDL	0.2

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Location:**Sample 3: Well in the farm of Sheshrao Dnyanoji Jadhav Gat no. 141**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.8	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	717.0	500
3	Suspended Solids (SS)		12.0	2000
4	Total Alkalinity		324.0	200
5	Biochemical Oxygen Demand (BOD)		5.0	20
6	Chloride		126.96	250
7	Chemical Oxygen Demand (COD)		24.0	250
8	Dissolved Oxygen		6.4	4
9	Hardness (calcium)		266.00	75
10	Hardness (total)		386.00	200
11	Hardness (Magnesium)		120.00	50
12	Oil & Grease		BDL	0.2

Location:**Sample 4: Well in the farm of Dinesh Vinayak Jadhav Gat no. 143**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.5	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	821.0	500
3	Suspended Solids (SS)		11.0	2000
4	Total Alkalinity		276.0	200
5	Biochemical Oxygen Demand (BOD)		4.0	20
6	Chloride		151.95	250
7	Chemical Oxygen Demand (COD)		16.0	250
8	Dissolved Oxygen		6.3	4
9	Hardness (calcium)		264.00	75
10	Hardness (total)		426.00	200
11	Hardness (Magnesium)		162.00	50
12	Oil & Grease		BDL	0.2

Location:**Sample 5: Well in the farm of Bhagwan Bala Jadhav Gat no. 140**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.9	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	801.0	500
3	Suspended Solids (SS)		13.0	2000
4	Total Alkalinity		280.0	200
5	Biochemical Oxygen Demand (BOD)		2.5	20
6	Chloride		106.97	250
7	Chemical Oxygen Demand (COD)		8.0	250
8	Dissolved Oxygen		6.9	4
9	Hardness (calcium)		262.00	75
10	Hardness (total)		378.00	200
11	Hardness (Magnesium)		116.00	50
12	Oil & Grease		BDL	0.2

Location:**Sample 6: Well in the farm of Shivaji Kaduba Bhosle Gat no. 27**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.9	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	806.0	500
3	Suspended Solids (SS)		11.0	2000
4	Total Alkalinity		218.0	200
5	Biochemical Oxygen Demand (BOD)		6.0	20
6	Chloride		111.97	250
7	Chemical Oxygen Demand (COD)		28.0	250
8	Dissolved Oxygen		6.1	4
9	Hardness (calcium)		194.00	75
10	Hardness (total)		354.00	200
11	Hardness (Magnesium)		208.00	50
12	Oil & Grease		BDL	0.2

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Location:**Sample 7: Well in the farm of Ganpat Dasharath Bansode Gat no. 126**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.6	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	744.0	500
3	Suspended Solids (SS)		14.0	2000
4	Total Alkalinity		334.0	200
5	Biochemical Oxygen Demand (BOD)		8.0	20
6	Chloride		126.96	250
7	Chemical Oxygen Demand (COD)		32.0	250
8	Dissolved Oxygen		5.9	4
9	Hardness (calcium)		204.00	75
10	Hardness (total)		340.00	200
11	Hardness (Magnesium)		136.00	50
12	Oil & Grease		BDL	0.2

Location:**Sample 8: Well in the farm of Sanju Khandu Navgire Gat no. 123**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		7.8	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	1240.0	500
3	Suspended Solids (SS)		10.0	2000
4	Total Alkalinity		208.0	200
5	Biochemical Oxygen Demand (BOD)		4.0	20
6	Chloride		223.93	250
7	Chemical Oxygen Demand (COD)		16.0	250
8	Dissolved Oxygen		6.3	4
9	Hardness (calcium)		224.00	75
10	Hardness (total)		498.00	200
11	Hardness (Magnesium)		274.00	50
12	Oil & Grease		BDL	0.2

Location:**Sample 9: Well in the farm of Mitra Sadhana Shikshan Prasarak Mandal Gat no. 144**

Sr. No.	Parameter	Unit	Results	Permissible Limits
1	pH		8.1	6.5-8.5
2	Total Dissolved Solids(TDS)	Mg/lit	1190.0	500
3	Suspended Solids (SS)		12.0	2000
4	Total Alkalinity		174.0	200
5	Biochemical Oxygen Demand (BOD)		7.0	20
6	Chloride		334.90	250
7	Chemical Oxygen Demand (COD)		32.0	250
8	Dissolved Oxygen		5.9	4
9	Hardness (calcium)		486.00	75
10	Hardness (total)		704.00	200
11	Hardness (Magnesium)		218.00	50
12	Oil & Grease		BDL	0.2

Chapter 7

Overall Analysis of Soil samples by Joint Committee report generated on 06/04/2023

Location:

Sample 1: Soil Sample in the farm of Sheshrao Gyanogi Jadhav, Gat No. 140, at Pathri, Tal. Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limits
1	Cadmium and Cadmium Compounds (A4)	Mg/kg	0.00	0.002-0.5
2	Total Chromium		0.00	0.002-0.2
3	Copper Compounds (B3)		36.60	1-12
4	Lead and Lead Compounds (B4)		0.00	0.3-10
5	Nickel Compounds (B6)		0.00	0.05
6	Zinc Compounds (C14)		48.90	12-60

Location:

Sample 2: Soil Sample in the farm of Shri. Bhagwan Shankar Suradkar, Gat No. 123, at Pathri, Tal. Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limits
1	Cadmium and Cadmium Compounds (A4)	Mg/kg	0.00	0.002-0.5
2	Total Chromium		0.00	0.002-0.2
3	Copper Compounds (B3)		86.50	1-12
4	Lead and Lead Compounds (B4)		0.00	0.3-10
5	Nickel Compounds (B6)		0.00	0.05
6	Zinc Compounds (C14)		5.40	12-60

Location:

Sample 3: Soil Sample in the farm of Mitra Sadhana Shikshan Prasarak Mandal, Gat No.144, at Pathri, Tal. Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limits
1	Cadmium and Cadmium Compounds (A4)	Mg/kg	0.00	0.002-0.5
2	Total Chromium		0.00	0.002-0.2
3	Copper Compounds (B3)		95.40	1-12
4	Lead and Lead Compounds (B4)		0.00	0.3-10
5	Nickel Compounds (B6)		0.00	0.05
6	Zinc Compounds (C14)		10.00	12-60

Location:

Sample 4: Soil Sample in the farm of Shri. Ganesh Girjaram Dheple, Teluba, at Pathri, Tal. Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limits
1	Cadmium and Cadmium Compounds (A4)	Mg/kg	0.00	0.002-0.5
2	Total Chromium		0.00	0.002-0.2
3	Copper Compounds (B3)		29.90	1-12
4	Lead and Lead Compounds (B4)		0.00	0.3-10
5	Nickel Compounds (B6)		0.00	0.05
6	Zinc Compounds (C14)		8.50	12-60

Location:

Sample 5: Soil Sample in the farm of Shri.Umesh Sahebrao Bansod, Gat No. 125, at Pathri, Tal. Phulambri, Dist. Aurangabad.

Sr. No.	Parameters	UoM	Results	Permissible Limits
1	Cadmium and Cadmium Compounds (A4)	Mg/kg	0.00	0.002-0.5
2	Total Chromium		0.00	0.002-0.2
3	Copper Compounds (B3)		40.40	1-12
4	Lead and Lead Compounds (B4)		0.00	0.3-10
5	Nickel Compounds (B6)		0.00	0.05
6	Zinc Compounds (C14)		27.00	12-60

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Sr. No.	Soil Parameters	Unit	Analysis Results					Desired Results
			Gat 123	Gat 144	Gat 18	Gat 125	Gat 140	
1	pH	--	8.40	8.80	8.50	8.50	8.70	6.5-7.5
2	Electrical Conductivity	mS/cm	0.85	0.64	0.50	0.37	0.43	0-1
3	Organic Carbon	%	0.38	0.45	0.51	0.21	0.45	0.40-0.60
4	Nitrogen	Kg/Ha	68.99	119.17	43.90	94.08	94.08	280-420
5	Phosphorous	Kg/Ha	44.51	38.47	37.50	28.06	51.29	14-21
6	Potassium	Kg/Ha	113.46	126.67	238.78	232.85	206.42	150-200

Gat 123 – Land of Bhagwan Shankar Suradkar

Gat 144 – Land of Mitra Sadhana Shikshan Prasarak Mandal

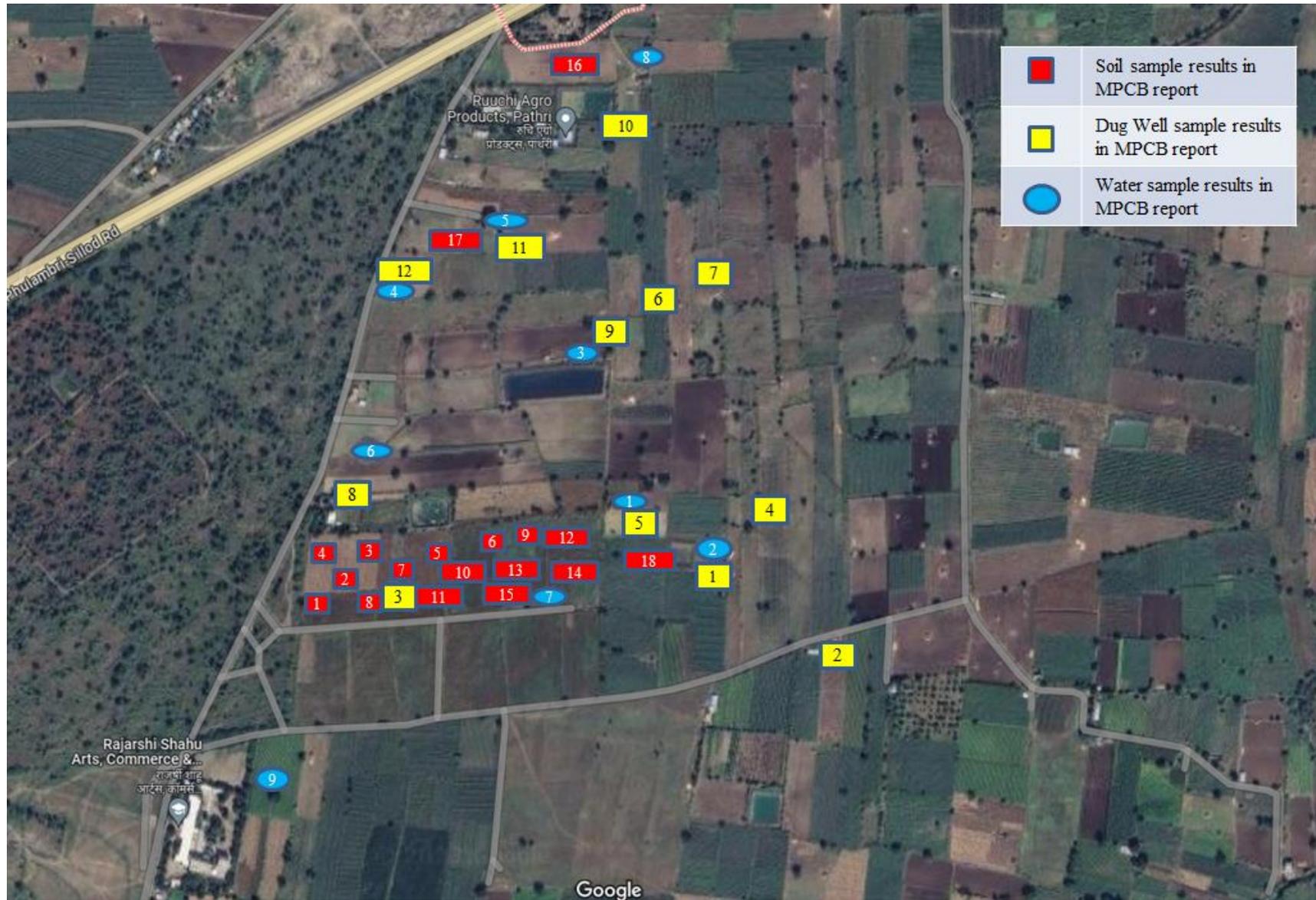
Gat 18 – Land of Gaurinarayan Shamrao Dheple

Gat 125 – Land of Umesh Sahebrao Bansod

Gat 140 – Land of Sheshrao Gyanoji Jadhav

Chapter 8

Plan map of the samples collected on the ground surface by MPCB



Soil Samples:**Location:**

Sample 1- Section no.1 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 2- Section no.2 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 3- Section no.3 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 4- Section no.4 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 5- Section no.5 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 6- Section no.6 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 7- Section no.7 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 8- Section no.8 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 9- Section no.9 in the Farm of MSSPM +Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 10- Section no.10 in the Farm of MSSPM +Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 11- Section no.1 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 12- Section no.2 in the Farm of Foster development Sanstha, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 13- Section no.3 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 14- Section no.4 in the Farm of MSSPM, Gat no.144, At Pathri, Phulambri, Dist. Aurangabad

Sample 15- Sludge accumulated in the Farm of Shri Bhagwan Suradkar, Gat no.123, At Pathri, Tal.Phulambri, Dist. Aurangabad

Sample 16- Soil sample in the farm of Shri Bhagwan Shankar Suradkar

Sample 17- Soil sample in the farm of Shri Sheshrao Gyanoji Jadhav

Sample 18- Soil sample in the farm of Shri Umesh Sahebrao Bansod

Dug Well Samples:**Location:**

Sample 1- Dug well in the Farm of Shri Sanjay Khandu Navgire, Gat no.123, Pathri, Tal.Phulambri, Dist. Aurangabad.

