

FINAL ACTION TAKEN REPORT

In the matter of O. A. 669 of 2018, Marvada Amrutlal Becharlal Vs. State of Gujarat - Ashapura Group of Companies, Kutch, order dated 03/09/2019.

COMPLIANCE W.R.T. NGT ORDER DATED 03/09/2019

- Unit has been inspected by the GPCB officials on dated 17/09/2019 with reference to Hon'ble NGT, Principal Bench, New Delhi, OA No. 669/2018 order dated 03/09/2019.
- GPCB has also undertaken inspection of the land/revenue records on 16/10/2019 to ascertain if the sites where the gypsum has been dumped are government lands or not.
- GPCB has appointed Pollucon Laboratories Pvt. Ltd. to carry out soil and ground water sampling and ascertain the level of contamination around the premises and the locations where gypsum has been dumped.
- GPCB has issued a conditional Revocation Order to the Closure dated 27/09/2019 for three months in light of the study undertaken by the unit with the help of M/s Kadam Environmental Consultants for groundwater restoration and in light of the proper disposal of gypsum as per CCA conditions after neutralization with fresh hydrated lime.
- Furthermore, after receiving the report of both M/s Kadam and Pollucon, GPCB has issued a Notice of Directions dated 18.11.2019 directing the industry:
 - To execute the restoration/remediation of ground water within 3 months;
 - To remove the gypsum from all the remaining locations within 3 months; and
 - To submit monthly progress reports for the same to GPCB;failing which the unit will be closed without further notice.

REGARDING PROSECUTION:

- The prosecution is filed in the court of Bhuj on 20/05/2019, Case No. 1696/2019 as "A complaint under S.15 of The Environment Protection Act, 1986 on account of violation of environmental norms & non-compliance of conditions enumerated in CC&A". The summons/Notice served on 27/09/2019 & Advocate of unit had submitted his Vakalatnama. As per the last hearing on 16/11/2019, the proceedings are on the stage of plea and the next date of hearing is scheduled to be on 27/12/2019.

REGARDING THE ENVIRONMENT COMPENSATION:

- In compliance with the order dated 17/09/2009 passed by the High Court of Gujarat in Special Civil Application No. 9699/2008, GPCB has submitted a file on 20/12/2018 before the District Collector for the constitution of a District Level Compensation Committee to assess the amount of compensation for environmental losses, agricultural

losses, etc pollution caused by M/s. Ashapura Perfoclay Ltd. The said Committee has been constituted and is under the process of ascertaining the said damages.

- However, in the interregnum, the environment compensation imposed on industry of amount Rs.97,50,000/-, the amount is calculated taking into consideration the report of the CPCB formed in-house committee and Report on methodology for assessing environmental compensation and action plan to utilize the fund is prepared by CPCB in reference Hon'ble NGT order in matter of O.A. No. 593/2017 and the unit has paid compensation against Environment damage/loss of amount of Rs.97,50,000/- as per order no. PC/CCA-KUTCH-27(13)/GPCB ID-17774/510577 dated 19/06/2019.
- In addition to this, GPCB has forfeited bank guarantee of Rs.15 Lakhs.
- Furthermore, an additional bank guarantee of Rs.30 Lakhs has been taken from the industrial unit.

REGARDING GROUNDWATER CONTAMINATION & RESTORATION:

- As per the earlier analysis report of GPCB dated 17/09/2019, which has also been confirmed by the final report of M/s Kadam Environmental Consultants, Ammonia contamination is observed in different bore-wells in the vicinity of industrial unit. The source of ammonia contamination in ground water may be due to use of lime from "Gujarat Narmada Valley Fertilizers & Chemicals Ltd (hereinafter "GNFC") and improper (Kachha pond) storage of wastewater. The said analysis reports under which a total of 10 bore-wells samples were collected in the vicinity of unit, the contamination of ground water is present.

Remedial Measures:

a) Elimination of Source of Contamination:

- The unit is now using fresh lime and has stopped using lime from GNFC.
- Unit has provided RCC pond for storage of wastewater and converted the kaccha pond into a pucca pond.

b) Restoration of contaminated of groundwater:

- As mentioned in the Interim Action Taken Report submitted before this Hon'ble Tribunal on 15/10/2019, GPCB had approached to the Head of Department, Environmental Engineering Section, Faculty of Technology & Engineering, The MS University, Baroda-Gujarat for the report on "*Detailed study with remedial action/complete solution for contamination of Groundwater as well as Soil by M/s. Ashapura Perfoclay Ltd, Survey No. 167, Village: Ler, Ta: Bhuj-Kutch.*" However, MS University was not able to

conduct the said study and GPCB had to appoint another institution for conducting the same.

- Promptly, on 18/10/2019, GPCB engaged the services of ‘Pollucon Laboratories Pvt. Ltd.’ to carry out soil and ground water sampling and ascertain the level of contamination thereof.
- The Report of Pollucon on “*Study on groundwater as well as soil from peripheral of M/s Ashapura Perfoclay Ltd.*” was received by GPCB with the following observations:
 - “M/s. GPCB assigned work for detailed study with remedial action/complete solution for contamination of Groundwater as well as Soil by M/s. Ashapura Perfoclay Ltd, Survey No. 167, Village: Ler, Ta: Bhuj-Kutch to M/s. Pollucon Laboratories Pvt. Ltd.-Surat
 - M/s. Pollucon Laboratories Pvt. Ltd.-Surat carried out the sampling during 21/10/2019 to 23/10/2019 and analysed gypsum, ground water as well as soil samples to see the impact of the contamination on ground water and soil with respect to specific parameters.
 - Ground water samples are collected from the surrounding bore wells from various locations including reference samples & unit's borewells- total 31 Nos. and total 7 Nos. of Gypsum samples are collected from the surrounding area of the unit and various locations where gypsum was dumped.
 - **Results of Ground water Analysis**

Sr. No.	Parameters	Location 1 to 10 (approximate Within 1.5 km at distance from M/s. Ashapura Perfoclay Ltd.)	Location 11 to 30 – except 20, 21, 27 & 31 (approximate 2 to 8 km at distance from M/s. Ashapura PerfoclayLtd.)	Location 20, 21, 27 & 31 approximate 8 to 10 km at distance from M/s. Ashapura Perfoclay Ltd.)
		Results		
1.	Ammonical Nitrogen	Ranging from 0.34 to 16.10 mg/l	Ranging from 0.38 to 6.20 mg/l	Ranging from 0.42 to 1.20 mg/l
2.	Total Dissolved Solids	Ranging from 1620 to 5285 mg/l	Ranging from 509 to 4211 mg/l	Ranging from 618 to 1415 mg/l

- While comparing above results with IS 10500:2012 Drinking Water, some of the bore well water is not suitable for drinking purpose.”

The Report of Pollucon Laboratories on “*Study on groundwater as well as soil from peripheral of M/s Ashapura Perfoclay Ltd.*” is annexed herewith as ANNEXURE A.

- As per the Interim Action Taken Report, the unit had appointed M/s. Kadam Environmental Consultants for conducting the ground water quality restoration and geo-hydrological study as per the Revocation conditions vide Notice dated 27/09/2019 and an interim report was submitted. M/s Kadam Environmental Consultants have now submitted the final report titled “*Groundwater Remediation Action Plan at Ashapura Perfoclay Limited, Bhujodi, Bhuj, Kutch District*” with the following observations:
 - Presence of Ammonical nitrogen and nitrate in groundwater may be due to use of impure lime in neutralization process in the past and use of fertilizer (Urea) in agricultural lands.
 - Elevated levels of total dissolved solids, chloride, Sulphate, Nitrate etc. may be due to local geology.

In light of the high levels of Ammonical nitrogen found in the ground water, the Report provides for a time bound action plan for remediation thereof which is annexed as Annexure 9 in the said Report.

The Report of M/s Kadam Environmental Consultants titled “*Groundwater Remediation Action Plan at Ashapura Perfoclay Limited, Bhujodi, Bhuj, Kutch District*” is annexed herewith as ANNEXURE B.

REGARDING SOIL CONTAMINATION AND RESTORATION.....

- Alongwith the ground water study, GPCB also directed Pollucon to undertake soil sampling and analysis to determine the level of contamination therein due to dumping of gypsum. As per the Final Report submitted by Pollucon, the following observations/findings are made with respect to soil contamination:
 - The soil samples are collected from 38 locations (total nos. of sample collected are 110 nos. and sampling done from top soil, 1 Meter, and 2 Meter depth as per the map describing the site of gypsum dumping given by GPCB. (Ref. Annexure-3 &4).
 - To study the impact around approximate 10 km of area is considered. Gypsum dumping is done by M/s. Ashapura perfoclay Ltd, Bhuj-kutch around approx. 8 km. (Ref. Annexure-3 & 4 as per documents provided by GPCB).
 - For more clarity and evaluation reference sample may be useful at

some extent. Preliminary reference samples collected for 4 nos. of water samples and 3 nos. of soil from distance of approximate more than 8 kms from M/s. Ashapura Perfoclay Ltd., Survey No. 167, Village – Ler, Tal. – Bhuj, Kutch.

- Total 6 Nos. of gypsum sample were collected at different dumping site and 1 sample collected from gypsum storage area within factory premises. Gypsum is analyzed and analyzed parameters are with the norms. (Test Report No.- PLPL/130703009 and dated 03.07.2013)
- “Gypsum from this source can be categorized as non-hazardous.” As per the MoEF vide letter no. F no. 23-161/2014-HSMD, dated 17/10/2014.
- Following observation given by Department of Agriculture Chemistry & Soil Science Junagadh Agriculture University for gypsum: “Different methods and levels of gypsum application to cotton crop improves the seed cotton, stalk yield and seed yield but unable to reach the level of significance, but the S status of soil after harvest of the crop increased significantly.”
- Soil samples testing results of parameters such as pH, Heavy metals, Na and K are found to be more or less in the range of the samples collected from distance between 8 to 10 kms from M/s. Ashapura Perfoclay Ltd.
- To identify the pollutants, manufacturing details is referred as per the mail of GPCB dated 18th Oct, 2019. Looking to such details of manufacturing process, the probable inorganic pollutants studied.
- Gypsum analyzed for its chemical and other parameters. Most probable pollutant ammonia is within the norms of Waste constituents with concentration limits as per Class A: Based on leachable concentration limits of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as per Note I of Schedule II.

➤ **Results of Soil Analysis:**

Sr. No.	Parameters	Approximate 8 km distance from M/s. Ashapura Perfoclay Ltd.	Approximate 8 to 10 km distance from M/s. Ashapura Perfoclay Ltd.
		Results	
1.	pH	Ranging from 7.53 to 9.89	Ranging from 8.50 to 9.33
2.	Electrical Conductivity	Ranging from 0.02 to 3.44 ms	Ranging from 0.07 to 6.63 ms
3.	Ammonia (TCLP)	Ranging from 0.39 to 2.58 mg/l	Ranging from 0.66 to 1.13 mg/l

REGARDING GYPSUM DISPOSAL

- Gypsum has been dumped on a total of 35 locations by the industrial unit out of which gypsum has been lifted from 7 locations by the unit.
- As per the directions of the Order dated 03/09/2019 of the Hon'ble NGT, GPCB was directed to ascertain if the land where the gypsum has been dumped are government owned or private owned. In respect of this, the revenue records of the remaining 28 locations were inspected out of which 17 are government owned lands and the rest are private owned lands. It is however pertinent to note herein the unit has submitted affidavits of persons in possession of 27 locations out of the total 35 to GPCB, which state that these persons have no objection to the gypsum lying on the land which is in their possession and that such gypsum is useful for them due to its soil conditioning properties.
- As a result, GPCB has issued a Notice of Directions dated 18/11/2019 requiring the industry to:
 - *To execute the action plan submitted, for restoration/remediation of contaminated ground water within a period of three (3) months from the date of issuance of this notice;*
 - *To immediately remove gypsum dumped at various sites outside the premises & clear all the sites as per consented conditions within a period of (3) three months from the date of issuance of this notice;*
 - *You are hereby directed to submit progress report to above mentioned points by the 18th of December 2019, 18th January 2020 and final report by 18th February 2020 failing which direction of closure will be issued without further notice to you.*

The Notice of Directions dated 18/11/2019 issued by GPCB to the industry is annexed herewith as **ANNEXURE C**.

- GPCB will carry out monthly inspections to verify the progress and issue any further directions to the unit, if necessary.

**“STUDY ONGROUNDWATER AS WELL AS SOIL
FROM PERIPHERIAL OF M/S. ASHAPURA
PERFOCLAY LIMITED (ASHAPURA GROUP OF
COMPANIES, KUTCH)”**

For

M/S. GUJARAT POLLUTION CONTROL BOARD (GPCB)

**KATIRA COMMERICAL COMPLEX-1,
NEAR MANGLAM CHAR RASTA,
SANSKAR NAGAR, NEAR INCOMETAX OFFICE
BHUJ 370001 (WEST)**

OCTOBER-2019

Prepared By:



Pollucon Laboratories Pvt. Ltd.
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**“STUDY ONGROUNDWATER AS WELL AS SOIL
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NEAR MANGLAM CHAR RASTA,
SANSKAR NAGAR, NEAR INCOMETAX OFFICE
BHUJ 370001 (WEST)**

OCTOBER-2019

For and on behalf of Pollucon Laboratories Pvt. Ltd., Surat.

Approved by : Dr. ArunBajpai

Signed : 

Designation : Lab Manager (Q)

Year : Oct-2019



This report is prepared by PolluconLaboratoriesPvt. Ltd. with all reasonable skills, care and diligence, incorporating our General Terms and Conditions of Business and taking account of the resources devoted.

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1. HISTORY OF PROJECT

M/s. AshapuraPerfoclay Ltd, Survey No. 167, Village: Ler, Ta: Bhuj-Kutch is engaged in manufacturing of Bleaching Earth from Bentonite mineral. Unit has obtained Consolidated Consent and Authorization (CC&A) of the Board for manufacturing of Bleaching clay 12000 MT/Month; vide order no. AWH-93521, dated 11/06/2018 valid up to 24/06/2023

During the bentonite activation, spent sulphuric acid is generated. The first wash of spent sulphuric acid is sent to M/s. IFFCO Ltd, Kandla for further utilization. Further, the subsequent second & third wash which is dilute sulphuric acid is being neutralize with hydrated lime, resulting in generation of chemical Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) which is separated in the filter press and as per CC & A condition gypsum shall be sent to cement industry for co-processing.

Unit has dumped gypsum at various places outside the premises (total 35 locations nearby unit within 10 km).

Please find enclosed documents in Annexures

- a) Status of gypsum at 27 locations(Annexure-3)
- b) Details of identified location by applicant(Annexure-4)
- c) NGT Order(Annexure-2)
- d) CC&A(Annexure-5)

2. INTRODUCTION
OF
M/S. ASHAPURA PERFOCLAY LTD.

INTRODUCTION OF M/S. ASHAPURA PERFOCLAY LTD.

M/s. AshapuraPerfoclay Ltd, Survey No. 167, Village: Ler, Ta: Bhuj-Kutch is engaged in manufacturing of Bleaching Earth from Bentonite mineral. Unit has obtained Consolidated Consent and Authorization (CC&A) of the Board for manufacturing of Bleaching clay 12000 MT/Month; vide order no. AWH-93521, dated 11/06/2018 valid up to 24/06/2023

During the bentonite activation, spent sulphuric acid is generated. The first wash of spent sulphuric acid is sent to M/s. IFFCO Ltd, Kandla for further utilization. Further, the subsequent second & third wash which is dilute sulphuric acid is being neutralize with hydrated lime, resulting in generation of chemical Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) which is separated in the filter press and as per CC & A condition gypsum shall be sent to cement industry for co-processing.

The distance of the unit is 10 km from the Bhuj& approximate time to reach the unit is around 30 minutes.

3. INTRODUCTION
OF
POLLUCON LABORATORIES PVT. LTD.

INTRODUCTION

Pollucon Laboratories Pvt. Ltd., Plot No.5/6 "Pollucon House",Opp.Balaji Industrial Society,OldShantinathSilk Mill Lane,NearGaytriFarsan Mart, NavjivanCircle,UdhanaMagdalla Road, Surat-395007, Gujarat, India have been in the analytical field since long time and have adequate expertise, Trained man power and required infrastructure to render the uninterrupted service; Backed by a dedicated team we intend to give you a comprehensive analytical service with statutory interpretation and timely information vital for addressing the regulatory compliance.

We have so far a proven track record for successfully giving such services to various power plants , chemical factories and large scale set up and always met their demand for timely and effectively attendance to address the compliance solutions.

Apart from such set up as stated above following are our credential:

Laboratories are recognized by Ministry of Environment & Forest, Government of India, New Delhi under the EPA- article 12 A. along with the recognition by GPCB as Environmental Auditors under the Honorable High Court; GujaratOrders.

Laboratory set up is having recognition from NABL (National accreditation board for Laboratories) under the ministry of Science &Technology as per ISO 17025:2017 for the relevant scope.

Entire administration and operations of the Laboratory is as per ISO 9001:2015, OHSAS 18000 & EMS ISO 14001 quality systems and is certified by TUVconsultants.

4. SAMPLING LOCATIONS

4.1. SAMPLING LOCATIONS FOR SOIL

SR.NO.	SAMPLING LOCATIONS FOR SOIL
S-1	SURVEY NO. 205
S-2	SURVEY NO. 164
S-3	SURVEY NO. 163
S-4	NEAR GATE NO. 2 AT ASHAPURA VALUCLAY
S-5	BESIDE LEHRIYA HANUMAN TEMPLE (SR.NO 3 AS PER ANNEXURE-3)SAMPLE TAKEN 50 MTR AWAY IN DOWN STREAM
S-6	NEAR LEHRIYA HANUMAN TEMPLE SAMPLE TAKEN 100 MTR AWAY IN DOWN STREAM OF SR NO 1 & 3 (ANNEXURE -3)
S-7	LAND OF HITUBHA JADEJA (ANNEXURE -3_27 & ANNEXURE - 4_5,5.1) DOWNSTREAM - 30 MTR @ SR. 27, 5,5.1
S-8	DOWNSTREAM - 10 MTR @ SR. NO- 3 OF ANNEXURE 4)
S-9	DOWNSTREAM - 100 MTR @ SR. NO- 13 OF ANNEXURE 3) FARM ON LAKHOND LAND ROAD
S-10	LOCATION DOWNSTREAM @ 50 MTR FROM SR. NO
S-11	DOWNSTREAM - 50 MTR @ SR. NO- 17 OF ANNEXURE 3) CHINA CLAY MINES VASTABHAI
S-12	DOWNSTREAM - @ SR. NO- 2 OF ANNEXURE 3) OPPOSITE OF LEHRIYA HAUNMAN TEMPLE
S-13	DOWNSTREAM - @ SR. NO- 4 OF ANNEXURE 3) OLD STONE MINES OF PRAKASH PATEL
S-14	DOWNSTREAM - @ SR. NO- 5 OF ANNEXURE 3) BEHIND KHATRI MILL
S-15	BESIDE OF WATER TANK OF GWIL SUMP SR.NO 6 @ ANNEXURE -3
S-16	SR.NO 21 (ANNEXURE-3)NR. MATIYADEV MANDIR
S-17	SR.NO 22 (ANNEXURE-3)LAND BETWEEN SWAMINARAYAN WADI AND WATER TANK GWIL
S-18	SR.NO 23 (ANNEXURE-3)NATURAL DRAIN NR SANJOTNAGAR B/H SWAMINARAYAN WADI
S-19	SR.NO 24 (ANNEXURE-3)NORTH SIDE OF SWAMINARAYAN WADI
S-21	NEAR DARGAH LAKHOND (SR. NO 1 & 2 @ ANNEXURE -4)
S-22	BOREWELL OPPOSITE TO GWSSB LAKHOND – REFERENCE SAMPLE
S-23	AFTER TOLL GATE LEFT SIDE (SR NO. 3 ANNEXURE - 4)
S-24	OPPOSITE PADDHAR POLICE STATION (SR. NO 19 @ ANNEXURE -3)
S-25	AFTER PADDHAR POLICE STATION RIGHT SIDE 50 MTR DOWNSTREAM (SR. NO 18 @ ANNEXURE -3)
S-26	PADDHAR GAM – REFERENCE SAMPLE
CONTINUE...	

SR.NO.	SAMPLING LOCATIONS FOR SOIL
S-27	Sr.No 8 & 9 (Annexure-3)Vavdi Village
S-28	SHREEJI FARM , VAVDI – REFERENCE SAMPLE
S-29	DINESH MAHARAJ @ SR. NO7 (ANNEXURE-3)
S-30	DOWNSTREAM OF KUKMA-LAKHOND ROAD LHS (SR. NO 10 @ ANNEXURE -4)
S-31	GIR GAUDHAM ROAD SIDE SR. NO 11(ANNEXURE-3)
S-32	BEHIND ASHAPURA FOUNDATION SCHOOL SR.NO-12 (ANNEXURE-3)
S-35	DOWNSTREAM @ 50 MT SR. NO 26 (ANNEXURE -3) PITHORA MANDIR
S-36	DOWNSTREAM @ 100 MT SR. NO 25 (ANNEXURE -3) BESIDE BALUBHA RATHOD LAKE
S-37	SR. NO 20 (ANNEXURE -3) B/H BALAJI PETROL PUMP
S-38	DOWNSTREAM @ 50 MT SR. NO 4.1 (ANNEXURE -4) AT SHEIKHPIR PARLE ROAD
S-39	DOWNSTREAM @ 50 MT SR. NO 4 (ANNEXURE -4) AT SHEIKHPIR PARLE ROAD
S-40	DOWNSTREAM @ 50 MTSR. NO 7 (ANNEXURE -4) AT MANGAL MANDIR SCHOOL
S-41	DOWNSTREAM - 30 MTR OF SR.NO 8 (ANNEXURE-4) @VAKALMATA MANDIR
S-42	DOWNSTREAM OF SR.NO 6 (ANNEXURE-4) @VAKALMATA MANDIR

4.2. SAMPLING LOCATIONS FOR GROUNDWATER

SR.NO.	SAMPLING LOCATIONS FOR GROUND WATER
GW-1	NR GATE NO. 2
GW-2	SAMAVANDH SAMITI
GW-3	APL ADMIN
GW-4	LEHRIYA HANUMAN
GW-5	RAMESH PINDORIYA
GW-6	VASUDEV PINDORIYA
GW-7	GOVIND HIRJI GORASIA
GW-8	RANUBHA JADEJA
GW-9	HETUBHA JADEJA
GW-10	LAKHOND - GRAM PANCHYAT
GW-11	KUKMA-GWIL
GW-12	KANCHAN VADI-SHROFF FARM
GW-13	SWAMINARAYAN WADI
GW-14	SHIVUBHA JADEJA
GW-15	SECOND BOREWELL LAKHOND- GRAM PANCHYAT
GW-16	JAKHOBHAI HIRABHA BARADIYA- LAKHOND
GW-17	SHAVJIBHAI NARANBHAI BARADIYA- LAKHOND
GW-18	PANCHABHAI VELABHAI KOTIVAR-LAKHOND
GW-19	TOLL PLAZA LAKHOND
GW-20	GRAM PANCHYAT-PADDHAR (NEAR SAMSAN) – REFERENCE SAMPLE
GW-21	GRAM PANCHYAT-PADDHAR (NEAR TANK) – REFERENCE SAMPLE
GW-22	DINESHMAHARAJ WADISR.NO-7 (ANNEXURE-3)
GW-23	VAKALMATA MANDIR SR- 8 (ANNEXURE 4)
GW-24	BOREWELL NR SR.NO 4 (ANNEXURE 4) NR. PARLE
GW-25	BOREWELL OF GOVINDBHAI MAJOR AHIR (SR. NO 18 ANNEXURE-3)
GW-26	BOREWELL CHINACLAY MINES (SR. NO 17 ANNEXURE - 3)
GW-27	BOREWELL OPPOSITE TO GWSSB LAKHOND – REFERENCE SAMPLE
GW-28	SHYAMJI VELJI GORASIA (BW4)
GW-29	BOREWELL OF GOVIND BHAI PATEL OPPOSITE DREAM RESORT
GW-30	BOREWELL OF VALABHAI AHIR @ VILLAGE VAVDI (SR. NO 8&9 ANNEXURE 3)
GW-31	BOREWELL OF JAY THAKKAR (SHREEJI FARM) @ VILLAGE VAVDI – REFERENCE SAMPLE

4.3. SAMPLING LOCATIONS FOR GYPSUM STORAGE

SR.NO.	SAMPLING LOCATIONS FOR GYPSUM
1	ASHAPURA PERFOCLAY SURVEY NO.167
2	COMPOSITE SAMPLE OF BESIDES LEHRIYA HANUMAN TEMPLE, KUMKA VILLAGE
3	DOWNSTREAM OF NEAR BLOCK FACTORY, VILLAGE: LER
4	AT SHEKHPIR PARLE ROAD
5	AFTER PADHAR POLICE STATION RIGHT SIDE 50 M (ON GOVERNMENT LAND ON PADHDHAR VILLAGE)
6	VAVDI VILLAGE, OPPOSITE TO SURVEYNO: 85/1
7	NATURAL DRAIN BETWEEN FARM OF DINESH MAHARAJ AND GOVIND VANKER, SURVEY NO : 218, KUMKA VILLAGE

To evaluate the condition, in absence of any prescribed limit and earlier data for comparison, some reference sample may be useful. Evaluation of the reference sample will be based on numbers of scientific method and it will be varied compare to each methodology. In absence of any such ready data, sample is collected from some distance from the contaminated site, which will give some idea for the comparison, which is not actual reference but may be useful for some evaluation.

5. SAMPLING AND ANALYTICAL METHODS

Sampling and analytical methods are the important criteria for any tests and analysis as the accuracy of test results are dependent on the test methods selected for sampling and analysis besides the experience of the personnel. We have adopted IS (Indian Standards Methods), USDA (United States Department of Agriculture) & other standard methods for sampling and analysis.

Test Method for Soil analysis:

SR. NO.	PARTICULAR	TEST METHOD
1	pH	SOP's based on Soil Manual, IS, USEPA
2	Moisture	
3	Electrical Conductivity	
4	Copper as Cu	
5	Nickel as Ni	
6	Zinc as Zn	
7	Cadmium as Cd	
8	Lead as Pb	
9	Chromium as Cr ⁺³	
10	Arsenic as As	
11	Mercury as Hg	
12	Selenium as Se	
13	Cyanide as CN	
14	Texture	
15	Sulphate	
16	Sodium	
17	Potassium	
18	Ammonical Nitrogen	
19	Manganese	
20	Cobalt	
21	Gypsum as CaSO ₄ .2H ₂ O	

Test Method for Water analysis:

SR. NO.	PARTICULAR	TEST METHOD
1	pH Value	IS 3025 (Part – 11) 2002
2	Total Dissolved Solids	IS 3025 (Part-16) 2006
3	Temperature	IS 3025 (Part 9):2002
4	Chemical Oxygen Demand as COD	APHA (22 nd Edition 2012)- 5220 B Open Reflux Method: 2012
5	Biochemical Oxygen Demand as BOD	IS 3025 (Part – 44):2003
6	Ammonical Nitrogen as NH ₃ -N	IS 3025 (Part 34):2009
7	Nitrate Nitrogen	IS 3025 (PART 34):2009
8	Chlorides as Cl	IS 3025 (Part – 32) 2003
9	Colour	IS 3025 (Part – 4) 2002
10	Fluorides as F	APHA (23 rd Edition 2017) 4500 F D
11	SAR	By calculation
12	Sulphates as SO ₄	IS 3025 (Part-24) 2009
13	Total Hardness as CaCO ₃	IS 3025 (Part – 21) 2002
14	Total Kjeldahl Nitrogen	IS :3025 (Part-34):1988 Clause 2.3 (Reaffirmed 2009)
15	Sulphides as S	IS 3025 (Part-29) 2003
16	Lead as Pb	APHA (23 rd Edition 2017) 3111 B
17	Zinc as Zn	APHA (23 rd Edition 2017) 3111 B
18	Iron as Fe	APHA (23 rd Edition 2017) 3500-Fe B
19	Total Chromium as Cr ⁺³	APHA (23 rd Edition 2017) 3111 B

Test Method for Gypsum analysis:

SR. NO.	PARTICULAR	TEST METHOD
1	Gypsum	SOP's based on Hazardous waste Rule, 2016, (CPCB Manual), IS, USEPA

6. QA/QC Procedure

6.1 Scope

The scope of QA plan for the above mentioned study includes a minimum of following elements.

- ❖ preservation
- ❖ Chain of custody
- ❖ Laboratory

6.2 Checklist for analysis and chain of custody

Sample Forwarding

After the registration of sample for analysis, the Draft Test report is prepared and handed over to concerned laboratory in-charge and analytical jobs were allotted to specific scientific staff. The concerned analysts have started the analysis after verifying the integrity of the samples.

Chain of Custody

Chain of custody records is maintained for each sample to accompany the sample or set of samples from the point final analysis.

6.3 Laboratory Analysis

Calibration

The Lab Manager has ensured that all the laboratory instruments are calibrated as per calibration plan.

Documentation

All the raw data have been recorded in the raw data register along with the details relating to the sample identification No., date etc.

Lab has also recorded the details relating various quality check procedures or deviation if any.

6.4 Check List for Sample integrity

Item	Yes or No	If No, reasons and Justification for Acceptance
Is the chain of custody recorded?	Yes	
Is the chain of custody record filled in properly?	Yes	
Is the seal on the sample containers intact?	Yes	
Is the sample received in proper storage condition?	Yes	
Is the sample quantity adequate for required analysis?	Yes	
Checked By: Inspected By: Lab Manager		

Note: It is not necessary that this form be filled in for each sample/ sampling point.
It is sufficient if the deviations if any are recorded.

6.5 Check List for Analysis

Item	Yes or No	If No, reasons and Justification for Acceptance
Was the correct method used for the analysis?	Yes	
Were the correct instruments, equipment and apparatus used for the analysis?	Yes	
Was the competence of the analyst deployed for the analysis verified?	Yes	
Were the instruments, equipment and apparatus used precalibrated as required?	Yes	
Was the sample correctly and adequately identified?	Yes	
Were all the raw data properly recorded in the Raw data register?	Yes	
Were the correct equations and units used?	Yes	
Checked By: Inspected By: Lab Manager		

Note: It is not necessary that this form be filled in for each sample/ sampling point.
It is sufficient if the deviations if any are recorded.

QC CHECK -ICheck List for Quality Check

Sr. No.	Parameters	Comment (Yes or No)	Remark
1.	Sample container labeled properly?	Yes	
2.	Is Sample Container clean & dry?	Yes	
3.	Are proper storage conditions are maintained?	Yes	
4.	The sample quantity is adequate?	Yes	
5.	Is sample properly identified?	Yes	
6.	Is proper type of container used?	Yes	
Inspected By: Lab Manager			

Note: It is not necessary that this form be filled in for each sample/ sampling point.

QC CHECK -IICheck List for Quality Check in the lab

Sr. No.	Parameters	Comment (Yes or No)	Remark
1.	Is the sample details entered into Sample Inventory code?	Yes	
2.	Sample quantity measured	Yes	
3.	Glassware is calibrated	Yes	
4.	Balance / equipments are calibrated	Yes	
5.	Data entered in the raw data register or not?	Yes	
Inspected By: Lab Manager			

Note: It is not necessary that this form be filled in for each sample/ sampling point.
It is sufficient if the deviations if any are recorded.

6.6 Check List of QC for Sampler

Item	Yes or No	If No, reasons and Justification for Acceptance
Was the correct method used for the Monitoring?	Yes	
Were the correct instruments, equipment and apparatus used for the Monitoring?	Yes	
Was the competence of the Field Chemist deployed for the Field Chemist verified?	Yes	
Were the instruments, equipment and apparatus used precalibrated as required?	Yes	
Was the sample correctly and adequately identified?	Yes	
Were all the Filed data properly recorded in the Filed data Sheet?	Yes	
Were the correct equations and units used?	Yes	
Check Instrument used for Sampling Flameproof?	Yes	
Pre Calibration & Post internal Calibration?	Yes	
Checked By: Inspected By: Lab Manager		

7. RESULTS

➤ **Soil Analysis Results:**

Sr. No.	Identification of Sample		Survey No. 205 [#]		
	GPS Co-ordinates		N 23° 12' 27.9" E 69° 43' 13.1"		
	Sampling Date		21/10/2019		
	Parameters	Unit	RESULT		
S1 A (15 cm)			S1 B (1 mtr.)	S1 C (2 mtr.)	
		PLPL/191023167	PLPL/191023168	PLPL/191023169	
1	pH	--	8.82	8.71	8.95
2	Moisture	%	6.25	6.84	6.45
3	Electrical Conductivity	ms	0.220	0.280	0.438
4	Copper as Cu	mg/kg	12.99	12.18	7.27
5	Nickel as Ni	mg/kg	23.25	25.17	24.80
6	Zinc as Zn	mg/kg	36.58	60.00	28.58
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.190	0.130	0.106
16	Sodium	mg/kg	1120	1060	560
17	Potassium	mg/kg	485	626	310
18	Ammonia (TCLP)	mg/L	1.36	0.916	0.526
19	Manganese	mg/kg	411	365	296
20	Cobalt	mg/kg	20.63	22.47	6.62
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.340	0.230	0.190

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Survey No. 164 [#]		
	GPS Co-ordinates		N 23° 12' 07.0" E 69° 44' 22.2"		
	Sampling Date		21/10/2019		
	Parameters	Unit	RESULT		
S2 A (15 cm)			S2 B (1 mtr.)	S2 C (2 mtr.)	
PLPL/191023170			PLPL/191023171	PLPL/191023172	
1	pH	--	8.56	8.87	9.07
2	Moisture	%	7.48	8.23	5.80
3	Electrical Conductivity	ms	0.644	0.146	0.146
4	Copper as Cu	mg/kg	15.59	12.73	15.11
5	Nickel as Ni	mg/kg	25.98	35.94	25.64
6	Zinc as Zn	mg/kg	41.15	41.06	63.72
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.120	0.078	0.041
16	Sodium	mg/kg	464	383	464
17	Potassium	mg/kg	328	158	299
18	Ammonia (TCLP)	mg/L	1.26	0.845	0.711
19	Manganese	mg/kg	483	166	565
20	Cobalt	mg/kg	17.25	13.8	18.07
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.210	0.130	0.073

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Survey No. 163 [#]		
	GPS Co-ordinates		N 23° 12' 07.0" E 69° 44' 22.2"		
	Sampling Date		21/10/2019		
	Parameters	Unit	RESULT		
S3 A (15 cm)			S3 B (1 mtr.)	S3 C (2 mtr.)	
			PLPL/191023173	PLPL/191023174	PLPL/191023175
1	pH	--	8.64	8.76	9.00
2	Moisture	%	4.11	5.72	5.39
3	Electrical Conductivity	ms	0.492	0.905	0.746
4	Copper as Cu	mg/kg	8.11	11.20	9.28
5	Nickel as Ni	mg/kg	25.40	25.54	26.20
6	Zinc as Zn	mg/kg	31.56	54.70	38.88
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.089	0.079	0.066
16	Sodium	mg/kg	54.33	508	310
17	Potassium	mg/kg	45.9	293	188
18	Ammonia (TCLP)	mg/L	0.822	0.960	1.054
19	Manganese	mg/kg	321	448	621
20	Cobalt	mg/kg	10.99	19.52	8.26
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.150	0.140	0.120

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Near Gate No. 2 at Ashapura Valuclay [#]		
	GPS Co-ordinates		N 23° 12' 07.0" E 69° 44' 22.2"		
	Sampling Date		21/10/2019		
	Parameters	Unit	RESULT		
S3 A (15 cm)			S3 B (1 mtr.)	S3 C (2 mtr.)	
		PLPL/191023176	PLPL/191023177	PLPL/191023178	
1	pH	--	8.22	8.9	8.44
2	Moisture	%	6.74	5.33	5.32
3	Electrical Conductivity	ms	3.44	1.14	1.54
4	Copper as Cu	mg/kg	24.99	12.14	11.58
5	Nickel as Ni	mg/kg	25.50	29.39	28.72
6	Zinc as Zn	mg/kg	66.15	47.77	37.22
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.820	0.620	0.460
16	Sodium	mg/kg	1440	796	538
17	Potassium	mg/kg	333	289	116
18	Ammonia (TCLP)	mg/L	1.17	0.910	0.731
19	Manganese	mg/kg	800	385	255
20	Cobalt	mg/kg	23.96	15.08	9.45
21	Gypsum as CaSO ₄ .2H ₂ O	%	1.47	1.11	0.820