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Sample 2- Dug well in the Farm of Bashirabi Ibrahim Shaha, Gat no.73, At Dongargaon (Kawad), Tal.Phulambri, Dist. Aurangabad

Sample 3- Dug well at Gat no.144 of Mitrasadhana Shikshan Prasarak Mandal, Pathri, Tal.Phulambri, Dist. Aurangabad.

Sample 4- Dug well in the Farm of Shri Sayed Shabbir Syed Usman Gat no.112, Pathri, Tal.Phulambri, Dist. Aurangabad

Sample 5- Dug well in the Farm of Shri Bhagwan Shankar Suradkar, Gat no.123, Pathri, Tal.Phulambri, Dist. Aurangabad

Sample 6- Dug well in the Farm of Shri Madhukar Namdeo Pagare, Gat no.124, Pathri, Tal.Phulambri, Dist. Aurangabad

Sample 7- Dug well in the Farm of Shrimati Sindhubai Bhaskar Pagare, Gat no.124, Pathri, Tal. Phulambri, Dist. Aurangabad.

Sample 8- Bore well near house of Shri Dr. Pramod Jadhav, Gat no.143, Pathri, Tal. Phulambri, Dist. Aurangabad.

Sample 9- Dug well in the Farm of Dr. Pramod Jadhav, Gat no.143, Pathri, Tal. Phulambri, Dist. Aurangabad.

Sample 10- Dug well in the Farm of Shri Tejrao Gyanoji Jadhav, Gat no.139, Pathri, Tal. Phulambri, Dist. Aurangabad

Sample 11- Dug well in the Farm of Shri Bhagwan Bala Jadhav, Gat no.140, Pathri, Tal. Phulambri, Dist. Aurangabad

Sample 12- Dug well in the Farm of Shri Sheshrao Gyanoji Jadhav, Gat no.141, Pathri, Tal. Phulambri, Dist. Aurangabad

Water Samples:

Location:

Sample 1- Well water sample of Shri Bhagwan Shankar Suradkar

Sample 2- Well water sample of Shri Sanjay Khandu Navgire

Sample 3- Well water sample of Shri Dr. Pramod Eknath Jadhav

Sample 4- Well water sample of Shri Sheshrao Gyanoji Jadhav

Sample 5- Well water sample of Shri Ganesh Bhagwan

Sample 6- Well water sample of Shri Dinesh Vinayak Jadhav

Sample 7- Well water sample of Mitrasadhan Shikshan Prasarak Mandal

Sample 8- Well water sample of Shri Ganpat Dasharath Bansod

Sample 9- Well water sample of Shri Shivaji Kaduba Bhosle

Table No. 1: Soil Samples

Sr. No.	Parameters	UoM	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Permissible Limits(WHO)
1	Cadmium	Mg/kg	0.13	BDL	BDL	BDL	0.13	BDL	BDL	0.20	0.13	0.002-0.5
2	Chromium (Hexa)		6.0	1.6	1.6	1.7	2.6	3.1	6.2	4.6	3.6	0.002-0.2
3	Copper		67	139	183	177	227	188	195	151	161.75	1-12
4	Lead (Pb)		4.73	7.63	6.81	6.19	10.07	10.32	5.87	10.10	9.66	0.3-10
5	Nickel		15.77	25.58	32.16	30.32	34.86	32.38	26.68	23.05	30.19	0.05
6	Nitrate Nitrogen		964	915	957	933	951	685	252	530	619.30	10-50
7	Nitrite Nitrogen		2.50	1.36	1.53	1.55	1.44	1.87	1.48	1.40	2.33	10-30
8	Zinc		109	117	121	109	135	123	106	118	149.55	12-60
9	Concentration of po4		45.37	43.00	40.90	37.66	40.46	47.47	40.73	29.41	25.17	1

Table No. 2: Soil Samples

Sr. No.	Parameters	UoM	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16	Sample 17	Sample 18	Permissible Limits(WHO)
1	Cadmium	Mg/kg	0.07	0.20	0.26	0.46	0.33	0.46	0.00	0.00	0.00	0.002-0.5
2	Chromium (Hexa)		2.6	3.93	5.14	5.52	5.39	4.82	0.00	0.00	0.00	0.002-0.2
3	Copper		209.73	155.20	193.61	161.01	185.23	54.70	86.50	38.60	40.40	1-12
4	Lead (Pb)		5.34	10.74	8.71	10.89	8.10	7.65	0.00	0.00	0.00	0.3-10
5	Nickel		37.19	28.17	30.79	30.24	30.11	15.45	0.00	0.00	0.00	0.05
6	Nitrate Nitrogen		651.22	401.02	1.99	776.62	725.54	497.72				10-50
7	Nitrite Nitrogen		1.17	2.16	696.00	1.44	1.70	2.13				10-30
8	Zinc		83.97	114.17	125.32	116.04	92.36	284.77	5.40	48.90	27.00	12-60
9	Concentration of po4		47.59	53.80	117.12	59.05	40.20	42.47				1

Table No. 3: Dug Well Samples

Sr. No.	Parameter	Instance	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Permissible Limits (WHO)
1	BOD	1	3mg/lit	2.8mg/lit	11mg/lit	3.2mg/lit	6mg/lit	2.8mg/lit	20
2	Calcium Hardness			80mg/lit	162mg/lit	104mg/lit	224mg/lit		75
3	Chloride		40mg/lit	35mg/lit	959mg/lit	34mg/lit	859mg/lit	30mg/lit	250
4	COD		8mg/lit	8mg/lit	44mg/lit	8mg/lit	28mg/lit	8mg/lit	250
5	Conductivity		1002microsiemence/cm	879microsiernence/cm	1500microsiemence/cm	931microsiemence/cm	1533microsiemence/cm	543microsiemence/cm	1400microsiemence/cm
6	Copper		0.22mg/lit	0.02mg/lit	0.09mg/lit	0.12mg/lit	0.43mg/lit	0.50mg/lit	0.05
7	DO		7.2mg/lit	7.3mg/lit	2.1mg/lit	7.2mg/lit	7.1mg/lit	7.2mg/lit	4
8	Iron		0.22mg/lit	1.97mg/lit	0.0mg/lit	0.0mg/lit	0.93mg/lit	1.21mg/lit	0.3
9	Lead		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.01
10	Mercury			0.0mg/lit		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.001
11	Magnesium Hardness		120mg/lit	100mg/lit	158mg/lit	96mg/lit	296mg/lit	118mg/lit	50
12	Nickel		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.05
13	Nitrate Nitrogen		0.8mg/lit		0.8mg/lit	0.8mg/lit	0.3mg/lit	0.4mg/lit	45
14	Nitrite Nitrogen		0.0mg/lit	0.00mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0
15	pH		8.3	8.3	8.2	8.3	8.2	8.3	6.5-8.5
16	Phosphate		0.08mg/lit	0.09mg/lit	0.10mg/lit	0.07mg/lit	3.2mg/lit	0.0mg/lit	12
17	Potassium		1.4mg/lit	1mg/lit	3.8mg/lit	1.2mg/lit	6mg/lit	2mg/lit	55
18	Sodium		3.2mg/lit	3mg/lit	8mg/lit	3.2mg/lit	53.5mg/lit	4mg/lit	200

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19	Sulphate		13.7mg/lit	34.2mg/lit	77.8mg/lit	31.2mg/lit	0.0mg/lit	38.2mg/lit	400
20	Suspended Solids		20mg/lit	20mg/lit	28mg/lit	18mg/lit	24mg/lit	18mg/lit	2000
21	TKN		1.7mg/lit	1.1mg/lit	2.8mg/lit	1.1mg/lit	2.8mg/lit	0.6mg/lit	20
22	Total Alkalinity		184mg/lit	182mg/lit	180mg/lit	160mg/lit	400mg/lit	200mg/lit	200
23	Total Dissolved Solids		732mg/lit	560mg/lit	1428mg/lit	672mg/lit	1402mg/lit	422mg/lit	500
24	Total Hardness		220mg/lit	180mg/lit	320mg/lit	202mg/lit	520mg/lit	240mg/lit	200
25	TRC		0.0mg/lit						
26	Total Solids		752mg/lit	580mg/lit		690mg/lit	1426mg/lit	440mg/lit	500
27	Tot Ammoniacal Nit		0.7mg/lit	0.4mg/lit	0.9mg/lit	0.2mg/lit	0.9mg/lit	0.2mg/lit	0.5
28	Turbidity		0.0NTU	0.0NTU	0.0NTU	0.0NTU	0.0NTU	0.0NTU	1
29	Zinc		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.01mg/lit	5

Table No. 4: Dug Well Samples

Sr. No.	Parameter	Instance	Sample 7	Sample 8	Sample 9	Sample 10	Sample 11	Sample 12	Permissible Limits (WHO)
				Bore Well					
1	BOD	1	3mg/lit	3.2mg/lit	2.6mg/lit	2.8mg/lit	3.2mg/lit	3mg/lit	20
2	Calcium Hardness		160mg/lit	80mg/lit	102mg/lit	136mg/lit	104mg/lit	106mg/lit	75
3	Chloride		24.1mg/lit	34.1mg/lit	30mg/lit	34.1mg/lit	30mg/lit	31mg/lit	250
4	COD		8mg/lit	8mg/lit	8mg/lit	8mg/lit	8mg/lit	8mg/lit	250
5	Conductivity		567.2microsiemence/cm	584.5microsiemence/cm	532.1microsiemence/cm	928.3microsiemence/cm	916.4microsiemence/cm	852.7microsiemence/cm	1400 microsiemence/cm
6	Copper		0.03mg/lit	0.44mg/lit	0.51mg/lit	0.37mg/lit	0.67mg/lit	0.28mg/lit	0.05
7	DO		7.1mg/lit	7mg/lit	7.3mg/lit	7.3mg/lit	7mg/lit	7mg/lit	4
8	Iron		0.0mg/lit	0.34mg/lit	1.53mg/lit	0.0mg/lit	0.0mg/lit	1.17mg/lit	0.3
9	Lead		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.01
10	Mercury		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.001
11	Magnesium Hardness		130mg/lit	110mg/lit	98mg/lit	128mg/lit	120mg/lit	116mg/lit	50
12	Nickel		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.05
13	Nitrate Nitrogen		0.6mg/lit	0.5mg/lit	0.3mg/lit	0.3mg/lit	0.7mg/lit	0.3mg/lit	45
14	Nitrite Nitrogen		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0.0mg/lit	0
15	pH		8.3	8.4	8.3	8.2	8.3	8.3	6.5-8.5
16	Phosphate		0.08mg/lit		0.10mg/lit	0.13mg/lit	0.09mg/lit		12
17	Potassium		2mg/lit	2mg/lit	1.6mg/lit	1.6mg/lit	1.4mg/lit	1.2mg/lit	55

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18	Sodium		4mg/lit	4mg/lit	3.4mg/lit	3.4mg/lit	3.2mg/lit	3mg/lit	200
19	Sulphate		35.9mg/lit	40.5mg/lit	42.4mg/lit	34.2mg/lit	31.1mg/lit	39.3mg/lit	400
20	Suspended Solids		18mg/lit	20mg/lit	16mg/lit	20mg/lit	18mg/lit	18mg/lit	2000
21	TKN		0.6mg/lit	1.1mg/lit	1.1mg/lit	2.2mg/lit	1.7mg/lit	2.2mg/lit	20
22	Total Alkalinity		302mg/lit	192mg/lit	254mg/lit	260mg/lit	232mg/lit	216mg/lit	200
23	Total Dissolved Solids		440mg/lit	462mg/lit	436mg/lit	630mg/lit	696mg/lit	670mg/lit	500
24	Total Hardness		290mg/lit	190mg/lit	200mg/lit	264mg/lit	224mg/lit	222mg/lit	200
25	TRC								--
26	Total Solids		458mg/lit	482mg/lit	452mg/lit	650mg/lit	714mg/lit		500
27	Tot Ammoniacal Nit		0.2mg/lit	0.2mg/lit	0.3mg/lit	0.6mg/lit	0.5mg/lit	0.4mg/lit	0.5
28	Turbidity		0.0NTU	0.0NTU	0.0NTU	0.0NTU	0.0NTU	0.0NTU	1
29	Zinc		0.0mg/lit	0.0mg/lit	0.0mg/lit	0.01mg/lit	0.02mg/lit	0.05mg/lit	5

Table No. 5: Water Samples

Sr. No.	Parameter	UoM	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Permissible Limits(WHO)	
1	pH		8.5	8.4	8.4	7.9	7.5	7.8	7.8	7.6	7.9	6.5-8.5	
2	Dissolve Oxygen	Mg/lit	5.8	5.2	6.2	6.9	7.0	7.1	7.0	5.9	6.1	4	
3	BOD		9.1	15.9	9.7	4.5	4.2	3.8	4	8	6	20	
4	C.O.D		28	64	32	12	24	12	24	32	28	250	
5	T.D.Solids		2290	1270	1180	620	630	615	1490	744	806	500	
6	Ca Hardness		102	80	80	82	82	78	76	204	194	75	
7	Mg Hardness		100	80	100	80	58	58	64	136	208	50	
8	Total Hardness for demo		202	160	180	162	140	136	140	340	354	200	
9	Chlorides		619.8	349.9	269.9	60	22.5	70	379.9	126.96	111.97	250	
10	Oil & Grease		BDL	0.2									
11	Total Alkalinity		140	160	142	160	140	102	140	334	218	200	
12	Suspended Solids		14	12	10	16	14	12	8	14	11	2000	

Chapter 9

Conclusive Remarks:

1) Site Contamination & Relevant actions:

a. Detection of source and classification of contaminant:

It is very much required to perform sampling at the source from where this contaminant has been released and it is also needed to find out which toxic substances are actually available in that particular contaminant. Based on the toxic substances available the contaminant should be named which is in accordance with the International or Indian standard nomenclature norms.

However, at the present site the contaminant is named as spent wash which appears to be given very randomly given name and does not serve the exact classification of the contaminant or the contamination happened.

b. Proper Investigation of the contaminated site:

Sampling has to be performed to estimate the contaminant penetrated into the soil. This is because the overall dependency of the spread of contamination is completely depend on type of soil, amount of voids available in the soil and the permeability of the soil. Based on which the contaminant may permeate or percolate in the ground either horizontally, vertically or inclined fashion. So it is also required to perform sampling under the ground as well to some specific effective depth.

And this has to be performed by conducting bore holes, by performing undisturbed samplings and conducting that sample and taking those samples to approved laboratories so that they will actually find out how many contaminants are available in that particular soil sample and what is the depth of penetration of the contaminant at the present site.

The testing to be performed on the samples collected should be dependent on the detention of source and classification of the contaminant which has already been introduced into the site

2) Appropriate methods of investigation of contaminant in soil:

- Sampling: Collect representative soil samples from different depths and locations.

- Laboratory Analysis: Use analytical techniques like chromatography and spectrometry to identify and quantify contaminants.
- Field Testing: Employ portable instruments for on-site analysis to quickly assess contamination levels.
- Geophysical Surveys: Utilize methods like ground-penetrating radar or electromagnetic induction to identify subsurface anomalies.
- Remote Sensing: Use satellite or aerial imagery to identify potential contamination based on changes in vegetation or soil characteristics.
- Soil Permeability Tests: Evaluate soil permeability to understand how contaminants may move through the soil.
- Microbial Analysis: Assess microbial activity in the soil, as certain microbes can indicate contamination.
- Soil Core Sampling: Extract soil cores to analyze vertical distribution of contaminants and their impact on different soil layers.
- Chemical Immobilization: Explore methods to immobilize contaminants, such as using amendments to reduce their mobility.
- Risk Assessment: Combine findings with exposure pathways and receptor analysis to assess potential risks to human health and the environment.

3) Soil Exploration & Sampling in contaminant soil

Procedure:

1) Selection of Sampling Points:

- Identify the area from which the soil samples need to be collected.
- Divide the area into zones based on variations in soil characteristics

2) Number of Samples:

- Determine the number of samples needed based on the size and uniformity of the area.
- For a small area, 3 to 5 samples may be sufficient. For larger areas, more samples may be required.

3) Sample Depth:

- Collect samples from various depths based on the purpose of the investigation.
- Common depths include 0-15 cm, 15-30 cm, 30-45 cm, and so on.

4) Sample Collection Tools:

- Use appropriate tools such as augers, soil samplers, or hand augers for collecting disturbed or undisturbed samples

5) Sampling Procedure:

- Insert the sampling tool vertically into the soil at the desired depth.
- Extract the sample carefully to avoid contamination.
- Collect undisturbed samples in thin-walled tubes or cutting rings.
- For cohesive soils, use Shelby tubes or thin-walled tube samplers for undisturbed samples.

6) Labeling and Identification:

- Clearly label each sample with relevant information such as location, depth, and date of sampling.
- Maintain a record of the sampling procedure

7) Transportation:

- Transport the collected samples to the laboratory as soon as possible after collection.
- Take precautions to prevent contamination during transportation

8) Storage:

- Store undisturbed samples in a cool and dark place to maintain their natural moisture content.
- Store disturbed samples in airtight containers to prevent changes in moisture content.

9) Handling and Processing:

- Handle the samples carefully to avoid any alteration of their properties.
- Process the samples in the laboratory as per the testing requirements.

For soil investigation and sampling, you might refer to standards such as:

- **IS: 1892-1979**
- **ASTM D1586**
- **ASTM D1452-17**
- **IS 2131 (Part 1): 1981**

4) Actions to be taken to remediate the site:

Based on the actual investigation performed it can be found out that what is the depth of penetration of contaminant is how much toxic elements are available in to the present water and soil at the same time what is the lateral trade of this contaminant. Appropriate method of remediation can be decided this shall be the most important activity to remediate the present site.

5) Execution and supervision of remediation:

Once the actions to be taken is decide its execution has also to be defined and should be supervised with the concerned representatives from government as well as the people who have contaminated the soil and the people who are get affected because of the contaminated soil proper methodology has to be defined proper field laws to be made, and based on the field laws this has to be ensured that the decided actions are taken appropriately.

6) Reinvestigation to ensure the efficacy of the actions taken:

Again, overall sampling should be done and testing should be performed so that it will ensure that the action taken on the site is how much remediated.

How the sampling has to be done:

Sampling has to be performed to estimate the contaminant penetrated into the soil. This is because the overall dependency of the spread of contamination is completely depend on type of soil , amount of voids available in the soil and the permeability of the soil. Based on which the contaminant may permeate or percolate in the ground either horizontally, vertically or inclined fashion. So, it is also required to perform sampling under the ground as well to some specific effective depth.

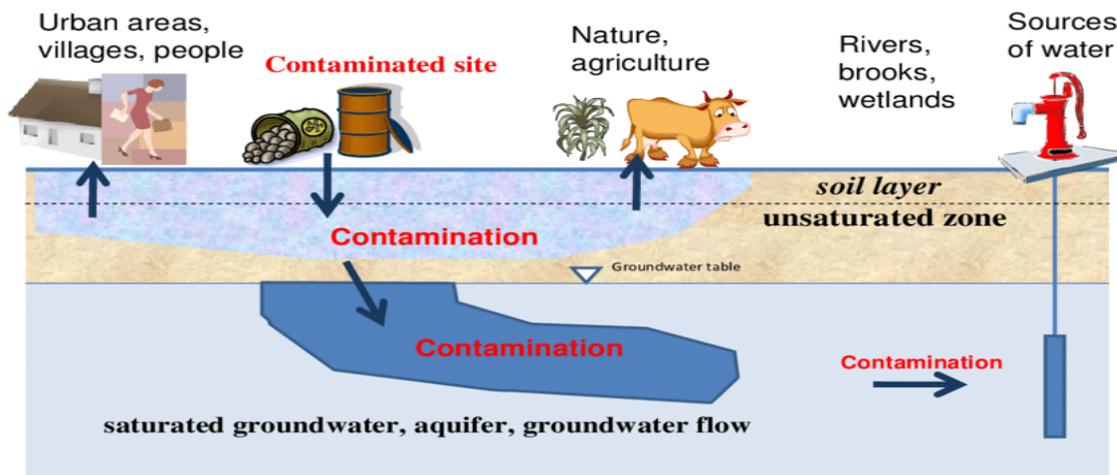
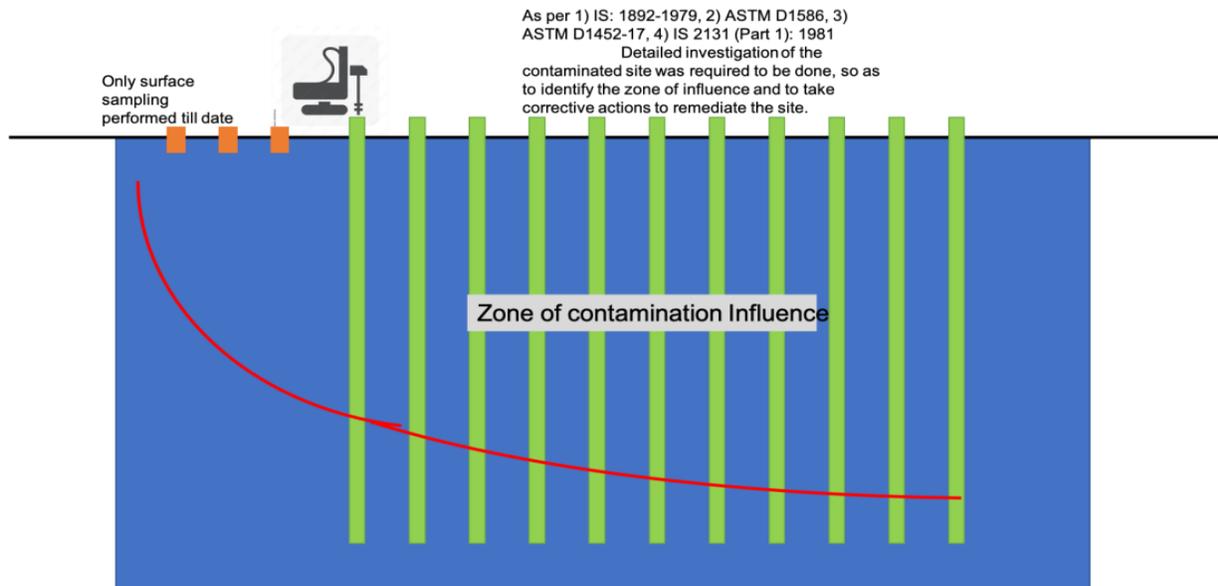
How actually the sampling is done:

Sampling is done only on the ground surface .As we have seen they have not mentioned any procedure or International Standard Code of Reference in the collection of samples. The tests are not conducted on the heavy or toxic metals which are found to be present in soil.

Soil Parameters: Cadmium, Chromium, Copper, Lead, Nickel, Nitrate Nitrogen, Nitrite Nitrogen, Zinc, and Concentration of po4

Water Parameters: pH, Dissolve Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Dissolved Solids, Calcium Hardness, Magnesium Hardness, Total Hardness, Chlorides, Oil & Grease, Total Alkalinity, Suspended Solids.

Dug Well Parameters: Biochemical Oxygen Demand, Calcium Hardness, Chlorides, Chemical Oxygen Demand, Conductivity, Copper, Dissolve Oxygen, Iron, Lead, Mercury, Magnesium Hardness, Nickel, Nitrate Nitrogen, Nitrite Nitrogen, pH, Phosphate, Potassium, Sodium, Sulphate, Suspended Solids, TKN, Total Alkalinity, Total Dissolved Solids, Total Hardness, Total Solids, Total Ammoniacal Nit, Turbidity, Zinc.



Chapter 10

Bad Effects of Metals on Human Body

Copper:

- **Copper Toxicity:** Excessive intake of copper can lead to copper toxicity, causing symptoms such as nausea, vomiting, diarrhea, and even liver damage. This is particularly a concern when copper levels in drinking water or supplements are too high.
- **Wilson's Disease:** In individuals with Wilson's disease, the body is unable to properly metabolize copper, leading to its accumulation in various organs, especially the liver and brain. This can result in severe health issues, including liver damage and neurological problems.
- **Gastrointestinal Distress:** High levels of copper intake can irritate the gastrointestinal tract, causing symptoms like stomach pain, cramps, and discomfort. This is more likely to occur with excessive consumption of copper-rich foods or contaminated water.

Nickel:

- **Allergic Reactions:** Nickel is a common allergen, and prolonged skin exposure to nickel-containing objects like jewelry or clothing accessories can lead to contact dermatitis, characterized by redness, itching, and skin rashes. In severe cases, it may cause blistering and open sores.
- **Respiratory Issues:** Inhalation of nickel-containing dust or fumes, often in industrial settings, can lead to respiratory problems such as chronic bronchitis or reduced lung function. Long-term exposure may increase the risk of developing respiratory disorders.
- **Carcinogenic Potential:** Some studies suggest a potential link between prolonged exposure to high levels of nickel compounds and an increased risk of lung and nasal cancers. Occupational settings, such as nickel refining or welding, pose a higher risk of exposure.