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Beside Lehriya Hanuman Temple (Sr.No 3 As Per Annexure-3) Sample Taken 50 Mtr Away In Down Stream [#]
	GPS Co-ordinates		N 23° 13' 25.2" E 69° 46' 20.3"
	Sampling Date		21/10/2019
	Parameters	Unit	RESULT
			S5 A (15 cm)
1	pH	--	8.4
2	Moisture	%	9.27
3	Electrical Conductivity	ms	0.668
4	Copper as Cu	mg/kg	108
5	Nickel as Ni	mg/kg	35.73
6	Zinc as Zn	mg/kg	43.04
7	Cadmium as Cd	mg/kg	Not Detected
8	Lead as Pb	mg/kg	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected
10	Arsenic as As	mg/kg	Not Detected
11	Mercury as Hg	mg/kg	Not Detected
12	Selenium as Se	mg/kg	Not Detected
13	Cyanide as CN	mg/kg	Not Detected
14	Texture	--	Sandy loam
15	Sulphate	%	0.050
16	Sodium	mg/kg	281
17	Potassium	mg/kg	459
18	Ammonia (TCLP)	mg/L	1.56
19	Manganese	mg/kg	704
20	Cobalt	mg/kg	26.66
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.089

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Remark: 1mtr & 2 mtr sample not possible due to stone facia

Sr. No.	Identification of Sample		Near Lehriya Hanuman Temple, Sample Taken 100 Mtr. Away In Down Stream Of Sr No 1 & 3 (Annexure -3) #		
	GPS Co-ordinates		N 23° 13' 26.2" E 69° 46' 24.0"		
	Sampling Date		21/10/2019		
	Parameters	Unit	RESULT		
S6 A (15 cm)			S6 B (1 mtr.)	S6 C (2 mtr.)	
PLPL/191023180			PLPL/191023181	PLPL/191023182	
1	pH	--	8.23	7.96	8.22
2	Moisture	%	6.25	6.18	6.44
3	Electrical Conductivity	ms	0.328	0.303	0.783
4	Copper as Cu	mg/kg	47.20	36.94	34.75
5	Nickel as Ni	mg/kg	34.26	32.00	27.5
6	Zinc as Zn	mg/kg	47.41	82.20	42.60
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.021	0.032	0.016
16	Sodium	mg/kg	633	380	346
17	Potassium	mg/kg	719	127	291
18	Ammonia (TCLP)	mg/L	2.58	1.91	1.43
19	Manganese	mg/kg	35.54	456	608
20	Cobalt	mg/kg	9.27	16.23	18.24
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.037	0.057	0.028

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Land Of Hitubha Jadeja (Annexure -3_27 & Annexure -4_5,5.1)Downstream - 30 Mtr @ Sr. 27, 5,5.1 [#]	
	GPS Co-ordinates		N 23° 12' 07.2" E 69° 45' 35.8"	
	Sampling Date		21/10/2019	
	Parameters	Unit	RESULT	
S7 A (15 cm)			S7 B (1 mtr.)	
PLPL/191023183			PLPL/191023184	
1	pH	--	9.01	8.80
2	Moisture	%	4.57	3.92
3	Electrical Conductivity	ms	0.211	0.092
4	Copper as Cu	mg/kg	2.92	4.18
5	Nickel as Ni	mg/kg	27.40	15.28
6	Zinc as Zn	mg/kg	596	17.43
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam
15	Sulphate	%	0.046	0.014
16	Sodium	mg/kg	348	272
17	Potassium	mg/kg	162	110
18	Ammonia (TCLP)	mg/L	1.84	1.28
19	Manganese	mg/kg	146	100
20	Cobalt	mg/kg	7.07	12.40
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.082	0.044

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Remark: 2 mtr not possible due to stone facia

Sr. No.	Identification of Sample		Downstream - 10 Mtr @ Sr. No- 3 Of Annexure 4 [#]		
	GPS Co-ordinates		N 23° 12' 01.8" E 69° 45' 33.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S8 A (15 cm)			S8 B (1 mtr.)	S8 C (2 mtr.)	
		PLPL/191023185	PLPL/191023186	PLPL/191023187	
1	pH	--	9.22	9.27	9.12
2	Moisture	%	2.34	1.99	1.44
3	Electrical Conductivity	ms	0.096	0.094	0.065
4	Copper as Cu	mg/kg	7.14	3.77	2.10
5	Nickel as Ni	mg/kg	17.59	38.97	16.99
6	Zinc as Zn	mg/kg	21.40	57.46	14.69
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.009	0.018	0.012
16	Sodium	mg/kg	215	208	216
17	Potassium	mg/kg	70	32.50	52.56
18	Ammonia (TCLP)	mg/L	0.986	1.06	1.40
19	Manganese	mg/kg	230	264	168
20	Cobalt	mg/kg	13.00	18.89	16.46
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.016	0.015	0.021

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream - 100 Mtr @ Sr. No- 13 Of Annexure 3 Farm On Lakhond Land Road [#]		
	GPS Co-ordinates		N 23° 14' 58.6" E 69° 46' 50.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S9 A (15 cm)			S9 B (1 mtr.)	S9 C (2 mtr.)	
			PLPL/191023188	PLPL/191023189	PLPL/191023190
1	pH	--	8.96	8.98	9.51
2	Moisture	%	8.22	8.53	10.44
3	Electrical Conductivity	ms	0.194	0.166	0.171
4	Copper as Cu	mg/kg	21.03	10.50	99.46
5	Nickel as Ni	mg/kg	130	107	120
6	Zinc as Zn	mg/kg	75.45	64.69	61.89
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.008	0.088	0.001
16	Sodium	mg/kg	78.84	170	265
17	Potassium	mg/kg	111	140	156
18	Ammonia (TCLP)	mg/L	1.53	1.62	1.92
19	Manganese	mg/kg	1020	816	1227
20	Cobalt	mg/kg	38.15	26.50	36.00
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.014	0.157	0.002

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Location downstream @ 50 mtr from [#]		
	GPS Co-ordinates		N 23° 15' 04.8" E 69° 46' 47.5"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
			S10 A (15 cm)	S10 B (1 mtr.)	S10 C (2 mtr.)
		PLPL/191023191	PLPL/191023192	PLPL/191023193	
1	pH	--	9.20	8.96	8.99
2	Moisture	%	6.02	5.17	10.23
3	Electrical Conductivity	ms	0.103	0.056	0.108
4	Copper as Cu	mg/kg	17.55	18.84	26.05
5	Nickel as Ni	mg/kg	91.08	114.00	181.00
6	Zinc as Zn	mg/kg	47.96	55.20	68.54
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.203	0.058	0.018
16	Sodium	mg/kg	448	110	462
17	Potassium	mg/kg	233	199	157
18	Ammonia (TCLP)	mg/L	1.29	1.13	0.922
19	Manganese	mg/kg	813	630	1300
20	Cobalt	mg/kg	27.31	26.90	34.06
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.360	0.100	0.043

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		downstream - 50 mtr @ sr. No- 17 of Annexure 3) China clay mines vastabhai#		
	GPS Co-ordinates		N 23° 15' 36.4" E 69° 47' 14.8"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S11 A (15 cm)			S11 B (1 mtr.)	S11 C (2 mtr.)	
		PLPL/191023194	PLPL/191023195	PLPL/191023196	
1	pH	--	8.73	8.99	8.61
2	Moisture	%	5.69	5.76	6.72
3	Electrical Conductivity	ms	0.143	0.079	0.076
4	Copper as Cu	mg/kg	5.10	1.63	6.68
5	Nickel as Ni	mg/kg	24.12	22.70	19.34
6	Zinc as Zn	mg/kg	49.80	16.60	20.52
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.016	0.012	0.012
16	Sodium	mg/kg	167	48.79	310
17	Potassium	mg/kg	261	130	190
18	Ammonia (TCLP)	mg/L	1.40	1.31	0.638
19	Manganese	mg/kg	129	132	102
20	Cobalt	mg/kg	7.85	5.70	10.21
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.032	0.028	0.021

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream - @ Sr. No- 2 Of Annexure 3) Opposite Of Lehriya Haunman Temple [#]	
	GPS Co-ordinates		N 23° 13' 14.4" E 69° 46' 18.4"	
	Sampling Date		22/10/2019	
	Parameters	Unit	RESULT	
S12 A (15 cm)			S12 B (1 mtr.)	
PLPL/191023197			PLPL/191023198	
1	pH	--	8.83	8.94
2	Moisture	%	4.21	3.50
3	Electrical Conductivity	ms	0.273	0.253
4	Copper as Cu	mg/kg	30.53	13.37
5	Nickel as Ni	mg/kg	9.76	3.53
6	Zinc as Zn	mg/kg	523	61.98
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam
15	Sulphate	%	0.019	0.013
16	Sodium	mg/kg	96.56	49.94
17	Potassium	mg/kg	116	55.22
18	Ammonia (TCLP)	mg/L	0.814	0.919
19	Manganese	mg/kg	665	194
20	Cobalt	mg/kg	13.36	10.72
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.034	0.023

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Remark: 2 mtr not possible due to stone facia

Sr. No.	Identification of Sample		Downstream - @ Sr. No- 4 Of Annexure 3) Old Stone Mines Of PrakashPatel#		
	GPS Co-ordinates		N 23° 13' 14.5" E 69° 46' 06.3"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S13 A (15 cm)			S13 B (1 mtr.)	S13 C (2 mtr.)	
			PLPL/191023199	PLPL/191023200	PLPL/191023201
1	pH	--	9.09	9.89	9.66
2	Moisture	%	7.97	13.41	18.04
3	Electrical Conductivity	ms	0.765	1.905	3.29
4	Copper as Cu	mg/kg	104	78.13	72
5	Nickel as Ni	mg/kg	28.1	30.13	48.26
6	Zinc as Zn	mg/kg	75.51	63.1	82.47
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.111	0.029	0.074
16	Sodium	mg/kg	1297	1140	1277
17	Potassium	mg/kg	773	402	456
18	Ammonia (TCLP)	mg/L	0.638	1.02	1.20
19	Manganese	mg/kg	1182	1334	312
20	Cobalt	mg/kg	31.93	33.87	33.66
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.198	0.051	0.132

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Downstream - @ Sr. No- 5 Of Annexure 3) Behind Khatri Mill#		
	GPS Co-ordinates		N 23° 13' 23.3" E 69° 45' 57.9"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S14 A (15 cm)			S14 B (1 mtr.)	S14 C (2 mtr.)	
			PLPL/191023202	PLPL/191023203	PLPL/191023204
1	pH	--	9.13	9.23	9.25
2	Moisture	%	6.87	4.78	6.28
3	Electrical Conductivity	ms	0.104	0.06	0.199
4	Copper as Cu	mg/kg	98.43	41.51	24.37
5	Nickel as Ni	mg/kg	45.4	24.11	21.92
6	Zinc as Zn	mg/kg	90.77	39.44	29.16
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.011	0.0013	0.009
16	Sodium	mg/kg	698	302	140
17	Potassium	mg/kg	507	228	112
18	Ammonia (TCLP)	mg/L	1.30	0.98	0.86
19	Manganese	mg/kg	1600	576	331
20	Cobalt	mg/kg	33.57	16.28	15
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.019	0.002	0.016

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Beside Of Water Tank Of GWIL Sump Sr.No 6 @ Annexure-3#	
	GPS Co-ordinates		N 23° 13' 23.3" E 69° 45' 57.9"	
	Sampling Date		22/10/2019	
	Parameters	Unit	RESULT	
S15 A (15 cm)			S15 B (1 mtr.)	
PLPL/191023205			PLPL/191023206	
1	pH	--	8.58	9.14
2	Moisture	%	7.045	5.103
3	Electrical Conductivity	ms	0.54	0.926
4	Copper as Cu	mg/kg	44.4	12.45
5	Nickel as Ni	mg/kg	46.24	8.77
6	Zinc as Zn	mg/kg	65.89	20.82
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam
15	Sulphate	%	0.06	0.048
16	Sodium	mg/kg	281	446
17	Potassium	mg/kg	160	180
18	Ammonia (TCLP)	mg/L	1.15	1.27
19	Manganese	mg/kg	194	12.45
20	Cobalt	mg/kg	19.65	6.98
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.109	0.086

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Remark: 2 mtr not possible due to hard clay

Sr. No.	Identification of Sample		Sr.No 21 (Annexure-3)Nr. Matiyadev Mandir [#]		
	GPS Co-ordinates		N 23° 13' 02.9" E 69° 46' 15.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S16 A (15 cm)			S16 B (1 mtr.)	S16 C (2 mtr.)	
		PLPL/191023207	PLPL/191023208	PLPL/191023209	
1	pH	--	8.39	8.35	8.96
2	Moisture	%	3.23	3.69	4.07
3	Electrical Conductivity	ms	0.029	0.081	0.114
4	Copper as Cu	mg/kg	30	15.31	3.64
5	Nickel as Ni	mg/kg	13.91	17.89	13.5
6	Zinc as Zn	mg/kg	21.92	23.9	18.04
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.46	0.009	0.0092
16	Sodium	mg/kg	340	110	44
17	Potassium	mg/kg	169	35	32.63
18	Ammonia (TCLP)	mg/L	1.50	1.30	1.14
19	Manganese	mg/kg	114	77.6	20.89
20	Cobalt	mg/kg	8.33	7.1	4.8
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.820	0.016	0.016

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Sr.No 22 (Annexure-3) Land Between Swaminarayan Wadi And Water Tank GWIL#		
	GPS Co-ordinates		N 23° 13' 06.0" E 69° 45' 46.1"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S17 A (15 cm)			S17 B (1 mtr.)	S17 C (2 mtr.)	
		PLPL/191023210	PLPL/191023211	PLPL/191023212	
1	pH	--	7.85	7.53	8.01
2	Moisture	%	3.75	4.92	5.15
3	Electrical Conductivity	ms	0.103	0.22	0.486
4	Copper as Cu	mg/kg	4.32	3.96	Not Detected
5	Nickel as Ni	mg/kg	17.53	19.03	8.02
6	Zinc as Zn	mg/kg	42.47	19.96	22.35
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.066	0.057	0.013
16	Sodium	mg/kg	350	384	260
17	Potassium	mg/kg	180	310	95.54
18	Ammonia (TCLP)	mg/L	1.41	1.22	1.50
19	Manganese	mg/kg	102	106	12.27
20	Cobalt	mg/kg	5.93	3.78	1.78
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.118	0.102	0.023

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Sr.No 23 (Annexure-3) Natural Drain Nr Sanjotnagar B/H Swaminarayan Wadi [#]		
	GPS Co-ordinates		N 23° 12' 49.2" E 69° 46' 08.6"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S18 A (15 cm)			S18 B (1 mtr.)	S18 C (2 mtr.)	
			PLPL/191023213	PLPL/191023214	PLPL/191023215
1	pH	--	8.45	8.04	8.38
2	Moisture	%	6.82	6.19	6.28
3	Electrical Conductivity	ms	1.42	2.6	2.39
4	Copper as Cu	mg/kg	11.8	5.7	23.94
5	Nickel as Ni	mg/kg	28.64	14.4	58
6	Zinc as Zn	mg/kg	37.41	31.6	74.5
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.095	0.165	0.104
16	Sodium	mg/kg	541	525	690
17	Potassium	mg/kg	295	270	310
18	Ammonia (TCLP)	mg/L	1.90	1.23	0.90
19	Manganese	mg/kg	215	150	633
20	Cobalt	mg/kg	16	11.1	64.01
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.170	0.295	0.186

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Sr.No 24 (Annexure-3)North Side Of Swaminarayan Wadi [#]	
	GPS Co-ordinates		N 23° 12' 53.9" E 69° 45' 47.0"	
	Sampling Date		22/10/2019	
	Parameters	Unit	RESULT	
S19 A (15 cm)			S19 B (1 mtr.)	
PLPL/191023216			PLPL/191023217	
1	pH	--	8.63	8.80
2	Moisture	%	2.70	3.56
3	Electrical Conductivity	ms	0.523	0.498
4	Copper as Cu	mg/kg	3.82	18.11
5	Nickel as Ni	mg/kg	16.58	8.10
6	Zinc as Zn	mg/kg	16.70	19.70
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam
15	Sulphate	%	0.077	0.050
16	Sodium	mg/kg	201	310
17	Potassium	mg/kg	148	180
18	Ammonia (TCLP)	mg/L	1.58	1.40
19	Manganese	mg/kg	174	154
20	Cobalt	mg/kg	7.06	10.86
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.138	0.089

Detection Limit; Cadmium as Cd: 1 mg/kg,Lead as Pb: 1 mg/kg,Chromium as Cr+3: 1 mg/kg,Arsenic as As: 1 mg/kg,Mercury as Hg: 1 mg/kg,Selenium as Se: 1 mg/kg,Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Near Dargah Lakhond (Sr. No 1 & 2 @ Annexure -4) #		
	GPS Co-ordinates		N 23° 15' 32.0" E 69° 46' 56.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S21 A (15 cm)			S21 B (1 mtr.)	S21 C (2 mtr.)	
			PLPL/191023218	PLPL/191023219	PLPL/191023220
1	pH	--	8.95	9.32	9.10
2	Moisture	%	5.82	6.39	6.45
3	Electrical Conductivity	ms	1.25	0.634	0.540
4	Copper as Cu	mg/kg	6.03	10.91	6.40
5	Nickel as Ni	mg/kg	28.64	27.04	21.80
6	Zinc as Zn	mg/kg	44.91	43.21	50.40
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.033	0.034	0.028
16	Sodium	mg/kg	513	338	152
17	Potassium	mg/kg	277	359	154
18	Ammonia (TCLP)	mg/L	1.01	0.922	0.814
19	Manganese	mg/kg	134	85.4	245
20	Cobalt	mg/kg	9.15	3.71	9.63
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.059	0.060	0.050

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		After Toll Gate Left Side (Sr No. 3 Annexure - 4) [#]		
	GPS Co-ordinates		N 23° 14' 10.0" E 69° 47' 18.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
			S23 A (15 cm)	S23 B (1 mtr.)	S23 C (2 mtr.)
		PLPL/191023221	PLPL/191023222	PLPL/191023223	
1	pH	--	8.50	9.09	9.16
2	Moisture	%	4.89	7.15	7.50
3	Electrical Conductivity	ms	0.120	0.102	2.38
4	Copper as Cu	mg/kg	17.04	12.98	13.07
5	Nickel as Ni	mg/kg	36.67	49.02	41.91
6	Zinc as Zn	mg/kg	40.32	60.10	53.00
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.013	0.012	0.010
16	Sodium	mg/kg	450	362	499
17	Potassium	mg/kg	250	144	273
18	Ammonia (TCLP)	mg/L	1.13	1.35	1.40
19	Manganese	mg/kg	306	489	337
20	Cobalt	mg/kg	6.50	16.70	12.33
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.023	0.021	0.017

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		After Paddhar Police Station Right Side 50 Mtr Downstream (Sr. No 18 @ Annexure -3) [#]		
	GPS Co-ordinates		N 23° 14' 27.0" E 69° 48' 45.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-24 A (15 cm)			S-24 B (1 mtr.)	S-24 C (2 mtr.)	
		PLPL/191023224	PLPL/191023225	PLPL/191023226	
1	pH	--	8.95	8.72	8.87
2	Moisture	%	4.60	5.90	7.47
3	Electrical Conductivity	ms	0.108	0.980	1.122
4	Copper as Cu	mg/kg	17.30	9.60	12.04
5	Nickel as Ni	mg/kg	52.70	45.10	28.29
6	Zinc as Zn	mg/kg	70.80	40.90	23.88
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.045	0.039	0.0302
16	Sodium	mg/kg	1270	985	540
17	Potassium	mg/kg	310	240	183
18	Ammonia (TCLP)	mg/L	0.715	0.59	0.541
19	Manganese	mg/kg	90	124	171
20	Cobalt	mg/kg	21.80	23.90	14.41
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.080	0.069	0.054

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		After Paddhar Police Station Right Side 50 Mtr Downstream (Sr. No 18 @ Annexure -3) #		
	GPS Co-ordinates		N 23° 14' 27.0" E 69° 48' 45.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-25 A (15 cm)			S-25 B (1 mtr.)	S-25 C (2 mtr.)	
		PLPL/191023227	PLPL/191023228	PLPL/191023229	
1	pH	--	9.11	8.45	9.03
2	Moisture	%	4.45	5.77	3.91
3	Electrical Conductivity	ms	0.421	0.982	0.621
4	Copper as Cu	mg/kg	10.83	11.67	9.49
5	Nickel as Ni	mg/kg	22.47	27.62	24.02
6	Zinc as Zn	mg/kg	25.02	21.91	13.97
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.0187	0.014	0.028
16	Sodium	mg/kg	363	232	156
17	Potassium	mg/kg	141	111	80
18	Ammonia (TCLP)	mg/L	0.566	0.821	1.12
19	Manganese	mg/kg	249	533	516
20	Cobalt	mg/kg	13.66	17.92	5.68
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.034	0.025	0.050

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Sr.No 8 & 9 (Annexure-3)Vavdi Village [#]	
	GPS Co-ordinates		N 23° 11' 32.0" E 69° 49' 44.0"	
	Sampling Date		22/10/2019	
	Parameters	Unit	RESULT	
S-27 A (15 cm)			S-27 B (1 mtr.)	
PLPL/191023230			PLPL/191023231	
1	pH	--	8.72	8.65
2	Moisture	%	4.53	5.21
3	Electrical Conductivity	ms	0.779	0.771
4	Copper as Cu	mg/kg	2.67	5.68
5	Nickel as Ni	mg/kg	10.41	13.57
6	Zinc as Zn	mg/kg	2.82	19.87
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam
15	Sulphate	%	0.014	0.019
16	Sodium	mg/kg	1260	784
17	Potassium	mg/kg	124	118
18	Ammonia (TCLP)	mg/L	0.914	0.765
19	Manganese	mg/kg	717	103
20	Cobalt	mg/kg	15.40	9.60
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.025	0.034

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Remark: 2 mtr not possible due to stone facia

Sr. No.	Identification of Sample		Dinesh Maharaj @ Sr. No7 (Annexure-3)#		
	GPS Co-ordinates		N 23° 11' 57.0" E 69° 46' 49.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-29 A (15 cm)			S-29 B (1 mtr.)	S-29 C (2 mtr.)	
			PLPL/191023232	PLPL/191023233	PLPL/191023234
1	pH	--	9.17	9.49	9.29
2	Moisture	%	1.70	3.55	4.04
3	Electrical Conductivity	ms	0.162	0.212	0.212
4	Copper as Cu	mg/kg	10.00	4.68	2.67
5	Nickel as Ni	mg/kg	27.44	11.72	22.66
6	Zinc as Zn	mg/kg	23.70	6.45	27.49
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.015	0.038	0.133
16	Sodium	mg/kg	1775	745	415
17	Potassium	mg/kg	177	150	48
18	Ammonia (TCLP)	mg/L	1.20	1.08	0.884
19	Manganese	mg/kg	190	119	121
20	Cobalt	mg/kg	2.82	5.20	3.64
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.026	0.068	0.238

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream Of Kukma-Lakhond Road LHS (Sr. No 10 @ Annexure -4)#		
	GPS Co-ordinates		N 23° 13' 53.0" E 69° 46' 50.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-30 A (15 cm)			S-30 B (1 mtr.)	S-30 C (2 mtr.)	
PLPL/191023235			PLPL/191023236	PLPL/191023237	
1	pH	--	9.52	8.72	9.32
2	Moisture	%	2.60	11.08	8.73
3	Electrical Conductivity	ms	0.162	0.582	0.243
4	Copper as Cu	mg/kg	9.29	17.43	12.85
5	Nickel as Ni	mg/kg	20.86	38.54	18.39
6	Zinc as Zn	mg/kg	18.30	39.48	18.41
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.009	0.042	0.014
16	Sodium	mg/kg	575	320	260
17	Potassium	mg/kg	380	247	100
18	Ammonia (TCLP)	mg/L	0.45	0.68	0.79
19	Manganese	mg/kg	269	383	287
20	Cobalt	mg/kg	15.48	21.90	15.18
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.017	0.075	0.024

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Gir Gaudham Road Side Sr. No 11(Annexure-3) [#]		
	GPS Co-ordinates		N 23° 14' 0.0" E 69° 46' 36.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-31 A (15 cm)			S-31 B (1 mtr.)	S-31 C (2 mtr.)	
			PLPL/191023238	PLPL/191023239	PLPL/191023240
1	pH	--	8.71	8.99	8.25
2	Moisture	%	8.79	9.90	8.22
3	Electrical Conductivity	ms	1.25	0.632	2.38
4	Copper as Cu	mg/kg	153	10.86	51.73
5	Nickel as Ni	mg/kg	46.37	14.82	38.84
6	Zinc as Zn	mg/kg	73.40	14.54	49.85
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.104	0.064	0.113
16	Sodium	mg/kg	1621	915	479
17	Potassium	mg/kg	399	210	180
18	Ammonia (TCLP)	mg/L	0.564	0.519	0.390
19	Manganese	mg/kg	1441	143	416
20	Cobalt	mg/kg	28.5	11.56	27.34
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.186	0.114	0.202

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Behind Ashapura Foundation School Sr.No-12 (Annexure-3) [#]		
	GPS Co-ordinates		N 23° 14' 7.0" E 69° 46' 26.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-32 A (15 cm)			S-32 B (1 mtr.)	S-32 C (2 mtr.)	
		PLPL/191023241	PLPL/191023242	PLPL/191023243	
1	pH	--	8.82	8.83	8.75
2	Moisture	%	3.90	4.73	7.10
3	Electrical Conductivity	ms	1.26	1.68	1.45
4	Copper as Cu	mg/kg	31.99	33.61	24.80
5	Nickel as Ni	mg/kg	69.74	53.01	45.20
6	Zinc as Zn	mg/kg	52.67	42.7	35.8
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.014	0.059	0.062
16	Sodium	mg/kg	1105	1515	1710
17	Potassium	mg/kg	299	613	750
18	Ammonia (TCLP)	mg/L	1.40	1.08	0.77
19	Manganese	mg/kg	583	388	350
20	Cobalt	mg/kg	16.47	12.82	9.40
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.025	0.105	0.111

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream @ 50 Mt Sr. No 26 (Annexure -3) Pithora Mandir [#]		
	GPS Co-ordinates		N 23° 10' 21.9" E 69° 46' 05.5"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S35 A (15 cm)			S35 B (1 mtr.)	S35 C (2 mtr.)	
		PLPL/191023244	PLPL/191023245	PLPL/191023246	
1	pH	--	8.23	8.33	8.55
2	Moisture	%	7.57	6.05	8.20
3	Electrical Conductivity	ms	1.60	1.68	1.45
4	Copper as Cu	mg/kg	23.47	25.12	19.60
5	Nickel as Ni	mg/kg	41.49	30.97	23.40
6	Zinc as Zn	mg/kg	102	84.59	75.2
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.044	0.0055	0.035
16	Sodium	mg/kg	566	681	715
17	Potassium	mg/kg	516	439	510
18	Ammonia (TCLP)	mg/L	1.22	0.81	0.68
19	Manganese	mg/kg	332	298	220
20	Cobalt	mg/kg	15.20	20.64	17.60
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.078	0.010	0.062

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream @ 100 Mtr Sr. No 25 (Annexure -3) Beside Balubha Rathod Lake [#]		
	GPS Co-ordinates		N 23° 11' 55.8" E 69° 46' 28.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S36 A (15 cm)			S36 B (1 mtr.)	S36 C (2 mtr.)	
			PLPL/191023247	PLPL/191023248	PLPL/191023249
1	pH	--	9.48	9.62	8.44
2	Moisture	%	7.15	13.87	15.83
3	Electrical Conductivity	ms	0.20	0.47	1.21
4	Copper as Cu	mg/kg	9.75	19.18	9.47
5	Nickel as Ni	mg/kg	46.03	47.95	26.78
6	Zinc as Zn	mg/kg	53.27	56.82	35.21
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.013	0.015	0.055
16	Sodium	mg/kg	490	521	492
17	Potassium	mg/kg	356	172	228
18	Ammonia (TCLP)	mg/L	1.43	1.00	0.935
19	Manganese	mg/kg	356	549	226
20	Cobalt	mg/kg	12.70	11.98	12.65
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.023	0.026	0.098

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Sr. No 20 (Annexure -3) B/H Balaji Petrol Pump#		
	GPS Co-ordinates		N 23° 13' 43.5" E 69° 45' 44.5"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S37 A (15 cm)			S37B (1 mtr.)	S37C (2 mtr.)	
			PLPL/191023250	PLPL/191023251	PLPL/191023252
1	pH	--	8.52	8.45	8.61
2	Moisture	%	5.17	6.25	7.09
3	Electrical Conductivity	ms	0.192	0.225	0.133
4	Copper as Cu	mg/kg	17.70	18.70	16.07
5	Nickel as Ni	mg/kg	79.38	61.50	47.80
6	Zinc as Zn	mg/kg	62.44	62.38	31.58
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.007	0.009	0.009
16	Sodium	mg/kg	351	279	93.49
17	Potassium	mg/kg	165	157	80.16
18	Ammonia (TCLP)	mg/L	0.514	0.738	1.054
19	Manganese	mg/kg	463	622	84.90
20	Cobalt	mg/kg	15.82	20.32	7.59
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.012	0.015	0.010

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream @ 50 Mtr Sr. No 4.1 (Annexure -4) At Sheikhpur Parle Road [#]		
	GPS Co-ordinates		N 23° 13' 29.0" E 69° 45' 20.9"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S38 A (15 cm)			S38 B (1 mtr.)	S38 C (2 mtr.)	
		PLPL/191023253	PLPL/191023254	PLPL/191023255	
1	pH	--	9.48	9.22	9.25
2	Moisture	%	2.51	3.65	3.07
3	Electrical Conductivity	ms	0.144	0.302	0.103
4	Copper as Cu	mg/kg	7.56	7.10	5.62
5	Nickel as Ni	mg/kg	20.12	16.12	13.68
6	Zinc as Zn	mg/kg	21.30	20.04	16.05
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.008	0.015	0.026
16	Sodium	mg/kg	210	186	213
17	Potassium	mg/kg	140	112	171
18	Ammonia (TCLP)	mg/L	1.20	0.931	0.859
19	Manganese	mg/kg	170	188	161
20	Cobalt	mg/kg	8.89	9.92	13.24
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.014	0.026	0.046

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Downstream @ 50 Mtr. Sr. No 4 (Annexure -4) At Sheikhpur Parle Road [#]		
	GPS Co-ordinates		N 23° 13' 36.5" E 69° 45' 30.1"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S39 A (15 cm)			S39 B (1 mtr.)	S39 C (2 mtr.)	
			PLPL/191023256	PLPL/191023257	PLPL/191023258
1	pH	--	8.76	8.81	8.96
2	Moisture	%	7.33	7.078	9.19
3	Electrical Conductivity	ms	0.275	0.179	0.316
4	Copper as Cu	mg/kg	24.78	270	195
5	Nickel as Ni	mg/kg	126	124	112
6	Zinc as Zn	mg/kg	73.99	440	426
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.006	0.035	0.009
16	Sodium	mg/kg	319	290	310
17	Potassium	mg/kg	221	212	153
18	Ammonia (TCLP)	mg/L	1.10	1.02	0.731
19	Manganese	mg/kg	10.46	1018	1040
20	Cobalt	mg/kg	36.03	36.23	25.94
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.010	0.062	0.015

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.
: Detail given by customer.

Sr. No.	Identification of Sample		Downstream @ 50 Mt Sr. No 7 (Annexure -4) At Mangal Mandir School [#]		
	GPS Co-ordinates		N 23° 13' 43.9" E 69° 44' 7.5"		
	Sampling Date		23/10/2019		
	Parameters	Unit	RESULT		
S-40 A (15 cm)			S-40 B (1 mtr.)	S-40 C (2 mtr.)	
			PLPL/191023259	PLPL/191023260	PLPL/191023261
1	pH	--	8.68	8.43	8.56
2	Moisture	%	1.77	1.95	2.20
3	Electrical Conductivity	ms	0.081	0.027	0.055
4	Copper as Cu	mg/kg	2.46	2.37	8.40
5	Nickel as Ni	mg/kg	10.30	7.48	5.60
6	Zinc as Zn	mg/kg	16.69	10.00	18.40
7	Cadmium as Cd	mg/kg	Not Detedted	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detedted	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detedted	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.021	0.018	0.025
16	Sodium	mg/kg	410	260	150
17	Potassium	mg/kg	102	43.45	60
18	Ammonia (TCLP)	mg/L	0.91	0.77	0.66
19	Manganese	mg/kg	186	140	120
20	Cobalt	mg/kg	12.85	17.1	15.6
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.037	0.032	0.044

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream - 30 Mtr Of Sr.No 8 (Annexure-4) @Vakalmata Mandir [#]		
	GPS Co-ordinates		N 23° 13' 34.7" E 69° 44' 42.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-41 A (15 cm)			S-41 B (1 mtr.)	S-41 C (2 mtr.)	
			PLPL/191023262	PLPL/191023263	PLPL/191023264
1	pH	--	9	8.85	9.61
2	Moisture	%	3.74	4.82	7.56
3	Electrical Conductivity	ms	0.129	0.29	0.066
4	Copper as Cu	mg/kg	14.87	17.95	8.89
5	Nickel as Ni	mg/kg	27.96	32.54	19.81
6	Zinc as Zn	mg/kg	46.22	57.43	42.21
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.011	0.010	0.033
16	Sodium	mg/kg	1150	128	83.24
17	Potassium	mg/kg	370	452	199
18	Ammonia (TCLP)	mg/L	0.77	0.80	0.91
19	Manganese	mg/kg	252	397	131
20	Cobalt	mg/kg	18.46	18.73	16.87
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.020	0.017	0.058

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Downstream Of Sr.No 6 (Annexure-4) @Vakalmata Mandir [#]		
	GPS Co-ordinates		N 23° 13' 34.7" E 69° 44' 42.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-42 A (15 cm)			S-42 B (1 mtr.)	S-42 C (2 mtr.)	
			PLPL/191023265	PLPL/191023266	PLPL/191023267
1	pH	--	8.5	8.67	8.38
2	Moisture	%	3.67	3.55	2.97
3	Electrical Conductivity	ms	0.034	0.016	0.019
4	Copper as Cu	mg/kg	2.44	2.54	1.20
5	Nickel as Ni	mg/kg	11.12	9.50	8.51
6	Zinc as Zn	mg/kg	8.44	9.10	6.62
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.011	0.029	0.021
16	Sodium	mg/kg	390	215	118
17	Potassium	mg/kg	140	98	70
18	Ammonia (TCLP)	mg/L	0.524	0.925	0.724
19	Manganese	mg/kg	340	270	208
20	Cobalt	mg/kg	10.66	7.21	6.10
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.020	0.051	0.038

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

➤ **Soil Analysis Results (Samples from 10 km Distance from M/s. Ashapura Perfoclay Ltd.):**

Sr. No.	Identification of Sample		Downstream Of Sr.No 6 (Annexure-4) @Vakalmata Mandir [#]		
	GPS Co-ordinates		N 23° 13' 34.7" E 69° 44' 42.4"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S22 A (15 cm)			S22 B (1 mtr.)	S22 C (2 mtr.)	
			PLPL/191023268	PLPL/191023269	PLPL/191023270
1	pH	--	8.65	8.87	8.9
2	Moisture	%	1.25	1.10	0.98
3	Electrical Conductivity	ms	0.096	0.071	0.065
4	Copper as Cu	mg/kg	5.85	7.63	9.40
5	Nickel as Ni	mg/kg	38.20	30.69	33.20
6	Zinc as Zn	mg/kg	85.20	74.68	68.00
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.085	0.005	0.062
16	Sodium	mg/kg	310	152	100
17	Potassium	mg/kg	270	154	85
18	Ammonia (TCLP)	mg/L	1.08	0.814	0.66
19	Manganese	mg/kg	388	245	205
20	Cobalt	mg/kg	17.80	9.63	5.83
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.152	0.009	0.111