Nitrate Nitrogen:

- **Methemoglobinemia (Blue Baby Syndrome):** High levels of nitrate nitrogen in drinking water can lead to the conversion of hemoglobin in the blood to methemoglobin, reducing its ability to transport oxygen. This condition is particularly dangerous for infants and can result in a bluish discoloration of the skin, known as blue baby syndrome, and may lead to serious health complications.
- **Interference with Oxygen Transport:** Elevated nitrate levels in the body can interfere with the normal transport of oxygen, causing symptoms such as shortness of breath, weakness, and fatigue. This is a result of the reduced oxygen-carrying capacity of methemoglobin.
- **Infant Health Issues:** Infants are more susceptible to the harmful effects of nitrate nitrogen. High nitrate levels in drinking water or formula can lead to methemoglobinemia

in infants, affecting their oxygen uptake and potentially leading to serious health problems.

Zinc:

- **Gastrointestinal Distress:** Excessive intake of zinc, either through supplements or certain foods, can lead to gastrointestinal issues such as nausea, vomiting, and abdominal pain. This is especially common when zinc supplements are taken on an empty stomach.
- **Interference with Nutrient Absorption:** High levels of zinc can interfere with the absorption of other essential minerals, such as copper and iron. Prolonged imbalance in these minerals may lead to health problems, including anemia and weakened immune function.
- **Suppression of Immune Function:** While zinc is crucial for immune function in appropriate amounts, excess zinc can actually suppress the immune system. This can make the body more vulnerable to infections and compromise overall immune response.

Lead (Pb):

- **Neurological Damage:** Lead exposure, especially in children, can lead to severe neurological damage, affecting cognitive function, behavior, and IQ. Even low levels of lead exposure have been associated with developmental delays and learning disabilities.
- **Anemia:** Lead interferes with the body's ability to produce hemoglobin, leading to anemia. This can result in fatigue, weakness, and pallor. Children and pregnant women are particularly vulnerable to the effects of lead-induced anemia.
- **Kidney Damage:** Prolonged exposure to lead can cause kidney damage, impairing their function. This may lead to increased blood pressure and other kidney-related health problems.

Cadmium:

- **Respiratory Issues:** Inhalation of cadmium fumes or dust in industrial settings can lead to respiratory problems, including lung damage and an increased risk of lung cancer. Long-term exposure may result in chronic obstructive pulmonary disease (COPD).
- **Kidney Damage:** Cadmium is known to accumulate in the kidneys, causing damage to the renal tubules. Chronic exposure may lead to kidney disease, reducing the organ's ability to filter waste from the blood and maintain overall health.
- **Cancer Risk:** Cadmium is classified as a human carcinogen, with a particular association to lung cancer. Occupational exposure, as well as exposure through contaminated food and tobacco smoke, increases the risk of developing various cancers.

Chromium (Hexa):

- **Carcinogenic Potential:** Hexavalent chromium, particularly in the form of chromium (VI), is a known human carcinogen. Prolonged exposure through inhalation or skin contact can increase the risk of developing lung cancer, especially in occupational settings like welding and chromate production.
- **Respiratory Issues:** Inhalation of hexavalent chromium compounds can irritate the respiratory tract, leading to symptoms such as coughing, wheezing, and shortness of breath. Long-term exposure may contribute to chronic respiratory conditions.

Nitrite Nitrogen:

- **Methemoglobinemia Risk:** Nitrite can react with hemoglobin in the blood, forming methemoglobin. Excessive levels of methemoglobin can reduce the blood's ability to carry oxygen, leading to a condition known as methemoglobinemia. This is particularly concerning in infants, as it can result in a bluish discoloration of the skin and potentially life-threatening oxygen deprivation.
- **Interference with Oxygen Transport:** Nitrite interferes with the normal function of hemoglobin, reducing its capacity to transport oxygen. This can result in symptoms such as shortness of breath, weakness, and fatigue.
- **Cancer Risk:** Prolonged exposure to nitrites, often through contaminated water or certain processed foods has been associated with an increased risk of cancer, particularly stomach cancer. Nitrites can react with amines to form nitrosamines, which are known carcinogens.

Concentration of po4:

- **Kidney Damage:** High concentrations of phosphate (PO₄) in the blood, often associated with kidney dysfunction, can lead to the formation of calcium phosphate crystals. Over time, these crystals may accumulate in the kidneys, potentially causing kidney stones and impairing renal function.
- **Cardiovascular Complications:** Elevated phosphate levels have been linked to an increased risk of cardiovascular problems, including arterial calcification. Excessive phosphate in the blood can contribute to the deposit of calcium in arterial walls, leading to atherosclerosis and other cardiovascular issues.
- **Bone and Mineral Imbalance:** While phosphate is essential for bone health, an imbalance with calcium can disrupt bone mineralization. High phosphate levels and an inappropriate calcium-phosphate ratio may contribute to bone disorders, such as osteoporosis or soft tissue calcification.

Chapter 11

Land contamination cases across the world:

1. **Love Canal (United States, 1970s):**

- Chemical waste disposal led to health issues, prompting the creation of the Superfund program.

2. **Bhopal Gas Tragedy (India, 1984):**

- Release of toxic gases from a pesticide plant resulted in immediate deaths and long-term health effects.

3. **Minamata Disease (Japan, 1950s-1960s):**

- Methylmercury released into Minamata Bay led to severe health effects, including neurological damage.

4. **Chernobyl Nuclear Disaster (Ukraine, 1986):**

- Radioactive materials released into the environment affected large areas and had long-term consequences.

5. **Joutel Mining Spill (Canada, 1990):**

- A mining tailings pond breach released heavy metals and sulfuric acid, impacting water bodies.

6. **Citarum River Pollution (Indonesia):**

- Considered one of the most polluted rivers globally due to industrial and domestic waste disposal.

7. **Times Beach (United States, 1980s):**

- Dioxin contamination led to the evacuation and demolition of the entire town.

8. **Seveso Disaster (Italy, 1976):**

- Chemical plant explosion released dioxin, leading to evacuations and environmental contamination.

9. **La Oroya (Peru, ongoing):**

- Ongoing contamination from a polymetallic smelter affecting air, soil, and water.

10. **Baia Mare Cyanide Spill (Romania, 2000):**

- A dam failure released cyanide-contaminated water into rivers, impacting ecosystems.

11. Kabwe (Zambia, ongoing):

- Lead and zinc mining activities have left a legacy of soil contamination and health issues.

12. Aral Sea Environmental Disaster (Central Asia, ongoing):

- Over-extraction of water for irrigation led to the shrinking of the Aral Sea, causing environmental and health issues.

13. Asbest (Russia, ongoing):

- Asbestos mining and production have resulted in widespread soil and air contamination.

14. Niger Delta Oil Spills (Nigeria, ongoing):

- Repeated oil spills from oil extraction activities have led to widespread land and water contamination.

15. Woburn Toxic Wells (United States, 1970s):

- Contaminated wells and toxic waste dumping led to health issues, inspiring the book and movie "A Civil Action."

16. Ranomafana National Park (Madagascar, ongoing):

- Illegal mining activities have resulted in soil and water contamination in a protected area.

17. Kodaikanal Mercury Poisoning (India, 2001):

- Unregulated disposal of mercury waste by a thermometer factory led to contamination and health issues.

18. Kingston Fossil Plant Coal Ash Spill (United States, 2008):

- Massive coal ash spill contaminated land and water in Tennessee.

19. Navajo Nation Uranium Contamination (United States, ongoing):

- Uranium mining and milling activities have left a legacy of contamination on Navajo lands.

20. Ok Tedi Mine (Papua New Guinea, ongoing):

- Mining activities have resulted in extensive environmental damage and land contamination.

21. Torrey Canyon Oil Spill (United Kingdom, 1967):

- The oil tanker spill contaminated coastlines in Cornwall, causing significant ecological damage.

22. Sumgait Chemical Plant (Azerbaijan, ongoing):

- Industrial activities have resulted in soil and air contamination in the city of Sumgait.

23. Guarapari Thorium Contamination (Brazil, 1987):

- Illicit dumping of radioactive material led to thorium contamination in a beach town.

24. Salinas Valley Pesticide Contamination (United States, ongoing):

- Pesticide runoff has resulted in soil and water contamination in agricultural areas.

25. Sidoarjo Mudflow (Indonesia, ongoing):

- Drilling for natural gas resulted in a mud volcano eruption, causing extensive land and property damage.

26. Aberfan Coal Slurry Disaster (United Kingdom, 1966):

- A coal waste tip collapsed, burying a school and causing environmental damage.

27. Copper Basin Mining District (United States, ongoing):

- Historic copper mining activities have left a legacy of heavy metal contamination in Tennessee.

28. La Courneuve Waste Incineration Plant (France, ongoing):

- Incineration plant emissions have raised concerns about soil and air contamination.

29. Göygöl Cyanide Spill (Azerbaijan, 1998):

- A dam failure released cyanide-contaminated water, impacting rivers and farmland.

30. Yanacocha Gold Mine (Peru, ongoing):

- Gold mining activities have resulted in water and soil contamination in the region.

31. Waihi Gold Mine (New Zealand, ongoing):

- Gold mining activities have raised environmental concerns, including water and soil contamination.

32. Oak Ridge Reservation (United States, ongoing):

- Nuclear research and production activities have led to soil and groundwater contamination.

33. Koko Chemical Spill (Nigeria, 2008):

- A chemical spill from a dumping site resulted in soil and water contamination.

34. Yunnan Aluminium Plant (China, ongoing):

- Aluminium production activities have raised concerns about soil and air contamination.

35. Peruvian Amazon Oil Spills (Peru, ongoing):

- Repeated oil spills from oil extraction activities have impacted the Amazon rainforest.

36. Nakhodka Oil Spill (Russia, 1997):

- The oil tanker "Nakhodka" spilled oil, impacting coastlines and marine life.

37. Gold Ridge Mine (Solomon Islands, ongoing):

- Abandoned gold mine tailings have resulted in environmental contamination.

38. Agbogbloshie Electronic Waste Dump (Ghana, ongoing):

- Electronic waste dumping has led to soil and water contamination in Accra.

39. Butte-Anaconda Superfund Site (United States, ongoing):

- Historic mining activities have left a legacy of environmental contamination in Montana.

40. Mizushima Oil Spill (Japan, 1995):

- The oil tanker "Nakhodka" spilled oil, impacting coastlines and marine life.

41. Dzershinsk Chemical Plant (Russia, ongoing):

- Historic chemical production activities have resulted in widespread soil and water contamination.

42. Sunshine Mine (United States, 1972):

- A fire in the Sunshine Mine released toxic fumes, causing health issues and environmental damage.

43. Bassens Industrial Zone (France, ongoing):

- Industrial activities have raised concerns about soil and water contamination.

44. Brazos River Mercury Spill (United States, 1974):

- A mercury spill impacted the Brazos River, leading to environmental damage.

45. Kamilo Beach Plastic Pollution (Hawaii, ongoing):

- Plastic pollution has affected the shores of Kamilo Beach on the Big Island.

46. Balakot Air Base Pesticide Contamination (Pakistan, ongoing):

- Pesticide contamination has been reported around the Balakot Air Base.

47. Dzoraget River Copper and Molybdenum Spill (Armenia, 1998):

- A dam failure released copper and molybdenum-contaminated water, impacting rivers.

48. Shawinigan PCB Contamination (Canada, ongoing):

- Historic PCB contamination has raised environmental concerns in the Shawinigan area.

49. Marlin Mine (Guatemala, ongoing):

- Gold mining activities have raised environmental and health concerns in the region.

50. Garden City Ammunition Plant (United States, ongoing):

- Historic ammunition production activities have led to soil and groundwater contamination.

51. Niger Delta Gas Flaring (Nigeria, ongoing):

- Gas flaring from oil extraction activities has raised environmental and health concerns.

52. Bariloche Nuclear Waste Dump (Argentina, ongoing):

- Nuclear waste disposal has raised concerns about soil and water contamination.

53. Kalimantan Forest Fires (Indonesia, ongoing):

- Annual forest fires have led to widespread land and air pollution in Kalimantan.

54. Kern River Oil Field (United States, ongoing):

- Oil extraction activities have raised environmental concerns in the Kern River area.

55. Montreal-Mirabel Airport PCB Contamination (Canada, ongoing):

- PCB contamination has been reported in the Montreal-Mirabel Airport area.

56. Kabwe Mine (Zambia, ongoing):

- Historic lead and zinc mining activities have resulted in soil and water contamination.

57. Gowanus Canal (United States, ongoing):

- The canal is contaminated with industrial pollutants, raising environmental concerns.

58. Herculaneum Lead Smelter (United States, ongoing):

- Historic lead smelting activities have left a legacy of soil and air contamination.