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr⁺³: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Paddhar Gam [#]		
	GPS Co-ordinates		N 23° 14' 44.0" E 69° 48' 25.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-26 A (15 cm)			S-26 B (1 mtr.)	S-26 C (2 mtr.)	
			PLPL/191023271	PLPL/191023272	PLPL/191023273
1	pH	--	8.62	8.77	8.73
2	Moisture	%	6.56	10.82	11.10
3	Electrical Conductivity	ms	4.87	6.12	6.63
4	Copper as Cu	mg/kg	21.49	34.94	31.82
5	Nickel as Ni	mg/kg	53.83	62.03	56.02
6	Zinc as Zn	mg/kg	47.05	59.51	62.62
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.056	0.146	0.130
16	Sodium	mg/kg	3648	5834	6383
17	Potassium	mg/kg	1080	771	671
18	Ammonia (TCLP)	mg/L	0.92	0.90	1.13
19	Manganese	mg/kg	973	1012	230
20	Cobalt	mg/kg	33.69	24.39	15.15
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.100	0.261	0.232

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

Sr. No.	Identification of Sample		Shreeji Farm , Vavdi [#]		
	GPS Co-ordinates		N 23° 12' 3.0" E 69° 49' 25.0"		
	Sampling Date		22/10/2019		
	Parameters	Unit	RESULT		
S-28 A (15 cm)			S-28 B (1 mtr.)	S-28 C (2 mtr.)	
			PLPL/191023274	PLPL/191023275	PLPL/191023276
1	pH	--	9.33	8.57	8.5
2	Moisture	%	5.37	5.95	6.25
3	Electrical Conductivity	ms	0.209	0.272	0.209
4	Copper as Cu	mg/kg	3.41	1.15	10.87
5	Nickel as Ni	mg/kg	11.50	8.69	22.20
6	Zinc as Zn	mg/kg	16.29	8.67	26.64
7	Cadmium as Cd	mg/kg	Not Detected	Not Detected	Not Detected
8	Lead as Pb	mg/kg	Not Detected	Not Detected	Not Detected
9	Chromium as Cr ⁺³	mg/kg	Not Detected	Not Detected	Not Detected
10	Arsenic as As	mg/kg	Not Detected	Not Detected	Not Detected
11	Mercury as Hg	mg/kg	Not Detected	Not Detected	Not Detected
12	Selenium as Se	mg/kg	Not Detected	Not Detected	Not Detected
13	Cyanide as CN	mg/kg	Not Detected	Not Detected	Not Detected
14	Texture	--	Sandy loam	Sandy loam	Sandy loam
15	Sulphate	%	0.023	0.168	0.014
16	Sodium	mg/kg	787	906	959
17	Potassium	mg/kg	139	60.67	421
18	Ammonia (TCLP)	mg/L	1.04	1.03	0.736
19	Manganese	mg/kg	99.25	44.70	259
20	Cobalt	mg/kg	21.70	13.20	10.20
21	Gypsum as CaSO ₄ .2H ₂ O	%	0.041	0.301	0.024

Detection Limit; Cadmium as Cd: 1 mg/kg, Lead as Pb: 1 mg/kg, Chromium as Cr+3: 1 mg/kg, Arsenic as As: 1 mg/kg, Mercury as Hg: 1 mg/kg, Selenium as Se: 1 mg/kg, Cyanide as CN: 0.1 mg/kg.

: Detail given by customer.

➤ **Water Analysis Results:**

Sr. No.	Identification of Sample#		Gw-1 Nr Gate No. 2	GW-2 Samavandh Samiti	GW-3 Apl Admin	GW-4 Lehriya Hanuman	GW-5 Ramesh Pindoriya
	GPS Co-ordinates		N 23° 11' 57.3" E 69° 44' 29.6"	N 23° 12' 6.5" E 69° 44' 24.8"	N 23° 12' 12.2" E 69° 44' 29.8"	N 23° 13' 19.7" E 69° 46' 16.1"	N 23° 12' 13.2" E 69° 44' 54.6"
	Sampling Date		21/10/2019	21/10/2019	21/10/2019	21/10/2019	22/10/2019
	Lab Id		PLPL/191023136	PLPL/191023137	PLPL/191023138	PLPL/191023139	PLPL/191023140
	Parameter	Unit	Results				
1	pH Value	--	6.82	6.98	7.11	7.07	7.48
2	Total Dissolved Solids	mg/l	3140	3730	4055	3290	4300
3	Temperature	°C	32.2	31.4	32.6	29.8	29.9
4	Chemical Oxygen Demand as COD	mg/l	28	39	25	30	22
5	Biochemical Oxygen Demand as BOD	mg/l	6	12	7	8	5
6	Ammonical Nitrogen as NH ₃ -N	mg/l	16.10	9.30	1.63	0.34	14.20
7	Nitrate Nitrogen	mg/l	2.92	9.60	6.20	8.10	9.10
8	Chlorides as Cl	mg/l	1599	1799	1894	1679	2081
9	Colour	Hazen	1	1	1	1	1
10	Fluorides as F	mg/l	1.01	1.97	1.49	1.11	1.60
11	Sulphates as SO ₄	mg/l	332	466	581	301	480
12	Total Hardness as CaCO ₃	mg/l	1167	1427	1551	1278	1738
13	Sulphides as S	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.240	0.100	0.280	0.050	0.190
16	Iron as Fe	mg/l	0.370	Not Detected	0.67	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	0.024	0.018	0.022	0.021	Not Detected
18	SAR	--	11.50	12.27	10.30	16.79	12.39
19	Total Kjeldahl Nitrogen	mg/l	20.60	8.07	25.78	2.18	3.38

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

Sr. No.	Identification of Sample#		GW-6 Vasudev Pindoriya	GW-7 Govind Hirji Gorasia	GW-8 Ranubha Jadeja	GW-9 Hetubha Jadeja	GW-10 Lakhond - Gram Panchyat
	GPS Co-ordinates		N 23° 12' 12.8" E 69° 44' 55.7"	N 23° 12' 18.6" E 69° 44' 46.3"	N 23° 11' 58.0" E 69° 44' 53.9"	N 23° 12' 6.4" E 69° 45' 40.3"	N 23° 13'39.2" E 69° 47'29.1"
	Sampling Date		22/10/2019	22/10/2019	22/10/2019	22/10/2019	22/10/2019
	Lab Id		PLPL/191023141	PLPL/191023142	PLPL/191023143	PLPL/191023144	PLPL/191023145
	Parameter	Unit	Results				
1	pH Value	--	7.41	6.75	7.13	7.36	6.84
2	Total Dissolved Solids	mg/l	3730	5285	3260	2570	1620
3	Temperature	°C	30.5	29.7	29.6	30.7	30.2
4	Chemical Oxygen Demand as COD	mg/l	16	19	23	14	17
5	Biochemical Oxygen Demand as BOD	mg/l	4	5	7	4	5
6	Ammonical Nitrogen as NH ₃ -N	mg/l	12.80	0.38	1.80	8.40	0.65
7	Nitrate Nitrogen	mg/l	8.30	6.90	3.20	4.30	2.75
8	Chlorides as Cl	mg/l	1750	2690	1690	1310	849
9	Colour	Hazen	1	1	1	1	1
10	Fluorides as F	mg/l	2.09	2.09	2.17	1.89	1.27
11	Sulphates as SO ₄	mg/l	612	578	352	243	129
12	Total Hardness as CaCO ₃	mg/l	1330	1991	1204	996	620
13	Sulphides as S	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.210	0.110	0.220	0.140	0.110
16	Iron as Fe	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
18	SAR	--	9.25	13.37	8.77	8.29	6.39
19	Total Kjeldahl Nitrogen	mg/l	0.290	0.505	0.239	0.652	0.877

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

Sr. No.	Identification of Sample#		GW-11 Kukma-GWIL	GW-12 Kanchan Vadi-Shroff Farm	GW-13 Swaminarayan Wadi	GW-14 Shivubha Jadeja	GW-15 Second Borewell Lakhond- Gram Panchyat
	GPS Co-ordinates		N 23° 13' 12.6" E 69° 45' 49.0"	N 23° 13' 3.7" E 69° 45' 51.6"	N 23° 12' 46.1" E 69° 45' 47.3"	N 23° 12' 5.3" E 69° 46' 31.2"	N 23° 15'35.0" E 69° 41'54.0"
	Sampling Date		22/10/2019	22/10/2019	22/10/2019	22/10/2019	22/10/2019
	Lab Id		PLPL/191023146	PLPL/191023147	PLPL/191023148	PLPL/191023149	PLPL/191023150
	Parameter	Unit	Results				
1	pH Value	--	7.18	6.93	6.91	7.69	6.84
2	Total Dissolved Solids	mg/l	1016	1456	1802	1947	2207
3	Temperature	°C	28.5	32.1	30.2	30.4	29.9
4	Chemical Oxygen Demand as COD	mg/l	12	20	27	35	18
5	Biochemical Oxygen Demand as BOD	mg/l	4	5	7	10	5
6	Ammonical Nitrogen as NH ₃ -N	mg/l	2.80	0.38	2.30	3.20	1.04
7	Nitrate Nitrogen	mg/l	4.77	2.11	3.81	4.00	2.97
8	Chlorides as Cl	mg/l	539	594	889	990	1166
9	Colour	Hazen	1	1	1	1	2
10	Fluorides as F	mg/l	1.62	1.56	1.17	1.28	1.41
11	Sulphates as SO ₄	mg/l	107	109	170	140	125
12	Total Hardness as CaCO ₃	mg/l	362	425	722	772	886
13	Sulphides as S	mg/l	Not Detected	0.34	0.68	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.049	0.050	0.089	0.043	Not Detected
16	Iron as Fe	mg/l	0.066	0.13	2.79	0.38	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	0.011	0.007	0.011	0.008	Not Detected
18	SAR	--	3.82	6.09	9.30	13.24	6.82
19	Total Kjeldahl Nitrogen	mg/l	0.380	0.513	0.482	0.432	1.414

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Zinc: 0.06 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

Sr. No.	Identification of Sample [#]		GW-16 Jakhobhai Hirabha Baradiya-Lakhond	GW-17 Shavjibhai Naranbhai Baradiya-Lakhond	GW-18 Panchabhai Velabhai Kotivar-Lakhond	GW-19 Toll Plaza Lakhond	GW-22 Dineshmaharaj Wadi Sr. No-7 (Annexure-3)
	GPS Co-ordinates		N 23° 15' 10.0" E 69° 46' 44.0"	N 23° 15' 10.0" E 69° 46' 50.0"	N 23° 15' 3.0" E 69° 46' 48.0"	N 23° 14' 9.0" E 69° 47' 22.0"	N 23° 11' 57.0" E 69° 46' 49.0"
	Sampling Date		22/10/2019	22/10/2019	22/10/2019	22/10/2019	22/10/2019
	Lab Id		PLPL/191023151	PLPL/191023152	PLPL/191023153	PLPL/191023154	PLPL/191023155
	Parameter	Unit	Results				
1	pH Value	--	6.74	7.38	6.93	6.56	7.58
2	Total Dissolved Solids	mg/l	3291	895	2875	894	1566
3	Temperature	°C	30.3	31.6	30.4	29.4	32.6
4	Chemical Oxygen Demand as COD	mg/l	24	37	28	9	28
5	Biochemical Oxygen Demand as BOD	mg/l	7	10	8	2	8
6	Ammonical Nitrogen as NH ₃ -N	mg/l	1.98	1.35	5.40	0.82	6.20
7	Nitrate Nitrogen	mg/l	1.82	2.58	2.39	3.49	2.55
8	Chlorides as Cl	mg/l	1699	439	1530	366	789
9	Colour	Hazen	1	1	2	1	1
10	Fluorides as F	mg/l	1.76	1.09	1.78	1.28	1.82
11	Sulphates as SO ₄	mg/l	230	84	145	48	117
12	Total Hardness as CaCO ₃	mg/l	1330	360	1170	296	609
13	Sulphides as S	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.120	0.099	0.200	0.035	0.209
16	Iron as Fe	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
18	SAR	--	10.18	6.66	12.81	3.57	10.28
19	Total Kjeldahl Nitrogen	mg/l	2.653	1.80	1.74	1.10	1.63

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

Sr. No.	Identification of Sample [#]		GW-23 Vakalmata Mandir Sr- 8 (Annexure 4)	GW-24 Borewell Nr Sr.No 4 (Annexure 4) Nr. Parle	GW-25 Borewell Of Govindbhai Major Ahir (Sr. No 18 Annexure-3)	GW-26 Borewell Chinaclay Mines (Sr. No 17 Annexure - 3)	GW-28 Shyamji Velji Gorasia (BW4)
	GPS Co-ordinates		N 23° 13' 29.0" E 69° 44' 42.0"	N 23° 13' 29.2" E 69° 45' 16.2"	N 23° 14' 25.8" E 69° 48' 48.4"	N 23° 15' 40.0" E 69° 47' 21.3"	N 23° 12' 27.9" E 69° 44' 35.4"
	Sampling Date		22/10/2019	22/10/2019	22/10/2019	23/10/2019	23/10/2019
	Lab Id		PLPL/191023156	PLPL/191023157	PLPL/191023158	PLPL/191023159	PLPL/191023160
	Parameter	Unit	Results				
1	pH Value	--	6.92	6.80	7.36	7.31	6.52
2	Total Dissolved Solids	mg/l	1553	1578	1416	2423	4211
3	Temperature	°C	31.1	30.2	29.7	28.9	31.4
4	Chemical Oxygen Demand as COD	mg/l	18	22	32	36	13
5	Biochemical Oxygen Demand as BOD	mg/l	5	6	10	11	4
6	Ammonical Nitrogen as NH ₃ -N	mg/l	1.38	4.80	6.10	4.20	1.80
7	Nitrate Nitrogen	mg/l	7.45	5.39	2.92	2.59	3.09
8	Chlorides as Cl	mg/l	809	604	741	1299	2249
9	Colour	Hazen	1	1	1	1	1
10	Fluorides as F	mg/l	1.23	0.98	1.49	1.17	1.49
11	Sulphates as SO ₄	mg/l	1006	78	100	112	205
12	Total Hardness as CaCO ₃	mg/l	610	467	554	384	1612
13	Sulphides as S	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.122	0.038	0.062	0.067	0.133
16	Iron as Fe	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
18	SAR	--	8.09	4.90	7.47	14.67	12.38
19	Total Kjeldahl Nitrogen	mg/l	2.20	1.29	1.86	2.98	2.16

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

Sr. No.	Identification of Sample [#]		GW-29 Borewell Of Govind Bhai Patel Opposite Dream Resort	GW-30 Borewell Of Valabhai Ahir @ Village Vavdi (Sr. No 8&9 Annexure 3)
	GPS Co-ordinates		N 23° 13' 04.3" E 69° 44' 20.7"	N 23° 11' 26.5" E 69° 49' 42.1"
	Sampling Date		23/10/2019	23/10/2019
	Lab Id		PLPL/191023161	PLPL/191023162
	Parameter	Unit	Results	
1	pH Value	--	7.30	7.27
2	Total Dissolved Solids	mg/l	1319	509
3	Temperature	°C	32.2	31.8
4	Chemical Oxygen Demand as COD	mg/l	30	22
5	Biochemical Oxygen Demand as BOD	mg/l	8	10
6	Ammonical Nitrogen as NH ₃ -N	mg/l	1.70	3.80
7	Nitrate Nitrogen	mg/l	2.58	6.51
8	Chlorides as Cl	mg/l	689	265
9	Colour	Hazen	1	1
10	Fluorides as F	mg/l	1.03	1.76
11	Sulphates as SO ₄	mg/l	84	30
12	Total Hardness as CaCO ₃	mg/l	523	197
13	Sulphides as S	mg/l	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.188	0.042
16	Iron as Fe	mg/l	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	Not Detected	Not Detected
18	SAR	--	7.26	2.52
19	Total Kjeldahl Nitrogen	mg/l	1.70	2.04

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

➤ **Water Analysis Results (Samples from 10 km distance from M/s. Ashapura Perfoclay Ltd.):**

Sr. No.	Identification of Sample [#]		GW-20 Gram Panchyat-Paddhar (Near Samsan)	GW-21 Gram Panchyat-Paddhar (Near Tank)	GW-27 Borewell Opposite To GWSSB Lakhond	GW-31 Borewell Of Jay Thakkar(Shreeji Farm) @Village Vavdi
	GPS Co-ordinates		N 23° 14' 48.0" E 69° 49' 39.0"	N 23° 14' 12.0" E 69° 49' 30.0"	N 23° 15' 58.3" E 69° 46' 58.9"	N 23° 12' 03.1" E 69° 49' 25.0"
	Sampling Date		22/10/2019	22/10/2019	23/10/2019	23/10/2019
	Lab Id		PLPL/191023163	PLPL/191023164	PLPL/191023165	PLPL/191023166
	Parameter	Unit	Results			
1	pH Value	--	6.84	7.28	7.08	6.98
2	Total Dissolved Solids	mg/l	895	845	1415	618
3	Temperature	°C	30.1	31.8	30.6	31.2
4	Chemical Oxygen Demand as COD	mg/l	28	36	10	16
5	Biochemical Oxygen Demand as BOD	mg/l	8	12	2	2
6	Ammonical Nitrogen as NH ₃ -N	mg/l	1.20	1.02	0.42	0.64
7	Nitrate Nitrogen	mg/l	4.49	0.78	1.67	2.01
8	Chlorides as Cl	mg/l	439	430	771	311
9	Colour	Hazen	3	2	1	1
10	Fluorides as F	mg/l	1.42	1.61	1.57	1.37
11	Sulphates as SO ₄	mg/l	68	55	58	40
12	Total Hardness as CaCO ₃	mg/l	345	326	553	236
13	Sulphides as S	mg/l	Not Detected	Not Detected	Not Detected	Not Detected
14	Lead as Pb	mg/l	Not Detected	Not Detected	Not Detected	Not Detected
15	Zinc as Zn	mg/l	0.035	0.058	0.099	0.052
16	Iron as Fe	mg/l	Not Detected	Not Detected	Not Detected	Not Detected
17	Total Chromium as Cr ⁺³	mg/l	Not Detected	Not Detected	Not Detected	Not Detected
18	SAR	--	4.69	8.52	6.06	2.54
19	Total Kjeldahl Nitrogen	mg/l	1.78	2.40	1.78	1.47

Detection Limit : Sulphides as S: 0.025 mg/l, Lead as Pb: 0.005 mg/l, Iron as Fe: 0.15 mg/l, Total Chromium as Cr⁺³: 0.025 mg/l.

: Detail given by customer.