59. Nkomati Mine (South Africa, ongoing):

- Nickel and copper mining activities have raised environmental concerns in the region.

60. North Sea Dumping of Chemical Weapons (ongoing):

- Dumping of chemical weapons in the North Sea has raised concerns about marine contamination.

61. Puebla Fertilizer Plant Explosion (Mexico, 1991):

- A fertilizer plant explosion released toxic gases, causing environmental and health damage.

62. Plachimada Coca-Cola Plant (India, ongoing):

- Water contamination and environmental concerns have been reported around the Plachimada plant.

63. Rio Tinto Mine (Spain, ongoing):

- Historic mining activities have left a legacy of environmental contamination in the region.

64. Bor Copper Mine (Serbia, ongoing):

- Copper mining activities have raised environmental concerns in the Bor region.

65. Musi River Industrial Pollution (India, ongoing):

- Industrial pollution has impacted the Musi River, raising environmental and health concerns.

66. Fukushima Daiichi Nuclear Disaster (Japan, 2011):

- Nuclear meltdowns and radioactive releases have had significant environmental consequences.

67. Omai Gold Mine (Guyana, 1995):

- A tailings dam failure released cyanide-contaminated water, impacting rivers.

68. Kaiyang Phosphate Spill (China, 2013):

- A dam failure released phosphate-contaminated water, impacting rivers and farmland.

69. Cleveland Pools Chemical Dumping (United Kingdom, 1978):

- Illegal chemical dumping contaminated the Cleveland Pools, causing environmental damage.

70. Sandoz Chemical Spill (Switzerland, 1986):

- A fire at a chemical storage facility released pollutants into the Rhine River.

71. Vapi Industrial Area (India, ongoing):

- Industrial pollution has raised environmental and health concerns in the Vapi area.

72. Krasny Bor Radioactive Waste Site (Russia, ongoing):

- Radioactive waste disposal has raised concerns about soil and water contamination.

73. Karakum Canal Water Pollution (Turkmenistan, ongoing):

- Agricultural runoff has raised concerns about water pollution in the Karakum Canal.

74. Lingang Industrial Area (China, ongoing):

- Industrial activities have raised concerns about soil and water contamination in Lingang.

75. Bacău Oil Refinery Spill (Romania, 1987):

- An oil spill from a refinery contaminated land and water in Bacău.

76. Honduras Rosario Mining Spill (2005):

- A dam failure released metal-contaminated water, impacting rivers and farmland.

77. Kabwe Mine (Zambia, ongoing):

- Historic lead and zinc mining activities have resulted in soil and water contamination.

78. Niger Delta Oil Spills (Nigeria, ongoing):

- Repeated oil spills from oil extraction activities have impacted the Niger Delta.

79. Ok Tedi Mine (Papua New Guinea, ongoing):

- Mining activities have resulted in extensive environmental damage and land contamination.

80. Nakhodka Oil Spill (Russia, 1997):

- The oil tanker "Nakhodka" spilled oil, impacting coastlines and marine life.

81. Guarapari Thorium Contamination (Brazil, 1987):

- Illicit dumping of radioactive material led to thorium contamination in a beach town.

82. Salinas Valley Pesticide Contamination (United States, ongoing):

- Pesticide runoff has resulted in soil and water contamination in agricultural areas.

83. Waihi Gold Mine (New Zealand, ongoing):

- Gold mining activities have raised environmental concerns, including water and soil contamination.

84. Dzoraget River Copper and Molybdenum Spill (Armenia, 1998):

- A dam failure released copper and molybdenum-contaminated water, impacting rivers.

85. Shawinigan PCB Contamination (Canada, ongoing):

- Historic PCB contamination has raised environmental concerns in the Shawinigan area.

86. Kamilo Beach Plastic Pollution (Hawaii, ongoing):

- Plastic pollution has affected the shores of Kamilo Beach on the Big Island.

87. Balakot Air Base Pesticide Contamination (Pakistan, ongoing):

- Pesticide contamination has been reported around the Balakot Air Base.

88. Dzershinsk Chemical Plant (Russia, ongoing):

- Historic chemical production activities have resulted in widespread soil and water contamination.

89. Sunshine Mine (United States, 1972):

- A fire in the Sunshine Mine released toxic fumes.

Calculations for overall damages with example case:

Example case of Love Canal (United States, 1970s):

- Chemical waste disposal led to health issues, prompting the creation of the Superfund program.

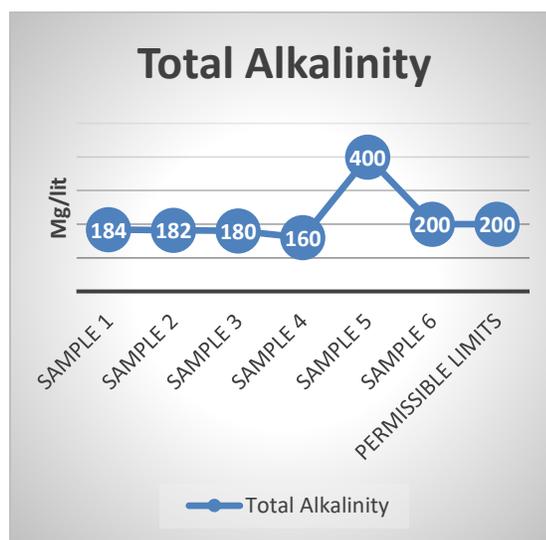
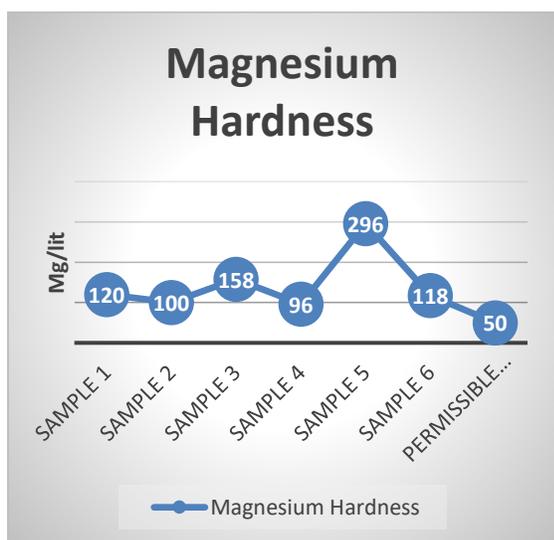
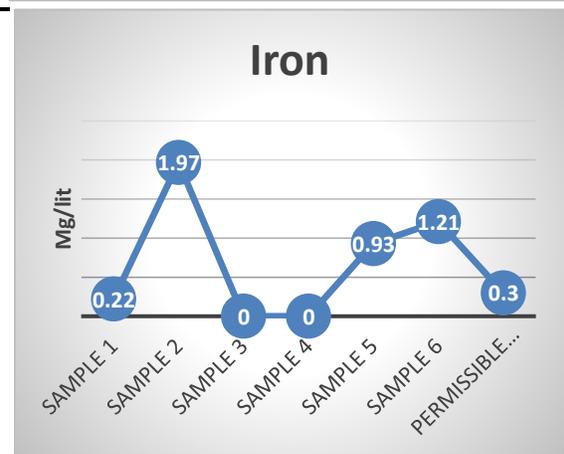
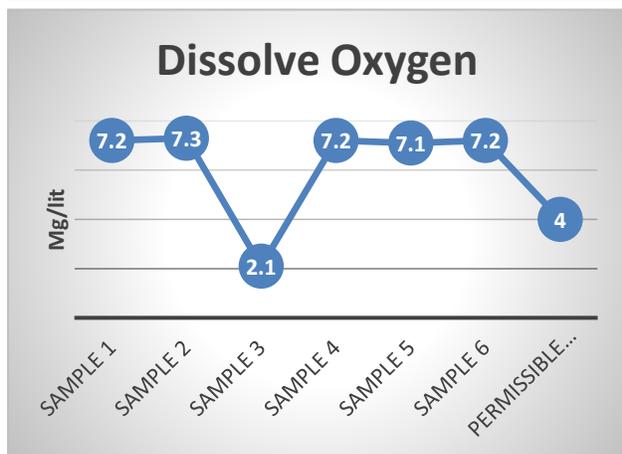
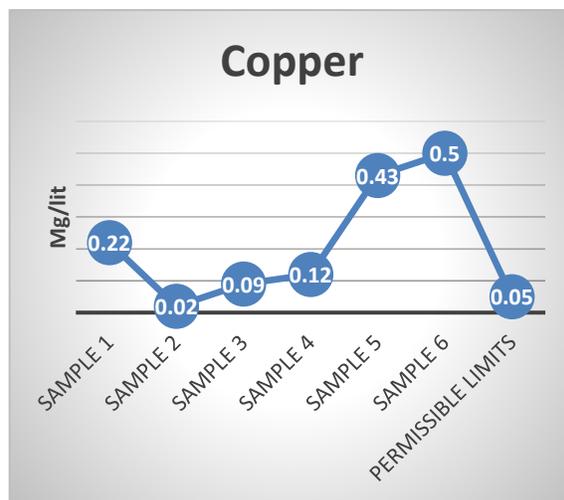
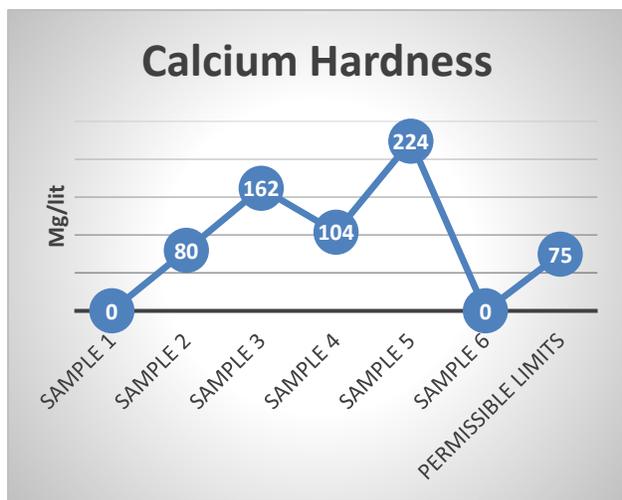
The Love Canal disaster in the 1970s prompted significant legal and regulatory actions. Here are some key steps taken in response to the Love Canal contamination:

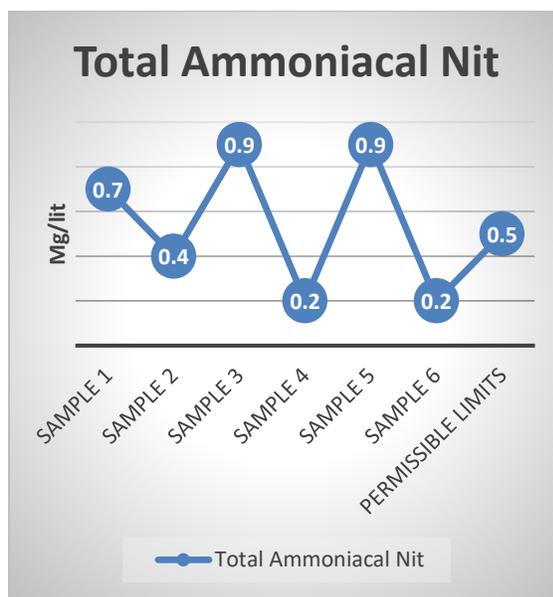
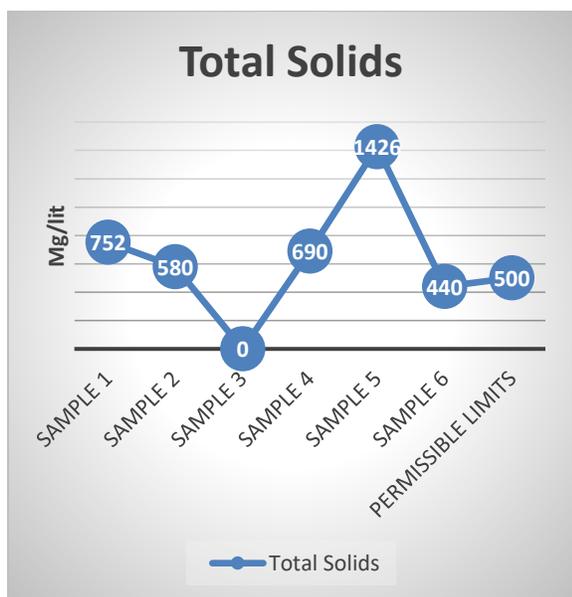
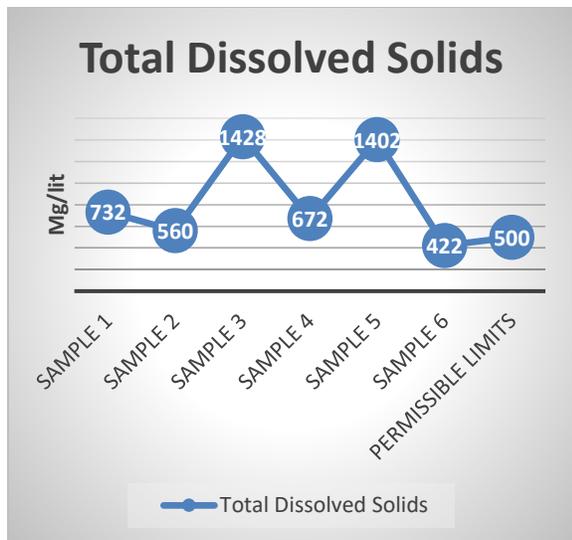
1. **Superfund Legislation:** The Love Canal incident played a pivotal role in the creation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. This legislation established the Superfund program, which is designed to identify and clean up hazardous waste sites. The Superfund provides a mechanism for the government to respond to environmental emergencies and hold responsible parties accountable for clean-up costs.
2. **EPA Declaration of Emergency:** In 1978, the Environmental Protection Agency (EPA) declared a federal emergency at Love Canal, and residents were evacuated from the affected area. This marked one of the first instances of the federal government taking direct action to address a hazardous waste site.
3. **Legal Actions Against Occidental Petroleum:** Occidental Petroleum, the company responsible for dumping hazardous waste at Love Canal, faced legal actions and liabilities. In 1995, Occidental agreed to pay \$129 million to settle federal and state claims related to the Love Canal contamination. This settlement helped fund the ongoing clean-up efforts.
4. **Health Studies and Compensation:** Health studies were conducted to assess the impact of the contamination on residents. Compensation was provided to affected individuals, taking into account health damages and property losses. The compensation process involved legal negotiations and settlements.
5. **Environmental Remediation:** The Love Canal site underwent extensive environmental remediation efforts to mitigate the effects of the contamination. The Superfund program funded the clean-up activities, including the removal and containment of hazardous substances.

Calculating damages to residents involved a combination of health assessments, property evaluations, and legal negotiations. Health damages were often determined through medical studies and assessments of the prevalence and severity of health issues among the affected population. Property values were assessed based on the impact of contamination on real estate.

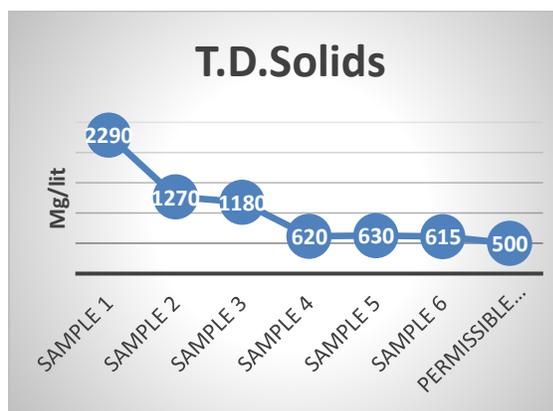
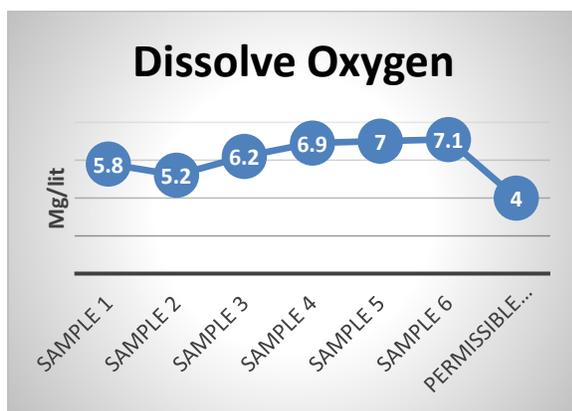
Chapter 12

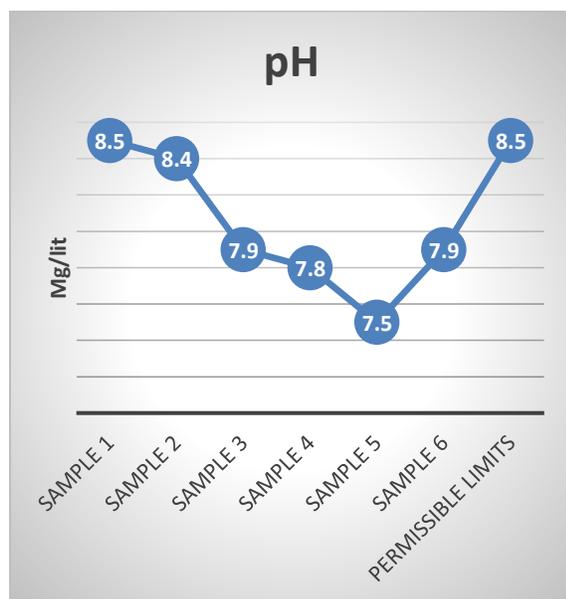
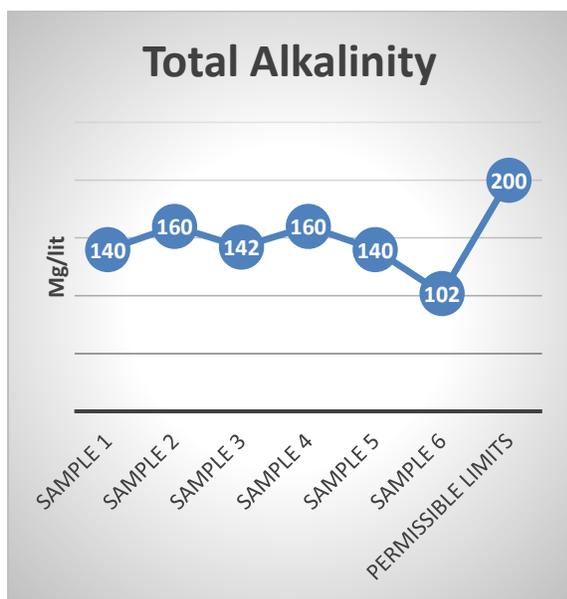
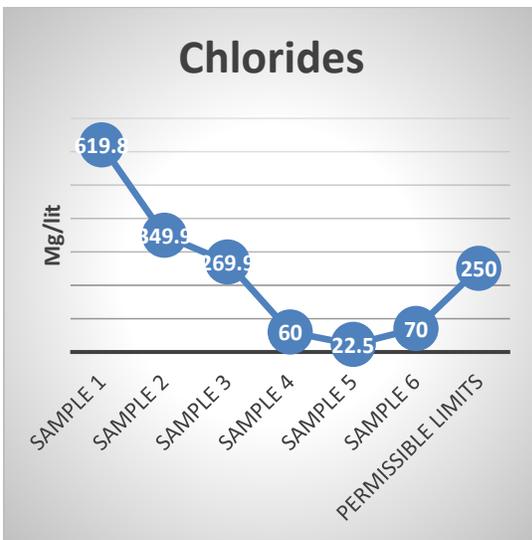
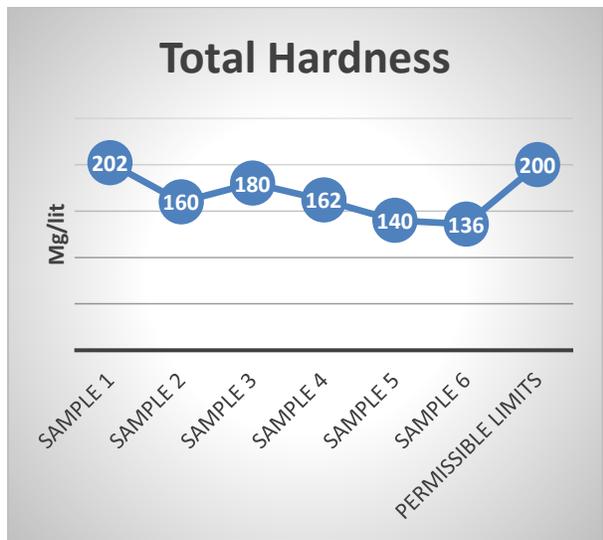
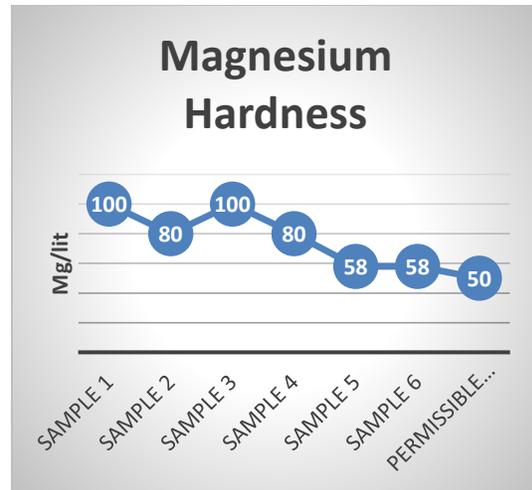
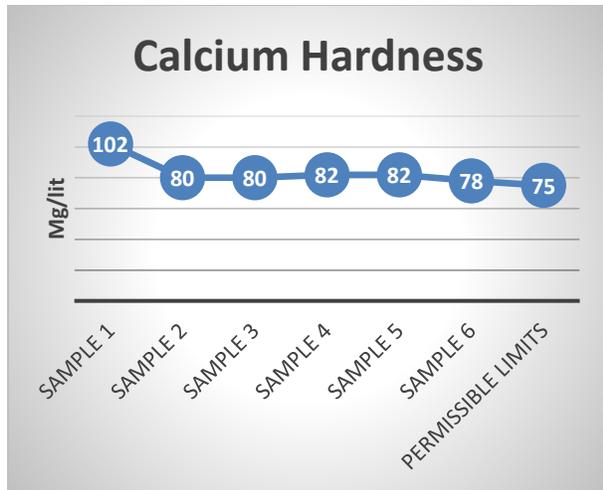
Comparison of Dug Well Samples tested by MPCB in 2018

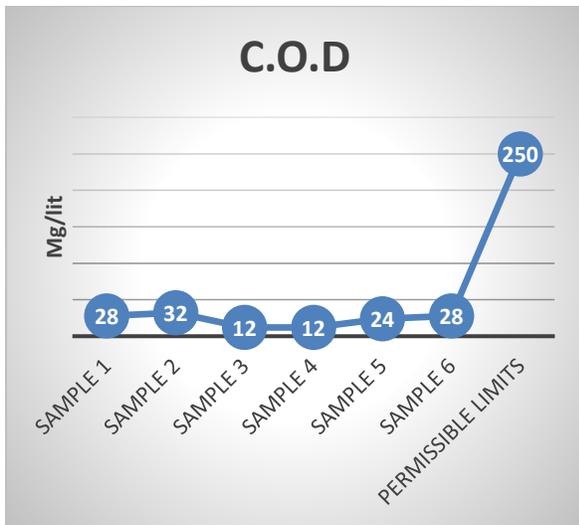
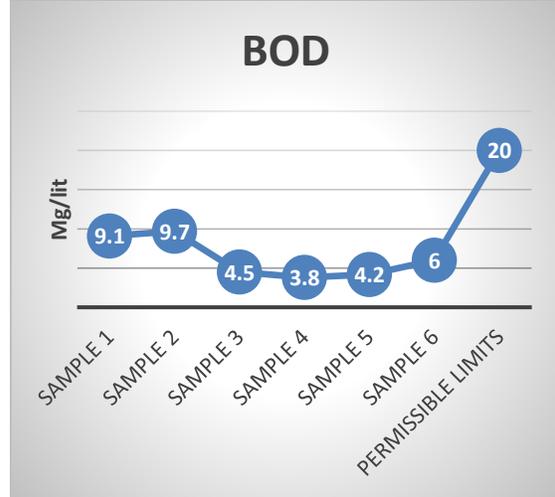
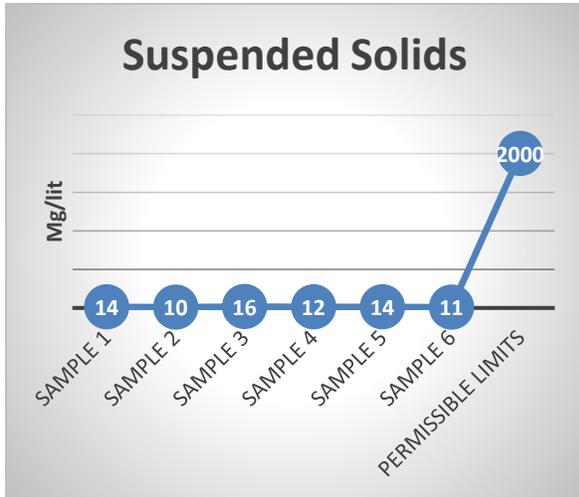