➤ **Gypsum Analysis Results:**

Sr. No.	Identification of Sample [#]		A1 Ashapura Perfoclay Survey No.167	A2 Composite sample ofbesides Lehriya Hanuman Temple, Kumka village	A3 Downstream of near block factory, village:ler
	Sampling Date		21/10/2019	22/10/2019	22/10/2019
	Lab Id		PLPL/191023276	PLPL/191023277	PLPL/191023278
	Parameter	Unit	Results		
1	pH	-	7.55	7.84	7.79
2	SiO ₂	%	7.39	1.09	0.71
3	Al ₂ O ₃	%	7.19	7.38	7.1
4	Fe ₂ O ₃	%	7.27	7.35	6.1
5	Na ₂ O	%	0.69	0.057	0.34
6	Moisture	%	10.4	3.6	1.84
7	Gypsum as CaSO ₄ .2H ₂ O	%	56.86	70.81	67.54

: Detail given by customer.

Sr. No.	Identification of Sample [#]		A1 Ashapura Perfoclay Survey No.167	A2 Composite sample ofbesides Lehriya Hanuman Temple, Kumka village	A3 Downstream of near block factory, village:ler	List of waste constituents with concentration limits of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as per Note I of Schedule II
	Sampling Date		21/10/2019	22/10/2019	22/10/2019	
	Lab Id		PLPL/191023276	PLPL/191023277	PLPL/191023278	
	Parameter	Unit	Results			
1	Lead as Pb (TCLP)	mg/l	0.043	0.032	0.026	5
2	Cadmium as Cd (TCLP)	mg/l	0.049	0.012	0.017	1
3	Copper as Cu (STLC)	mg/l	0.082	0.147	0.067	25
4	Nickel as Ni (STLC)	mg/l	0.324	0.082	0.12	20
5	Mercury as Hg (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	0.2
6	Chromium as Cr (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	5
7	Antimony as Sb (STLC)	mg/l	Not Detected	Not Detected	Not Detected	15
8	Arsenic as As (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	5
9	Cyanide as CN (TCLP/STLC)	mg/l	Not Detected	Not Detected	Not Detected	20
10	Ammonia (TCLP/STLC)	mg/l	1.16	1.24	1.01	50
11	Selenium as Se (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	1

Sr. No.	Identification of Sample [#]		A4 Shekhpur Parle Road	A5 After Padhar police station right side 50 m (on Government Land on Padhdhar village)	A6 Vavdi village, opposite to survey no: 85/1
	Sampling Date		22/10/2019	22/10/2019	22/10/2019
	Lab Id		PLPL/191023279	PLPL/191023280	PLPL/191023281
	Parameter	Unit	Results		
1	pH	-	7.99	7.51	7.61
2	SiO ₂	%	0.87	0.94	1.18
3	Al ₂ O ₃	%	7.54	7.24	7.81
4	Fe ₂ O ₃	%	7.2	6.28	6.88
5	Na ₂ O	%	0.031	0.108	0.088
6	Moisture	%	1.06	2.4	2.15
7	Gypsum as CaSO ₄ .2H ₂ O	%	69.08	63.78	66.51

: Detail given by customer.

Sr. No.	Identification of Sample [#]		A4 Shekhpur Parle Road	A5 After Padhar police station right side 50 m (on Government Land on Padhdhar village)	A6 Vavdi village, opposite to survey no: 85/1	List of waste constituents with concentration limits of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as per Note I of Schedule II
	Sampling Date		22/10/2019	22/10/2019	22/10/2019	
	Lab Id		PLPL/191023279	PLPL/191023280	PLPL/191023281	
	Parameter	Unit	Results			
1	Lead as Pb (TCLP)	mg/l	0.048	0.037	0.022	5
2	Cadmium as Cd (TCLP)	mg/l	0.009	0.021	0.018	1
3	Copper as Cu (STLC)	mg/l	0.099	0.062	0.042	25
4	Nickel as Ni (STLC)	mg/l	0.180	0.205	0.155	20
5	Mercury as Hg (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	0.2
6	Chromium as Cr (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	5
7	Antimony as Sb (STLC)	mg/l	Not Detected	Not Detected	Not Detected	15
8	Arsenic as As (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	5
9	Cyanide as CN (TCLP/STLC)	mg/l	Not Detected	Not Detected	Not Detected	20
10	Ammonia (TCLP/STLC)	mg/l	1.44	1.17	1.13	50
11	Selenium as Se (TCLP)	mg/l	Not Detected	Not Detected	Not Detected	1

Sr. No.	Identification of Sample#		A7 Natural Drain between farm of Dinesh Maharaj and Govind Vanker, survey no :218, Kumka village	
	Sampling Date		22/10/2019	
	Lab Id		PLPL/191023282	
	Parameter	Unit	Results	
1	pH	-	7.82	
2	SiO ₂	%	1.58	
3	Al ₂ O ₃	%	7.62	
4	Fe ₂ O ₃	%	6.7	
5	Na ₂ O	%	0.132	
6	Moisture	%	1.96	
7	Gypsum as CaSO ₄ .2H ₂ O	%	68.53	

: Detail given by customer.

Sr. No.	Identification of Sample#		A7 Natural Drain between farm of Dinesh Maharaj and Govind Vanker, survey no :218, Kumka village		List of waste constituents with concentration limits of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as per Note I of Schedule II
	Sampling Date		22/10/2019		
	Lab Id		PLPL/191023282		
	Parameter	Unit	Results		
1	Lead as Pb (TCLP)	mg/l	0.026		5
2	Cadmium as Cd (TCLP)	mg/l	0.025		1
3	Copper as Cu (STLC)	mg/l	0.078		25
4	Nickel asNi (STLC)	mg/l	0.122		20
5	Mercury as Hg (TCLP)	mg/l	Not Detected		0.2
6	Chromium as Cr (TCLP)	mg/l	Not Detected		5
7	Antimony as Sb (STLC)	mg/l	Not Detected		15
8	Arsenic as As (TCLP)	mg/l	Not Detected		5
9	Cyanide as CN(TCLP/STLC)	mg/l	Not Detected		20
10	Ammonia (TCLP/STLC)	mg/l	1.15		50
11	Selenium as Se (TCLP)	mg/l	Not Detected		1

8. OBSERVATION OF STUDY

OBSERVATION

- M/s. GPCB assigned work for detailed study with remedial action/complete solution for contamination of Groundwater as well as Soil by M/s. Ashapura Perfoclay Ltd, Survey No. 167, Village: Ler, Ta: Bhuj-Kutch to M/s. Pollucon Laboratories Pvt.Ltd.-Surat
- M/s. Pollucon Laboratories Pvt. Ltd.-Surat carried out the sampling during 21/10/2019 to 23/10/2019 and analyzed gypsum, ground water as well as soil samples to see the impact of contaminant on Ground water and Soil with respect to specific parameters.
- Ground water samples are collected from the surrounding bore wells from various locations including reference samples & unit's bore-wells- total 31 Nos. and total 7 Nos. of Gypsum samples are collected from the surrounding area of the unit and various locations where gypsum was dumped.
- The soil samples are collected from 38 locations (total nos. of sample collected are 110 nos. and sampling done from top soil, 1Meter, and 2 Meter depth as per the map describing the site of gypsum dumping given by GPCB. (Ref. Annexure-3 &4).
- To study the impact around approximate 10 km of area is considered. Gypsum dumping is done by M/s. Ashapura perfoclay Ltd, Bhuj-kutch around approx. 8 km. (Ref. Annexure-3 & 4 as per documents provided by GPCB).
- For more clarity and evaluation reference sample may be useful at some extent. Preliminary reference samples collected for 4 nos. of water samples and 3 nos. of soil from distance of approximate more than 8 kms from M/s. Ashapura Perfoclay Ltd., Survey No. 167, Village – Ler, Tal. – Bhuj, Kutch.
- Total 6 Nos. of gypsum sample were collected at different dumping site and 1 sample collected from gypsum storage area within factory premises. Gypsum is analyzed and analyzed parameters are with the norms. (Test Report No.- PLPL/130703009 and dated 03.07.2013)
- “Gypsum from this source can be categorized as non-hazardous.” As per the MoEF vide letter no. F no. 23-161/2014-HSMD, dated17/10/2014.
- Following observation given by Department of Agriculture Chemistry & Soil Science Junagadh Agriculture University for gypsum:

“Different methods and levels of gypsum application to cotton crop improves the seed cotton, stalk yield and seed yield but unable to reach the level of significance, but the S status of soil after harvest of the crop increased significantly.”

- Soil samples testing results of parameters such as pH, Heavy metals, Na and K are found to be more or less in the range of the samples collected from distance between 8 to 10 kms from M/s. Ashapura PerfoclayLtd.
- To identify the pollutants, manufacturing details is referred as per the mail of GPCB dated 18th Oct, 2019. Looking to such details of manufacturing process, the probable inorganic pollutants studied.
- Gypsum analyzed for its chemical and other parameters. Most probable pollutant ammonia is within the norms of Waste constituents with concentration limits as per Class A: Based on leachable concentration limits of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as per Note I of Schedule II.
- Results of some major parameters which may influence the ground water & soil quality.

Results of Soil Analysis :

Sr. No.	Parameters	Approximate 8 km distance from M/s. Ashapura Perfoclay Ltd.	Approximate 8 to 10 km distance from M/s. Ashapura Perfoclay Ltd.
		Results	
1.	pH	Ranging from 7.53 to 9.89	Ranging from 8.50 to 9.33
2.	Electrical Conductivity	Ranging from 0.02 to 3.44 ms	Ranging from 0.07 to 6.63 ms
3.	Ammonia (TCLP)	Ranging from 0.39 to 2.58 mg/l	Ranging from 0.66 to 1.13 mg/l

Results of Ground Water Analysis :

Sr. No.	Parameters	Location 1 to 10 (approximate Within 1.5 km at distance from M/s. Ashapura Perfoclay Ltd.)	Location 11 to 30 – except 20, 21, 27 & 31 (approximate 2 to 8 km at distance from M/s. Ashapura PerfoclayLtd.)	Location 20, 21, 27 & 31 approximate 8 to 10 km at distance from M/s. Ashapura Perfoclay Ltd.)
		Results		
1.	Ammonical Nitrogen	Ranging from 0.34 to 16.10 mg/l	Ranging from 0.38 to 6.20 mg/l	Ranging from 0.42 to 1.20 mg/l
2.	Total Dissolved Solids	Ranging from 1620 to 5285 mg/l	Ranging from 509 to 4211 mg/l	Ranging from 618 to 1415 mg/l

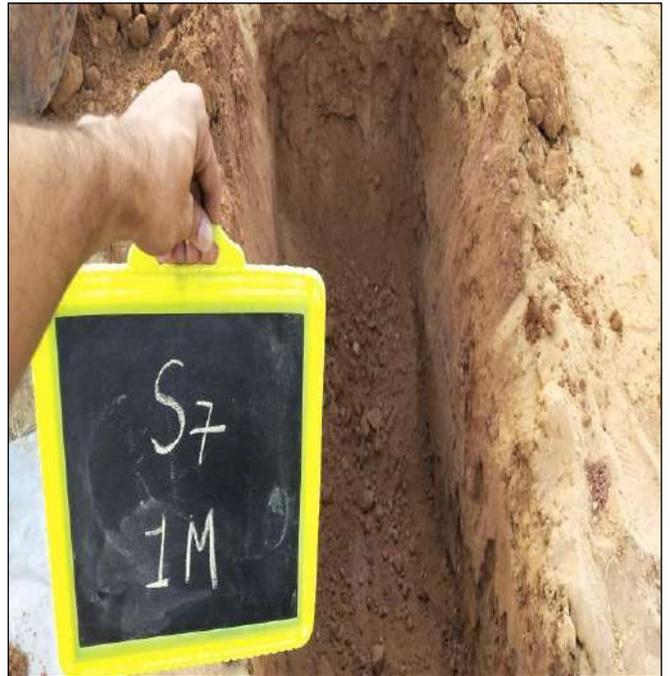
- While comparing above results with IS 10500:2012 Drinking Water, some of the bore well

water is not suitable for drinking purpose.

- Few many technologically available applications could be implemented to address the remedial measures wherever require with techno-commercial viability.
- However, in general water harvesting; ground water recharging may be helpful as remedial measures. And a periodical monitoring to be undertaken for the effect of action taken.
- Unit must follow EC/ CTE/ CC&A and other recommendation provided by competent authority.

9.SAMPLING
PHOTOGRAPHS

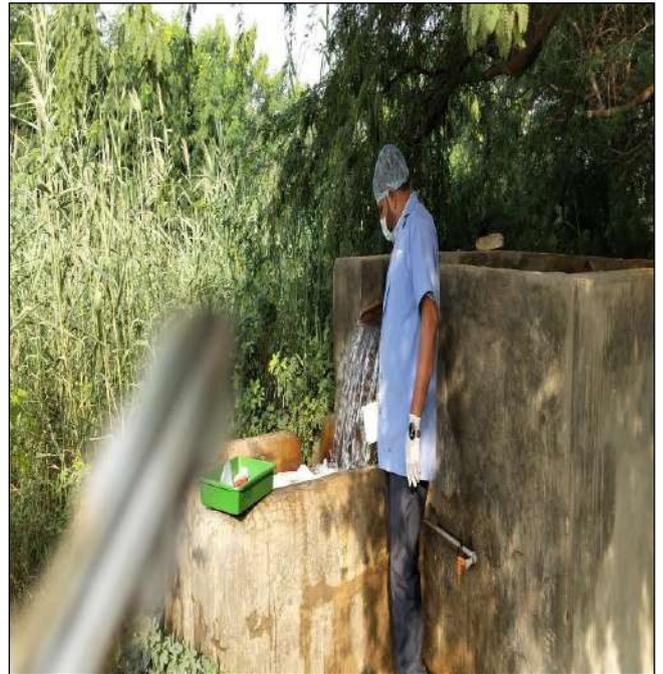
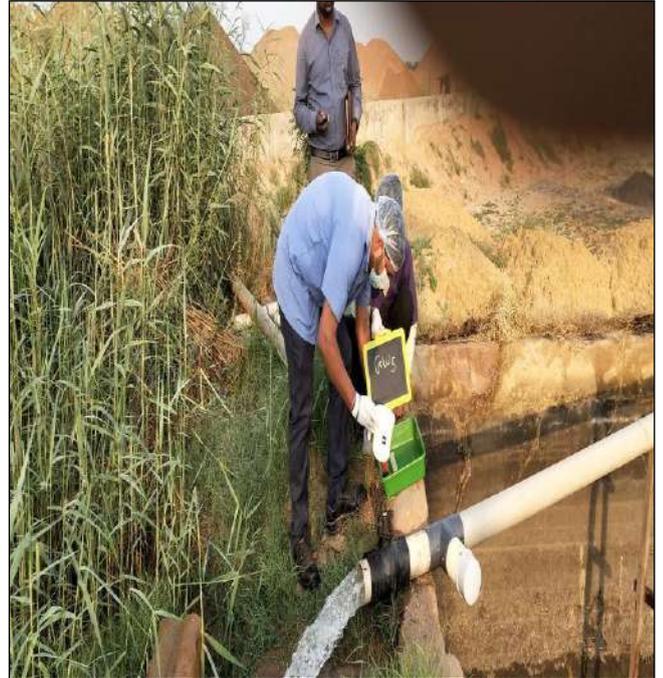
Soil Sampling Photograph

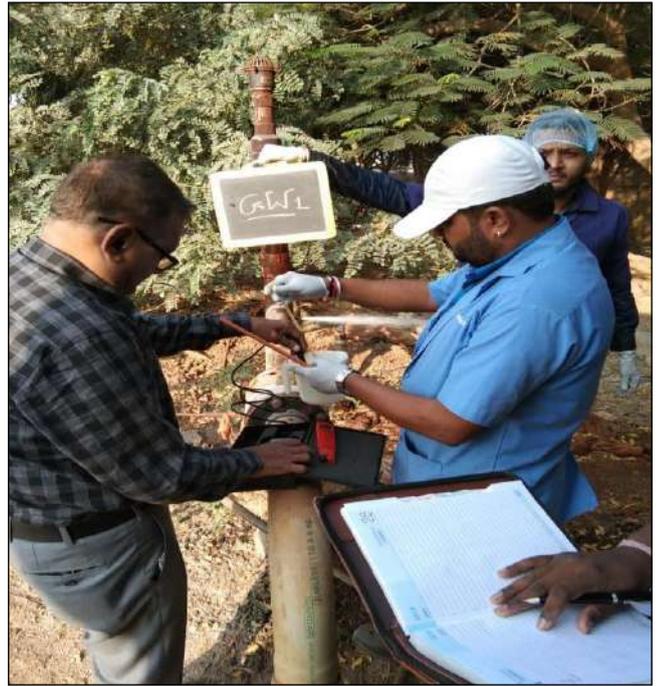






Ground Water Sampling Photograph:

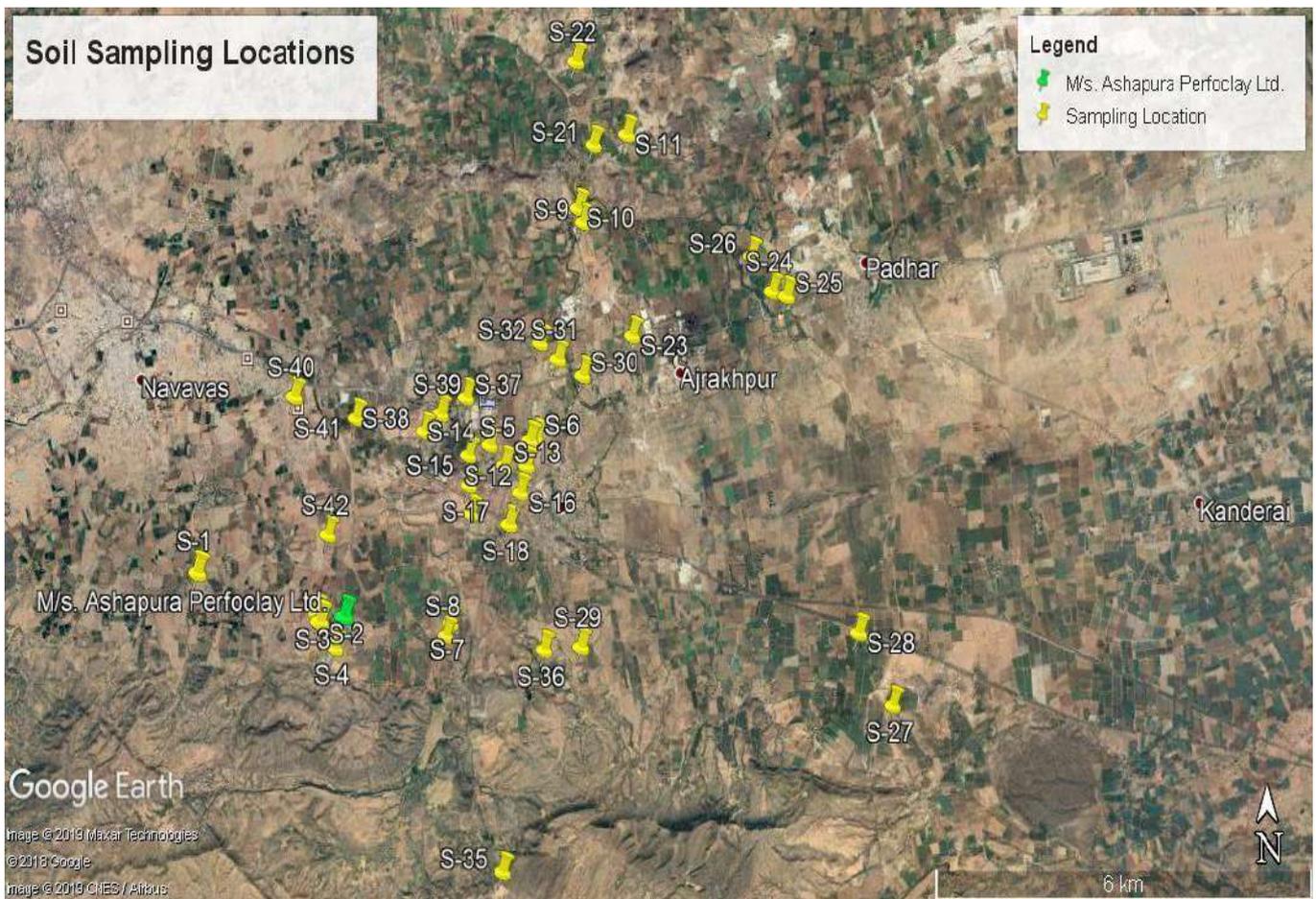




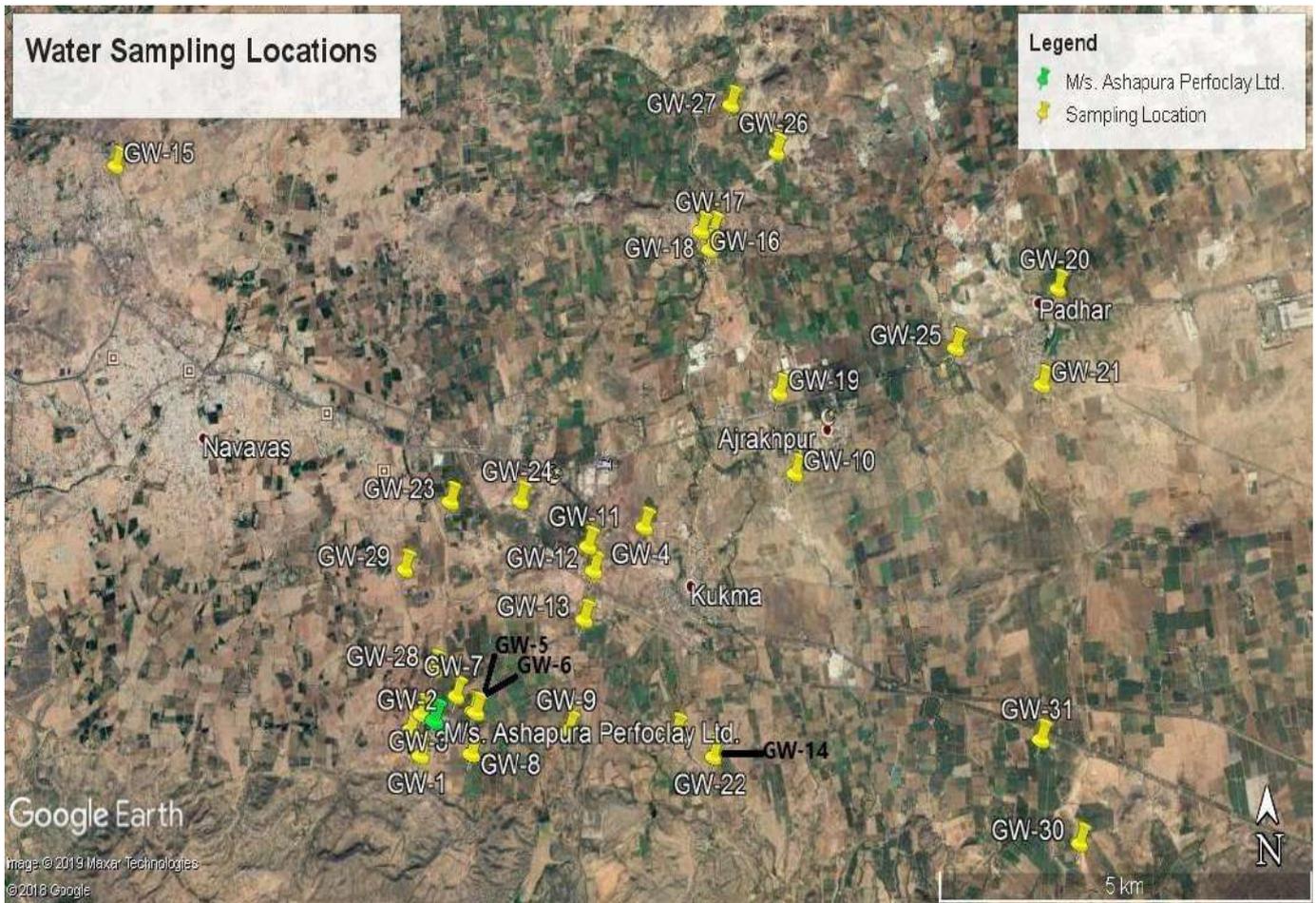
Gypsum Storage Area:



10. SAMPLING LOCATIONS ON GOOGLE EARTH



SOIL SAMPLING LOCATIONS			
S-1	Survey no. 205	S-22	Borewell opposite to gwssblakhond
S-2	Survey no. 164	S-23	After toll gate left side (sr no. 3 annexure -4)
S-3	Survey no. 163	S-24	Opposite paddhar police station (sr. No 19 @ annexure -3)
S-4	Near gate no. 2 at ashapuravaluclay	S-25	After paddhar police station right side 50 mtrdownstream (sr. No 18 @ annexure -3)
S-5	Beside lehriya hanuman temple (sr.no 3 as per annexure-3) sample taken 50 mtr away in down stream	S-26	Paddhar gam
S-6	Near lehriya hanuman temple sample taken 100 mtr away in down stream of sr no 1 & 3 (annexure -3)	S-27	Sr.no 8 & 9 (annexure-3)vavdi village
S-7	Land of hitubhajadeja (annexure -3_27 & annexure -4_5,5.1)downstream - 30 mtr @ sr. 27, 5,5.1	S-28	Shreeji farm , vavdi
S-8	Downstream - 10 mtr @ sr. No- 3 of annexure 4)	S-29	Dinesh maharaj @ sr. No7 (annexure-3)
S-9	Downstream - 100 mtr @ sr. No- 13 of annexure 3) farm on lakhond land road	S-30	Downstream of kukma-lakhond road lhs (sr. No 10 @ annexure -4)
S-10	Location downstream @ 50 mtr from sr. No	S-31	Girgaudhamroad side sr. No 11(annexure-3)
S-11	Downstream - 50 mtr @ sr. No- 17 of annexure 3) china clay mines vastabhai	S-32	Behind ashapura foundation school sr.no-12 (annexure-3)
S-12	Downstream - @ sr. No- 2 of annexure 3) opposite of lehriyahaunman temple	S-33	Downstream @ 50 mt sr. No 26 (annexure -3) pithoramandir
S-13	Downstream - @ sr. No- 4 of annexure 3) old stone mines of prakashpatel	S-34	Downstream @ 100 mt sr. No 25 (annexure -3) beside balubharathod lake
S-14	Downstream - @ sr. No- 5 of annexure 3) behind khatri mill	S-35	Sr. No 20 (annexure -3) b/h balaji petrol pump
S-15	Beside of water tank of gwil sump sr.no 6 @ annexure -3	S-36	Downstream @ 50 mt sr. No 4.1 (annexure -4) at sheikhpirparle road
S-16	Sr.no 21 (annexure-3)nr. Matiyadevmandir	S-37	Downstream @ 50 mt sr. No 4 (annexure -4) at sheikhpirparle road
S-17	Sr.no 22 (annexure-3)land between swaminarayanwadi and water tank gwil	S-38	Downstream @ 50 mt sr. No 7 (annexure -4) at mangalmandir school
S-18	Sr.no 23 (annexure-3)natural drain nr sanjotnagar b/h swaminarayanwadi	S-39	Downstream - 30 mtr of sr.no 8 (annexure-4) @vakalmatamandir
S-19	Sr.no 24 (annexure-3)north side of swaminarayanwadi	S-40	Downstream of sr.no 6 (annexure-4) @vakalmatamandir
S-20	Near dargahlakhond (sr. No 1 & 2 @ annexure -4)	S-41	Borewell opposite to gwssblakhond
S-21	Survey no. 205	S-42	After toll gate left side (sr no. 3 annexure -4)



GROUND WATER SAMPLING LOCATIONS			
GW-1	Nr gate no. 2	GW-17	Shavjibhai naranbhai baradiya- lakhond
GW-2	Samavandh samiti	GW-18	Panchabhai velabhai kotivar-lakhond
GW-3	Apl admin	GW-19	Toll plaza lakhond
GW-4	Lehriya hanuman	GW-20	Gram panchyat-paddhar (near samsan)
GW-5	Ramesh pindoriya	GW-21	Gram panchyat-paddhar (near tank)
GW-6	Vasudev pindoriya	GW-22	Dineshmaharaj wadiser.No-7 (annexure-3)
GW-7	Govind hirji gorasia	GW-23	Vakalmata mandir sr- 8 (annexure 4)
GW-8	Ranubha jadeja	GW-24	Borewell nr sr.no 4 (annexure 4) nr. Parle
GW-9	Hetubha jadeja	GW-25	Borewell of govindbhai major ahir (sr. No 18 annexure-3)
GW-10	Lakhond - gram panchyat	GW-26	Borewell chinaclay mines (sr. No 17 annexure - 3)
GW-11	Kukma-gwil	GW-27	Borewell opposite to gwssb lakhond
GW-12	Kanchan vadi-shroff farm	GW-28	Shyamji velji gorasia (bw4)
GW-13	Swaminarayan wadi	GW-29	Borewell of govind bhai patel opposite dream resort
GW-14	Shivubha jadeja	GW-30	Borewell of valabhai ahir @ village vavdi (sr. No 8&9 annexure 3)
GW-15	Second borewell lakhond- gram panchyat	GW-31	Borewell of jay thakkar (shreeji farm) @ village vavdi
GW-16	Jakhobhai hirabha baradiya- lakhond		

ANNEXURE I

Credentials

Of

Pollucon Laboratories Pvt.Ltd.

A. National Accreditation Board For Testing And Calibration Laboratories

		National Accreditation Board for Testing and Calibration Laboratories (A Constituent Board of Quality Council of India)	
<u>CERTIFICATE OF ACCREDITATION</u>			
POLLUCON LABORATORIES PVT. LTD.			
has been assessed and accredited in accordance with the standard			
ISO/IEC 17025:2017			
"General Requirements for the Competence of Testing & Calibration Laboratories"			
for its facilities at			
PLOT 5 AND 6 , "POLLUCON HOUSE", OLD SHANTINATH MILL LANE, NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT, GUJARAT, INDIA			
in the field of			
TESTING			
Certificate Number:	TC-5945		
Issue Date:	28/05/2019	Valid Until:	27/05/2021
<p>This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL. (To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)</p>			
Signed for and on behalf of NABL			
	 N. Venkateswaran Chief Executive Officer		

B. ISO 9001:2015

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited
certifies that

Pollucon

Pollucon Laboratories Pvt. Ltd.
"Pollucon House" Plot No. 80, Shed no. B/5 & B/6,
Opp Balaji Industrial Society, Nr. Navjivan Circle,
Udhana Magdalla Road, Surat – 395007, Gujarat, INDIA

has implemented a Quality Management System
in accordance with ISO 9001:2015
For Scope of

**Providing Environmental Audit, Consultancy, Monitoring & Testing
Services for Water, Air, Hazardous waste & Food Products**

The certificate is valid From 2017-12-30 until 2020-12-29
Subject to successful completion of annual periodic audits
The present status of this Certificate can be obtained on www.tuv-sud.in
Further clarifications regarding the scope of this certificate may be obtained by consulting the certification body
Certificate Registration No. 99 100 14114
Date of Initial certification : 2013-01-08

Signature

Certification Body
of TÜV SÜD South Asia Private Limited, Mumbai
Member of TÜV SÜD Group



TÜV SÜD South Asia Pvt. Ltd. • TÜV SÜD House • Saki Naka • Andheri (East) • Mumbai – 400072 • Maharashtra • India • TÜV[®]

ZERTIFIKAT ♦ CERTIFICATE ♦ 認証証書 ♦ CERTIFICADO ♦ CERTIFICAT

E. Gujarat Pollution Control Board Environmental Audit Recognition



GUJARAT POLLUTION CONTROL BOARD
Paryavaran Bhavan
Sector - 10 A, Gandhinagar - 382 010.
Environment Audit Cell

No. GPCB/EA-126(6)/ 493334)

1 FEB 2019

RPAD

To,
Pollucon Laboratories Pvt. Ltd.
Plot No. 5/6, Pollucon House,
Opp. Balaji Industrial Soc.,
Old Shantinath Silk Mill Lane,
Navjivan Circle, Udhana Magdalla Road,
Surat - 395 007

Sub:- Recognition as Schedule- II Environmental Auditor.

Sir,

This refers to your application for the recognition as Environmental Auditor, subsequent interview by Environment Audit Committee members. It is recommended by the Environment Audit Committee members, to recognize your firm as Schedule-II Environmental Auditor for carrying out the Environmental Audit under Environment Audit Scheme with following conditions.

- 1) Recognition is valid upto **31/12/2020**.
- 2) You shall have maximum **Three** teams for the Environment Audit.
- 3) You shall carry out maximum **45** nos. of Environment Audit.
- 4) Team members shall be as under :

Sr. No.	Name	Designation
Team-1		
1	Mr. Mehul Chevli	Environment Engineer
2	Mr. Nimesh Prajapati	Chemical Engineer
3	Mr. Devang Gandhi	Chemist
4	Mr. Harshal Gandhi	Microbiologist
Team-2		
1	Ms. Dhruvi Desai	Environment Engineer
2	Mr. Hitesh Rathod	Chemical Engineer
3	Mr. H.T.Shah	Chemist
4	Mr. Mukesh Patel	Microbiologist
Team-3		
1	Mr. Vishmay Rana	Environment Engineer
2	Mr. Nandlal Suthar	Chemical Engineer
3	Mr. Macky Suraliwala	Chemist
4	Mrs. Nikita Patel	Microbiologist

Clean Gujarat Green Gujarat
An ISO 9001: 2008 & ISO 14001: 2004 Certified Organization

F. MoEF

F. No. Q-15018/24/2014-CPW(PL)
Government of India
Ministry of Environment, Forest and Climate Change
(CP Division)

Prithvi-324, Indira Paryavaran Bhavan,
Jor Bagh Road, New Delhi - 110 003.

Dated, the 23 January, 2018

To

M/s Pollucon Laboratories Pvt. Ltd.,
"Pollucon House", 13-C, Plot No. 80
Shed No. B 5-6, Opp. Balaji Industrial Society,
Near Navjivan Circle, Udhna Magadalla Road
Surat-395007

Subject: -Change of address of M/s Pollucon Laboratories Pvt. Ltd. to "Pollucon House", 13-C, Plot No. 80, Shed No. B 5-6, Opp. Balaji Industrial Society, Near Navjivan Circle, Udhna Magadalla Road, Surat-395007.

Sir,

I am directed to refer to your application submitted vide letter No. PL/2022/31/2017 dated 20th February, 2017 seeking permission for shifting laboratory. Based on the recommendations of the Expert Committee for Recognition of Environmental Laboratories in its 50th meeting held on 7th & 16th June, 2017 and your acceptance of the revised terms and conditions at Annexure-III & IV of the Guidelines for recognition of Environmental Laboratories, this Ministry approves the recognition of M/s Pollucon Laboratories Pvt. Ltd. "Pollucon House", 13-C, Plot No. 80, Shed No. B 5-6, Opp. Balaji Industrial Society, Near Navjivan Circle, Udhna Magadalla Road, Surat-395007 from 02.06.2016 to 01.06.2021, as shall be notified in the Gazette of India.

2. As sought in your aforementioned application, M/s Pollucon Laboratories Pvt. Ltd. may undertake the following tests:

- i. **Physical Tests:** Conductivity, Colour, pH, Fixed & volatile solids, Total solids, Total dissolved solids, Total suspended solids, Turbidity, Temperature, Velocity & discharge measurement of industrial effluent stream, Flocculation test (Jar test), Odour, Salinity, Settleable solids and Sludge Volume Index (SVI)
- ii. **Inorganic (General & Non-metallic):** Acidity, Alkalinity, Ammonical nitrogen, Chloride, Chlorine residual, Dissolved oxygen, Fluoride, Total hardness, Total kjeldahl nitrogen (TKN), Nitrite nitrogen, Nitrate nitrogen, Phosphate, Sulphate, Bromide, Carbon dioxide, Chloride demand, Iodine, Sulphide, Silica, Cyanide and Sulphide.
- iii. **Inorganic (Trace metals):** Boron, Cadmium, Calcium, Chromium Total, Chromium Hexavalent, Copper, Iron, Lead, Magnesium, Mercury, Nickel, Potassium, Sodium, Sodium absorption ratio, Zinc, Arsenic, Aluminium, Barium, Manganese, Selenium, Silver, Strontium, Tin, Cobalt and Vanadium.
- iv. **Organics (General) and Trace Organics:** Bio-chemical oxygen demand (BOD), Chemical oxygen demand (COD), Oil & grease, Phenol, Pesticide (Organo-chlorine, Organo nitrogen-phosphorous), Surfactants, Tannin & Lignin, Poly-chlorinated biphenyl (PCB's) each, Polynuclear aromatic hydrocarbon (PAH) each and Carbon Nitrogen ratio
- v. **Microbiological:** Total coliform, Faecal coliform, Faecal streptococci, E. coli, Total plate count, Enterococcus, Coliphage.
- vi. **Toxicological:** Bioassay method for evaluation of toxicity using fish, Bio-accumulation, bio magnification and bio-transformation studies, Estimation of the effect at tissue level, Measurement of toxicity using Daphnia or other organism, Measurement of toxicity factor using Daphnia or other organism and Measurement of toxicity factor using zebra fish.
- vii. **Biological:** Benthic organism identification and count, Macrophytic identification, Parasitic identification count, Measurement of various diversity index, Saprobity Index, Chlorophyll Primary productivity and P/R Ratio.
- viii. **Hazardous Waste:** Preparation of Leachate (TCLP extract/water extract), Corrosivity, Ignitibility (Flash point), Reactivity, Toxicity, Measurement of heavy metals, Pesticides in the waste/leachate.