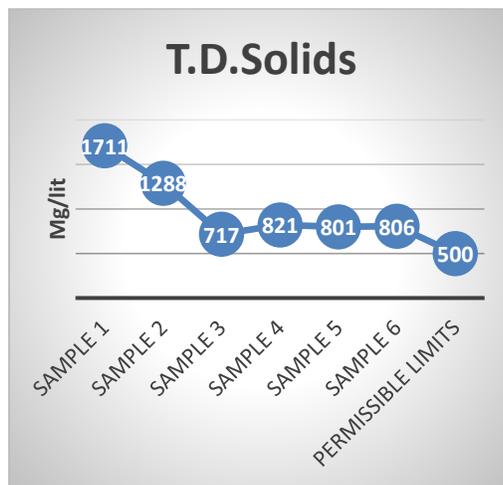
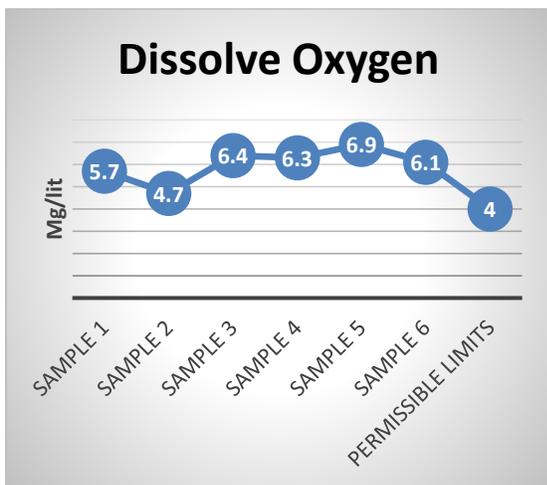
Comparison of Water Samples tested by MPCB in 2020

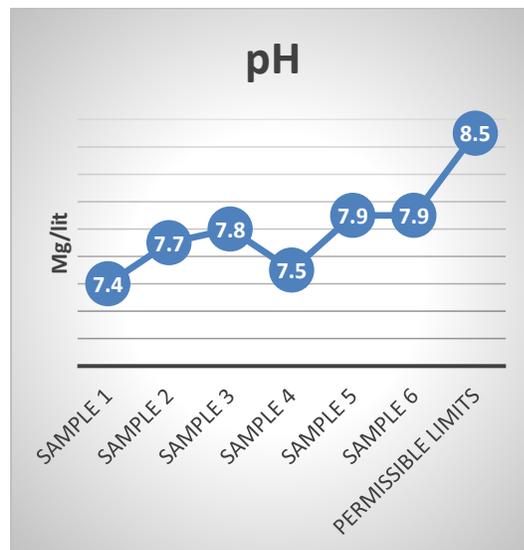
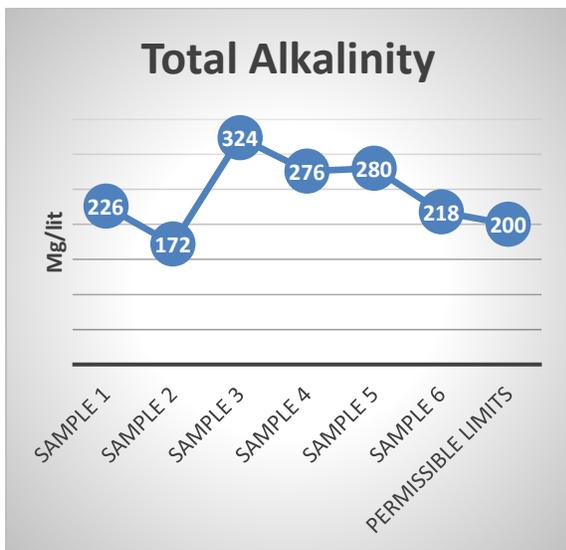
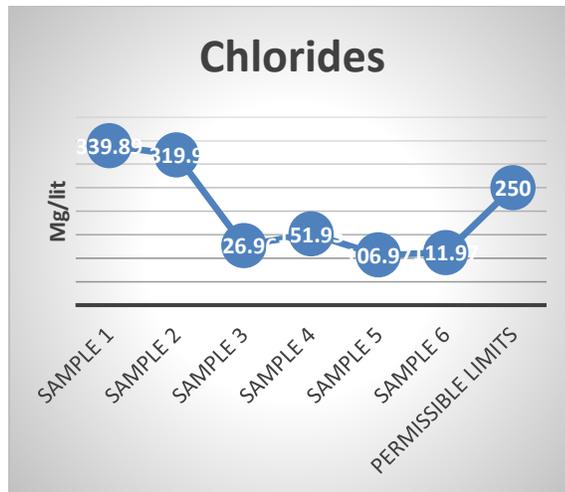
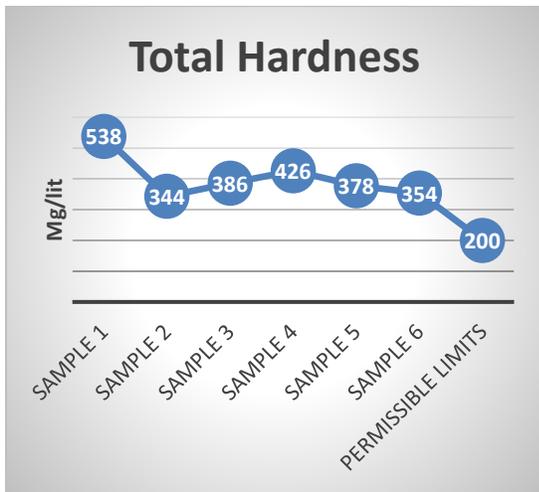
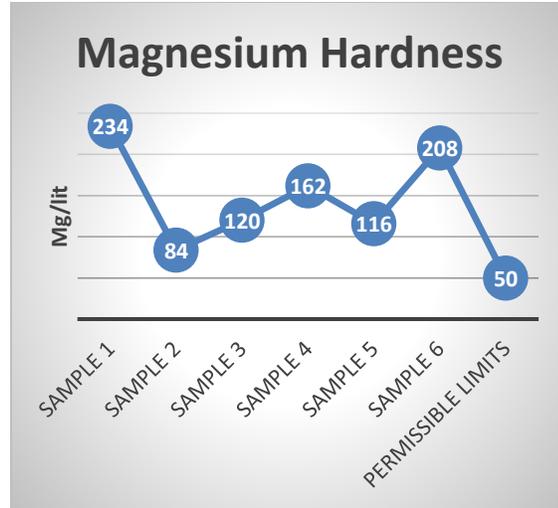
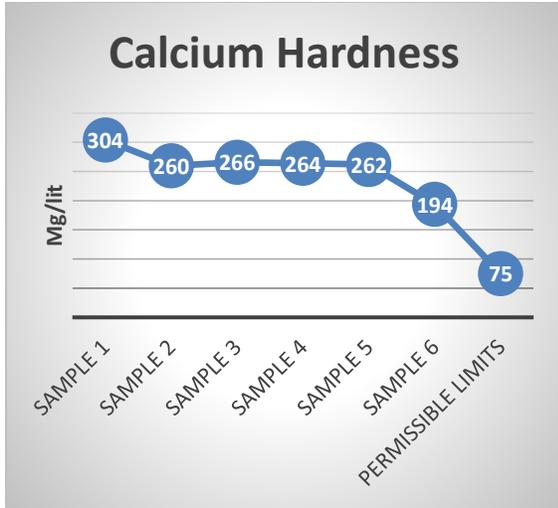


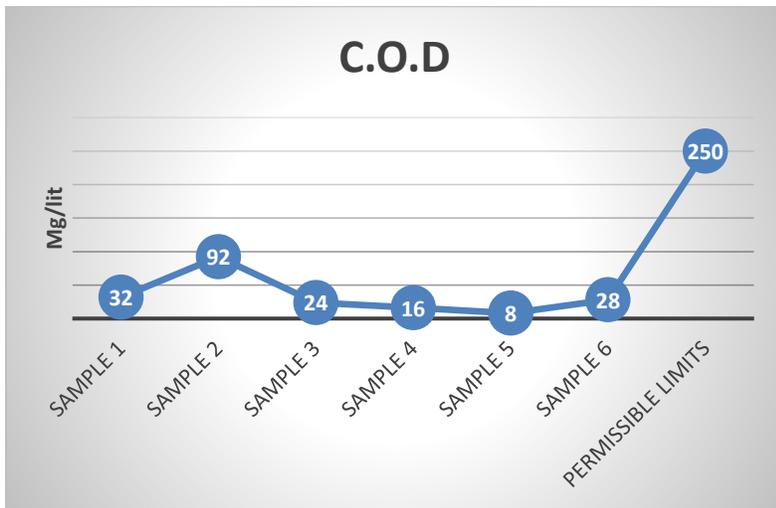
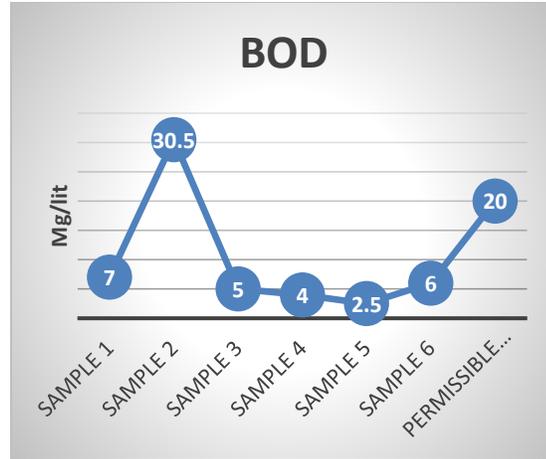
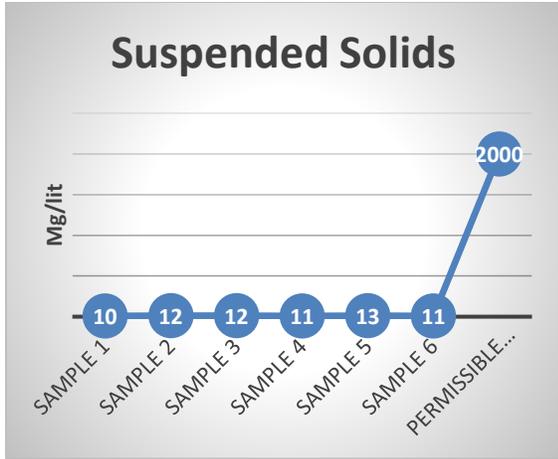




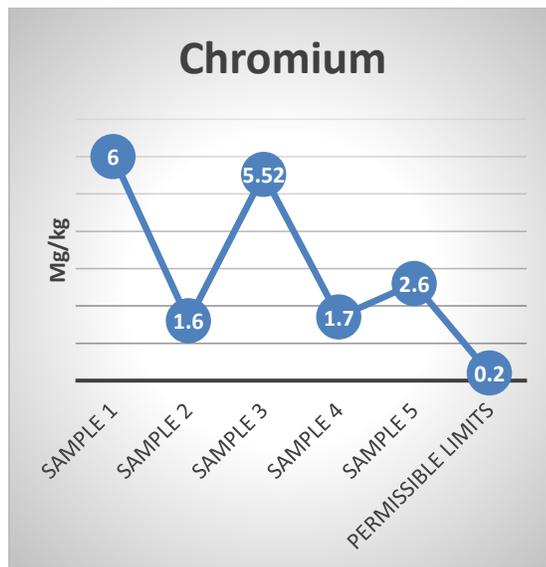
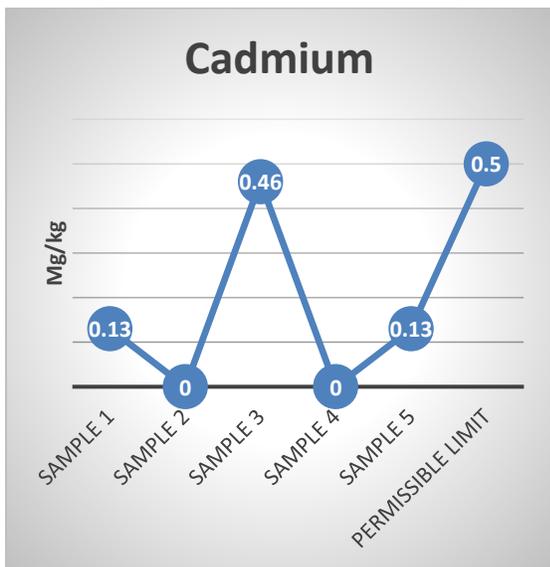
Comparison of Water Samples tested by Joint Committee in 2023

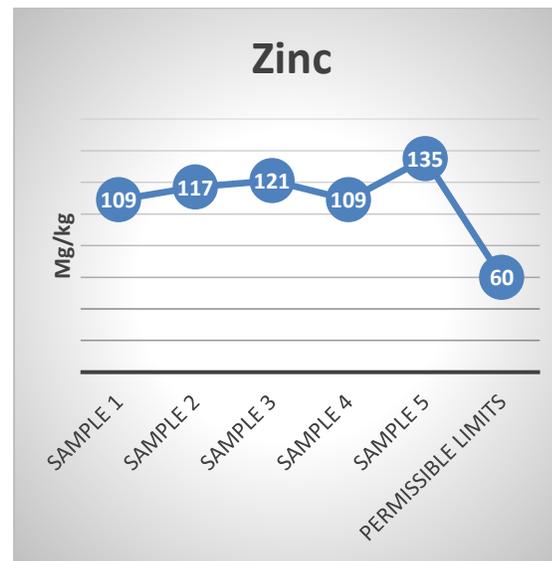
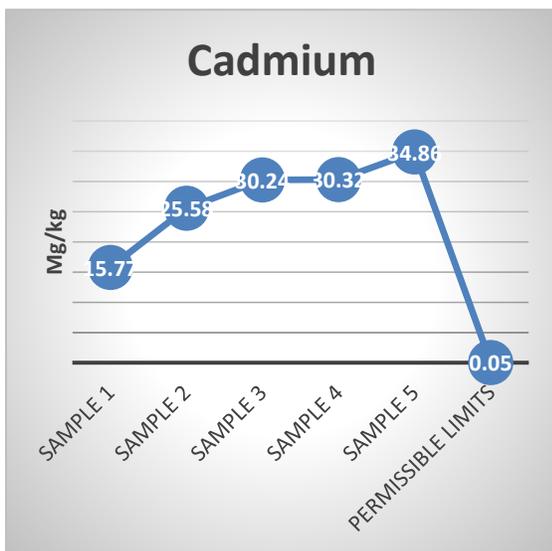
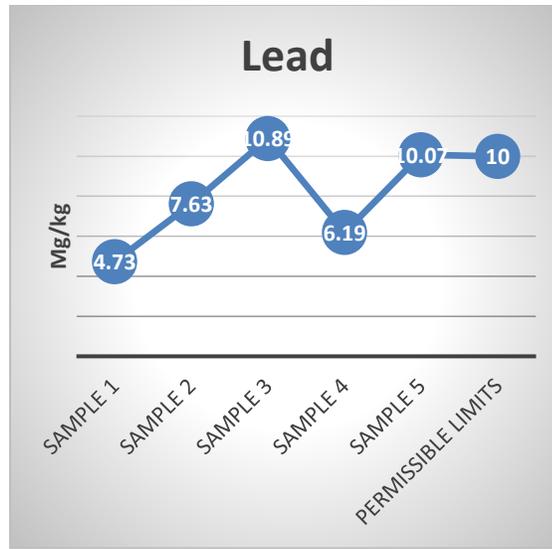
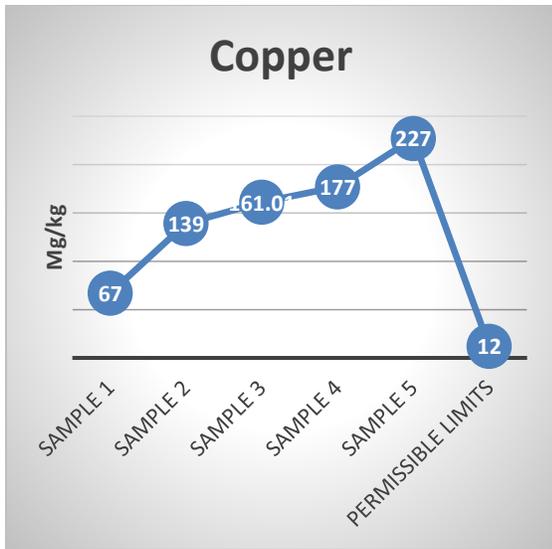




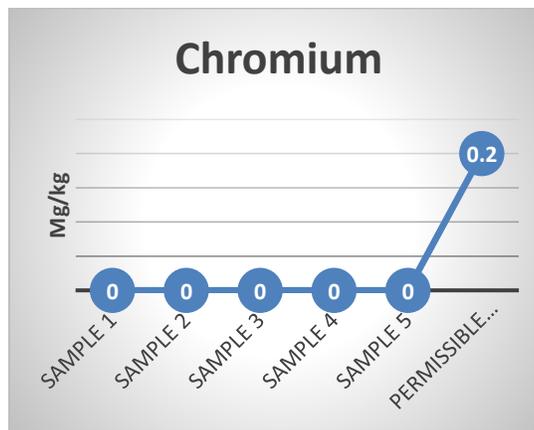
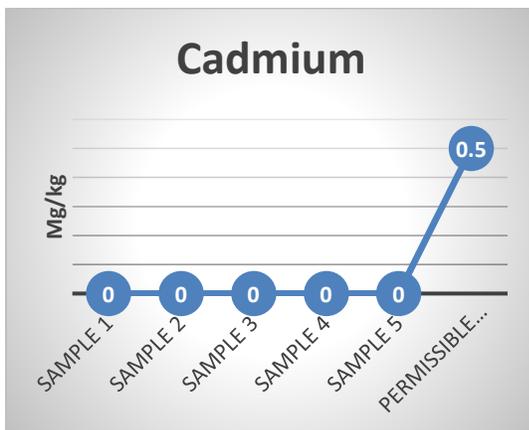


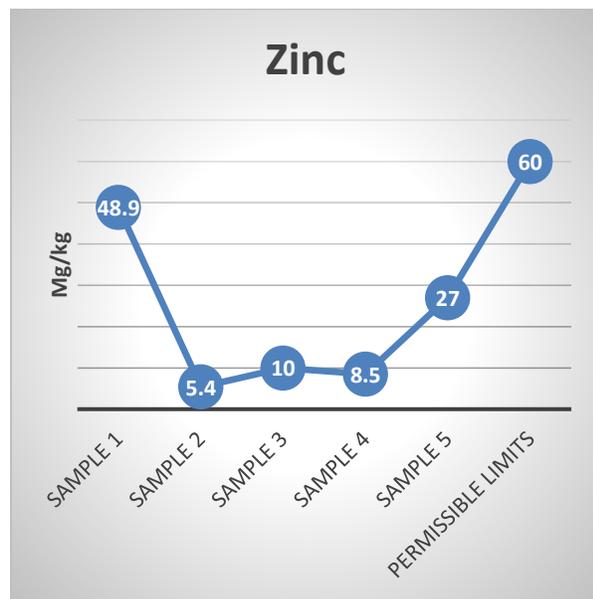
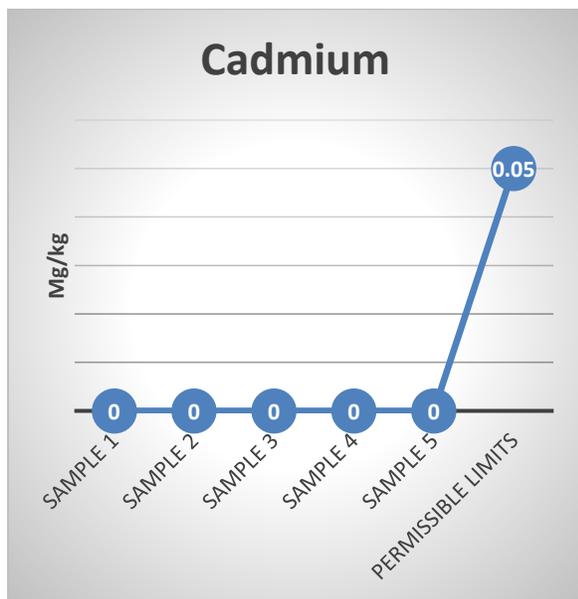
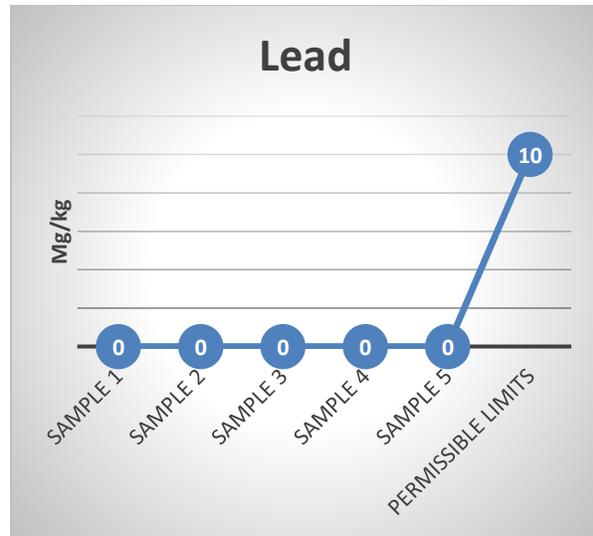
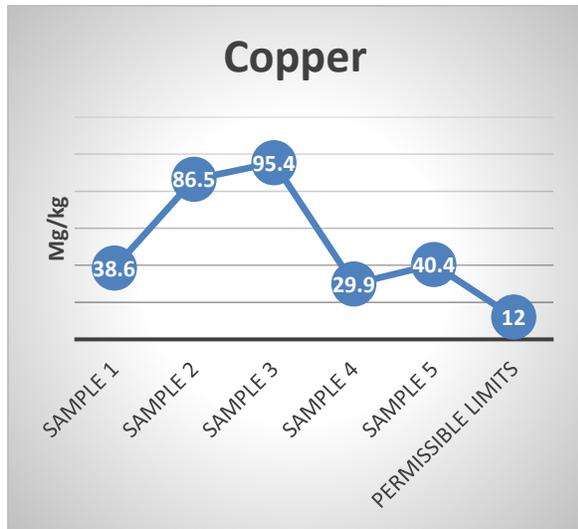
Comparison of Soil Samples tested by MPCB in 2018





Comparison of Soil Samples tested by Joint Committee in 2023:





Chapter 13

Overall Summary of the damages happened:

1. Overall contamination of the land, in the 20 acres which is directly mixed with the 1000 tankers of the contaminant, as well the nearby huge are on and well below the ground due to spread of the contaminant
2. Overall contamination of the water bodies Seasonal, confined and unconfined aquifers beneath the ground.
3. A huge area of the nearby land in 360° direction on and below the ground, Where a proper investigation of the affected spread is much required.
4. Damages to the livestock of the farmers, where the death of animals and health of the animals is affected severely
5. Damages to the human health of the habitants of the village
6. Damages to the productivity of the land, specifically the poisonous yields which might also have affected the nearby cities where the yields has been supplied.
7. Damages to the environment and future hazards due to continuous spread of these contaminants through the ground. (No actions have been reported or discussed by any investigators here till date to recover and reinstate the land in its original state)
8. Damages to the affected humans who have experienced much miseries during this course of time, fears, unsafe habitat, financial inabilities to earn, added expenses due to medical issues; damages to the family members either in the form of permanent disability or deaths.

Chapter 14**Remarks on the activities required and tentative minimum expenses required to be performed at this site:**

Sr. No.	Activity required	Min. tentative required expense as on date (in crores)
1	Proper investigation of the site, so as to arrive upto the actual spread of the contaminant in the ground, laterally as well as vertically.	5
2	Indicative benchmarking, mapping of the spread of the contaminants, including identification of the contaminant at source, identifying the overall spread in terms of the volume of the soil / rock mass affected by the said contaminant. Overall understanding of the actual volume affected, its potential hazards, environmental impact assessment, and deriving a proper methodology for reinstating this land to its original state.	2
3	Actual remedial measures to be taken at the present site (directly or indirectly affected) through appropriate techniques, under the strict supervision and ensuring all the activities through proper activity logs and signatures of the responsible persons.	This is completely dependent on above to activities, However, looking at severity of this matter if the infected soil mass has to get replaced entirely, a figure of at least 400 to 800 cr shall be accounted. (e.g., 200 acres of land affected till depth 30m = $809371\text{m} \times 15\text{m} = 12140565 \text{ cu.m.}$ with avg rate of excavation of upto 400rs per cu.m. the cost of excavation shall be $12140565 \times 400 = 485,62, 26,000 / \text{rs.}$) i.e.

		485.62 cr
4	Transportation and Appropriate disposal of the contaminated soil mass adhering to the environment regulations	This shall be a complete process of identification of the disposal site, making arrangements like landfill etc. tentative cost can be varying depending on which solution is appropriate and how far the disposal is proposed. Let's say its 30% of the cost incurred in above item (i.e. 120 to 240cr)
5	Refilling of the land with select fill which is not affected by the contaminant	700 to 1000 cr.
6	Investigation of the site upon completion of the remediation where it has to be ensured that the desired purpose if reinstating the site to its original state has been solved.	2
Total		1229 to 2049 Crores

The present scenario at Pathri and possible way to reach upto the right compensations to the environment as well as the affected Habitants:

Looking at the above case scenario following things can be considered towards calculation of the expenses/compensations/land remediation

1. The action should begin with identification of the responsible parties for this contamination
2. A complete cost required to remediate the land is needed to be identified through proper investigations as showcased in Chapter No. 14
3. Following to which the losses in various forms are required to be identified in various expert studies as given in Chapter No.13
4. Understanding overall expenses required and the compensations to be made, the total expenses shall be recovered from the responsible parties for this contamination.



(Authorised Signatory)

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End of the report