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99



भारत का राजपत्र

The Gazette of India

असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)
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PUBLISHED BY AUTHORITY

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पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 2 जून, 2016

का.आ. 1953(अ).—केन्द्रीय सरकार के माथ पठित पर्यावरण (संरक्षण) नियम, 1986 के नियम 10 पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 12 की उपधारा (1) के खंड (ख) और धारा 13 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना सं. का.आ. 1174(अ), तारीख 18 जुलाई, 2007 में निम्नलिखित संशोधन और करती है, अर्थात् :—

उक्त अधिसूचना में सर्वत्र तालिका में,—

(क) क्रम संख्यांक 5, 9, 13 से 20, 79, 80 और 83 से 85 तथा उससे संबंधित प्रविष्टियों के स्थान पर निम्नलिखित क्रमशः क्रम संख्यांक और प्रविष्टियां रखी जाएंगी, अर्थात् :—

20	मैसर्स पोल्यूकोन लैबोरेटरीस प्रा. लि., 544, बेलिजयम टावरस, गिंग रोड, जिनियर बस स्टैंड के पीछे, सुरत, गुजरात-395006	(1) डा. अरुण कुमार बाजपेई (2) श्री देवांग मधुकर गांधी (3) श्री हर्शल मधुकर गांधी	02.06.2016 से 01.06.2021
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2805 GI/2016

(1)

G. Major Projects undertaken by M/s. Pollucon Laboratories Pvt. Ltd.

SR. NO.	DETAILS OF PROJECT
1	Human Health Risk Assessment Study
2	Source Apportionment Study
3	Water Balance study
4	Fly ash Leachate study
5	Life Cycle Assessment Study
6	Solid waste management
7	Electrostatic Performance Test
8	Environmental Monitoring
9	Survey for water contamination of water throughout the UT of Dadra and Nagar haveli
10	Performance Test of Air Pollution Control Devise
11	Trial run for co-processing of waste mix solid in cement kiln
12	Trial run for co-processing of waste mix solids & waste mix liquids in cement kiln
13	Trial run for utilisation of used anode butt for manufacturing of electrode carbon paste
14	Trial run for Utilization of Hazardous waste as a Fuel
15	Ash pond Leachate Study
16	Trial run for co-processing of expired medicine & off specification drugs of Torrent Pharma in cement kiln
17	Trial run for utilisation of spent acid for manufacturing of ferrous sulphate
18	Trial Run for Co-processing of Hazardous Solid/ Semi-solid waste mix In Cement Kiln
19	Testing of water, GPS data collection, Sanitation Survey of all Public Drinking Water Sources
20	Mass balance study of toxic elements in coal fired power plant
21	Conducting a study on leaching of toxics from ash around ashmound
22	Occupational health and epidemic health disorder survey.
23	Trial Run for Utilization of Pet Coke in place of Coal/Lignite in cement Kiln
24	Sampling and Analysis for CEPI index (for CPCB)
25	Joint Monitoring with CPCB, GPCB etc.
26	Implementing liabilities for environmental damages due to handling & disposal of hazardous waste and penalty

- Pollucon has completed nos. of major Environmental Projects of Human Health Risk Assessment, Source Apportionment Study, Water Balance and Fly Ash leachate study.
- Fly Ash leachate study conducted on fly ash dumping site to check the contamination level up to ground water and other water bodies.

- Leachate study is required to get correct idea of contamination and subsequent remediation procedure identification.
- Leachate study is vital for any remediation process.
- Human Health Risk Assessment Study as per USEPA guideline is completed for many NTPC plants.
- Central Pollution Control Board awarded the monitoring project for CEPI index for industrial cluster of Vapi, Ankleshwar, Panoli, Ahmedabad, Vatva.
- Also, number of samples from GPCB are analyzed for Regional office and Head office Gandhinagar.
- We have completed sampling and analysis for “Implementing Liabilities For Environmental Damages Due To Handling & Disposal Of Hazardous Waste And Penalty” for different types of industry.
- We have monitored Dioxine & Furan and other gases for biomedical waste and other incinerator for TSDF site, GPCB, etc.

ANNEXURE II

NGT Order

Item No. 03

Court No. 1

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

Original Application No. 669/2018
(With report dated 28.06.2019)

Marvada Amrutlal Becharlal

Applicant(s)

Versus

State of Gujarat

Respondent(s)

Date of hearing: 03.09.2019

**CORAM: HONBLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HONBLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HONBLE DR. NAGIN NANDA, EXPERT MEMBER**

For Applicant (s): Ms. Shilpa Chohan and Mr. Shawhiq Siddiqui,
Advocates

For Respondent(s): Mr. Ruchi Kohli, Ms. Nidhi Jaswal and Ms.
Manyam Ghandok, Advocates for GPCB

ORDER

1. Issue for consideration is action for violation of pollution laws by M/s Ashapura Group of Companies, Village Ler, Taluka Bhuj, District Kutch, Gujarat.
2. The matter has been dealt with by this Tribunal on several dates in the light of the factual and action taken reports filed by the Gujarat Pollution Control Board (GPCB) as well as submission made on behalf of the applicant.
3. On 27.05.2019, the matter was reviewed as follows:-

"4. Accordingly, a joint report was furnished on 23.03.2019 by the CPCB and the GPCB which was considered on 06.05.2019. The joint Committee found that the unit had

1



not compliant with the environmental norms. It had stored gypsum which was required to be scientifically disposed. There was damage to the ground water quality which was required to be restored. Plantation had not been done as per the CCA Condition No. 3.9. Sprinklers were required for control of dust emissions. Line No. 1 & 2 could not be allowed to operate till proper fugitive emission control system is set up. Dust control system is required at raw material crushers and acid activation reactors are required to be covered. The stand of the GPCB was that bank guarantee furnished by the unit for Rs. 15 lakhs was forfeited on account of non-compliance and an additional bank guarantee of Rs. 30 Lakhs had been taken to secure compliance. Notice was issued for prosecution. Compensation assessment was left to the District level Committee. Revocation of the closure has been extended for three months subject to certain conditions.

10. The applicant has placed on record written submissions in response to the action taken report by the GPCB stating that bleaching clay plant in question is causing severe air pollution as shown by the photographs taken on 21.05.2019 and is also dumping effluents in the nearby drains as shown by photographs taken on 22.05.2019. Gypsum is dumped in villages upto a distance of 5 Kms of the government land in Village Kukma and is being covered with China Clay/sand as shown by the photographs. Gypsum is being dumped along the highways, in agricultural fields and government lands causing land pollution. Effluent water from the evaporation pond is being dumped in government land in Village Ler as shown by the photographs. Evaporation pond has been constructed on the government land adjoining the plant in question by encroachment. The Revenue Department of the Government has

issued show cause notice dated 16.11.2018, a copy of which has been filed. We have asked the GPCB to look into these submissions and photographs and documents and take further appropriate action in accordance with law.

11. In continuation of order dated 06.05.2019, we direct the GPCB to take further appropriate action in accordance with law in respect of the violation of the environment in the past as well as which are still continuing by way of closure of polluting activities, prosecution of the polluter and recovering compensation for the loss and furnish a further report within one month by email at judicial-ngt@gov.in."

4. In pursuance to above, the GPCB has filed further action taken report dated 28.06.2019 to the effect that compensation of Rs. 97,50,000/- has been recovered. Prosecution was being pursued and the Committee has been constituted to study the disposal of gypsum in back filling of the mines.

5. On behalf of the applicant, written submission dated 09.07.2019 has been filed relying upon the observations in the inspection reports of the GPCB and also submitting that gypsum was being stored on the Government land. Further written submissions have been filed during the course of hearing *inter-alia* stating that pet coke was still being stored and that the stand that the same was returned to Kotak Petro Chem P. Limited, Jamnagar, was not correct in view of response to a RTI query by GPCB itself. Further, photographs have been filed showing storage of gypsum.

6. Learned counsel for the GPCB seeks time to verify the facts and file a further report. Such report may be filed on or before 15.10.2019.

7. Needless to say that GPCB must ensure remedial action against the storage of gypsum in accordance with law.

List for further consideration on 20.11.2019.



ANNEXURE III

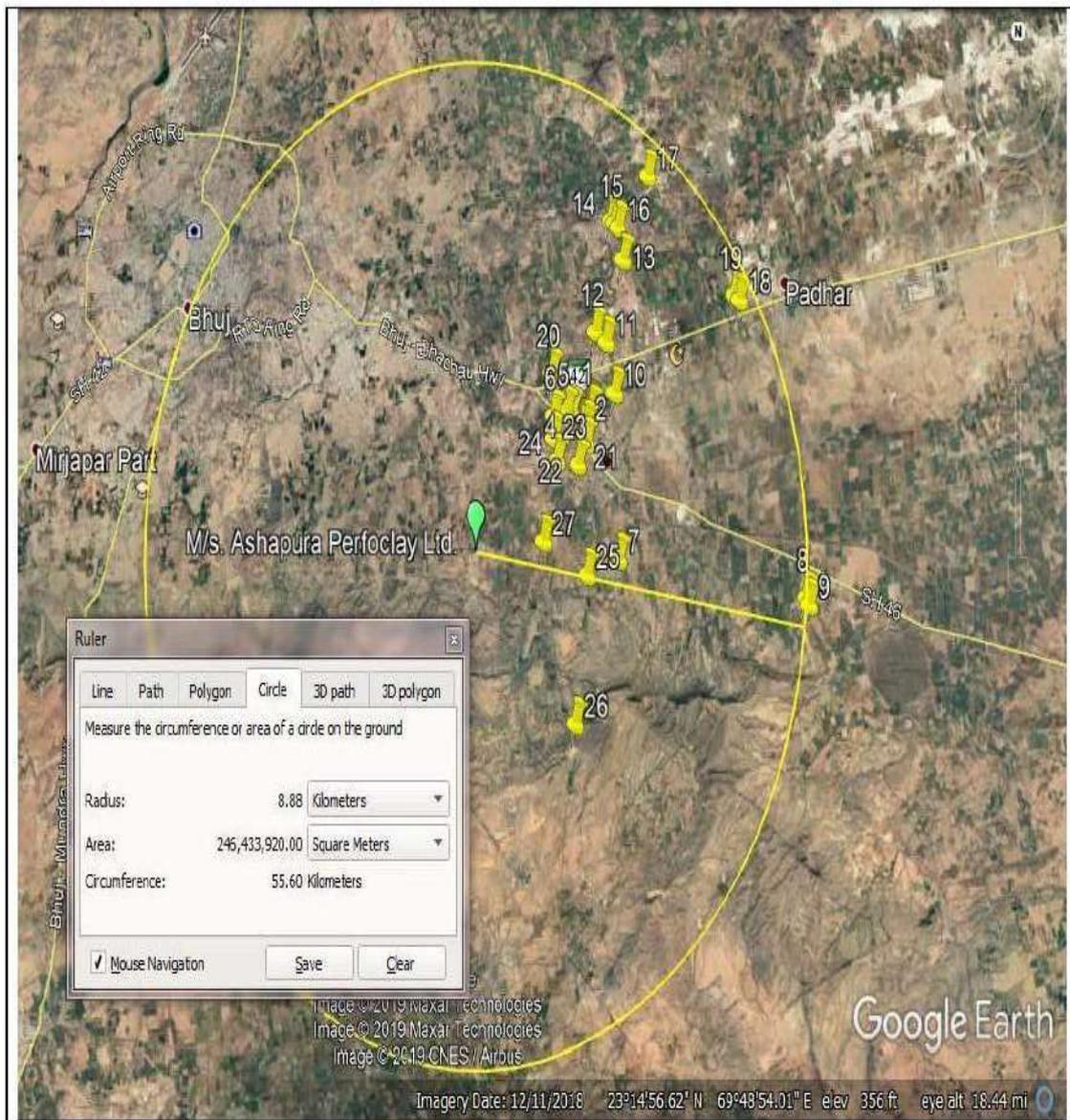
Status of Gypsum at 27 Locations

Status of gypsum at 27 locations		
Sr. No.	Location/Place	Status dated 17/09/2019
1.	Behind Lehriya Hanuman Temple, old stone mine, Kumka Village 23° 13' 21" N 69° 46' 21" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
2.	Opposite to Lehriya Hanuman Temple, Kumka Bhuj Road, Kumka Village 23° 13' 13" N 69° 46' 17" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
3.	Besides Lehriya Hanuman Temple, Kumka Village 23 ° 13' 24" N 69 ° 46' 19" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
4.	Old stone mine of Prakash Patel, Survey No:331, Besides old Hot Mix plant, Kumka Village: 23° 13' 16" N 69° 46' 3" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
5.	Behind khatri mills, Besides of above site, Traverse survey no: 331, government land, Kumka Village 23° 13' 20" N 69° 45' 58" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.

6.	Besides of water tank of GWIL Sump, Kumka Village 23° 13' 18" N 69° 45' 46" E	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land.
7.	Natural drain between farm of Dinesh Maharaj and Govind Vanker, survey no : 218, Kumka Village 23° 11' 56" N 69° 46' 47" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
8.	Vavdi Village 23° 11' 35" N 69° 49' 42" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
9.	Vavdi Village, opposite to survey no: 85/1 23° 11' 31" N 69° 49' 45" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
10.	Besides of Kumka- Lakhond village Road.	No gypsum is lifted from this location. It is observed that such Gypsum is dumped along the road side for leveling and back filling where underground drainage system is laid down hence it is practically difficult to lift the gypsum from the said location. As submitted; Unit has issued legal notice to Kukma Juth Gram Panchayat for lifting of gypsum for the same.
11.	Vrundavan Gir Gaudham, Shree Swaminarayan Mandir, Besides Ashapura Colony, Bhachau Road 23° 13' 49" N 69° 46' 48" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
12.	Behind Ashapura Foundation School, Ashapura Colony, Bhachau	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.

	Road, Kukma 23° 14' 7" N 69° 46' 26" E	
13.	Farm on Lakhond Road, 23° 14' 6" N 69° 46' 52" E & 23° 14' 49" N 69° 46' 52" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
14.	Land of Lakhond Village 23° 15' 12" N 69° 46' 41" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
15.	Adjacent above site as mentioned in sr no (15). Land of Lakhond Village.	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
16.	Lakhond- kali Talavadi Road, Village Lakhond	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
17.	China Clay mine of Vas tabhai , Village lakhond, Abandoned mine. 23° 15' 39" N 69° 47' 17" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
18.	On Government land on Padhdhar village 23° 14' 29" N 69° 48' 44" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
19.	Land opposite and besides of Padhdhar village police station.	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land
20.	Behind Balaji Petrol Pump, Shaikhpur Chokdi, Bhuj Anjar	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land

	Highway.	
21.	Near matiyadev Mandir, Kukma village, Nera kukma water distribution tank 23° 14' 3" N 69° 46' 15" E	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land
22.	Land between Swaminarayan vadi and Water sump of GWIL, Kukma Village 23° 14' 5" N 69° 45' 45" E	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land
23.	Natural Drain near Sanjotnagar, Behind Swaminarayan Vadi 23° 14' 5" N 69° 45' 45" E	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land
24.	North side of Swaminarayan Vadi 23° 12' 50" N 69° 46' 9" E	Dumped gypsum is lifted from the site and residual traces of the Gypsum is observed on the surface of the land
25.	Besides Balubha Rathod's Lake Ler Village 23° 11' 47" N 69° 46' 17" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
26.	Pithoradada Mandir Ler Village 23° 10' 23" N 69° 46' 5" E	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.
27.	Land of Hetubha Jadeja. Ler Village	No gypsum is lifted from this location. As informed by person contacted; unit has approached to lift the gypsum but the farmers / land owners are not ready to return the gypsum and have submitted Affidavit for the same.



ANNEXURE IV

Details of Identified Location by Applicant

Annexure-4

Details of identified location by applicant			
Sr. No.	Location/Place	Status as on dated 17/09/2019	Photographs
1.	At Dargah, Village: Lakhond 23° 15' 31.09" N 69° 46' 55.80" E	Gypsum is dumped for leveling of land.	
2.	At Village: Lakhond 23° 15' 39.39" N 69° 46' 44.64" E	Traces of gypsum is observed.	

Annexure-4

<p>2.1</p>	<p>At Village: Lakhond 23° 15' 36.71" N 69° 46' 48.23" E</p>	<p>Gypsum is dumped for leveling of land.</p>	
<p>3</p>	<p>At near toll gate, Lakhond 23° 15' 36.71" N 69° 46' 48.23" E</p>	<p>Gypsum is dumped for leveling of land. Silica sand is observed on the top of gypsum.</p>	

Annexure-4

<p>4.</p>	<p>At Shekhpur parle road 23° 13' 40.57" N 69° 45' 33.97" E</p>	<p>Gypsum is dumped for leveling of land. Grass is observed on surface.</p>	
<p>4.1.</p>	<p>At Shekhpur parle road 23° 13' 33.74" N 69° 45' 28.75" E</p>	<p>Gypsum is dumped for leveling of land.</p>	

Annexure-4

<p>5.</p>	<p>At Block factory, Village: Ler 23° 12' 6.99" N 69° 45' 34.62" E</p>	<p>Traces of gypsum is observed with grass on surface.</p>	
<p>5.1</p>	<p>Near Block factory, Village: Ler 23° 12' 5.56" N 69° 45' 35.78" E</p>	<p>Trace of gypsum is observed with grass on surface.</p>	

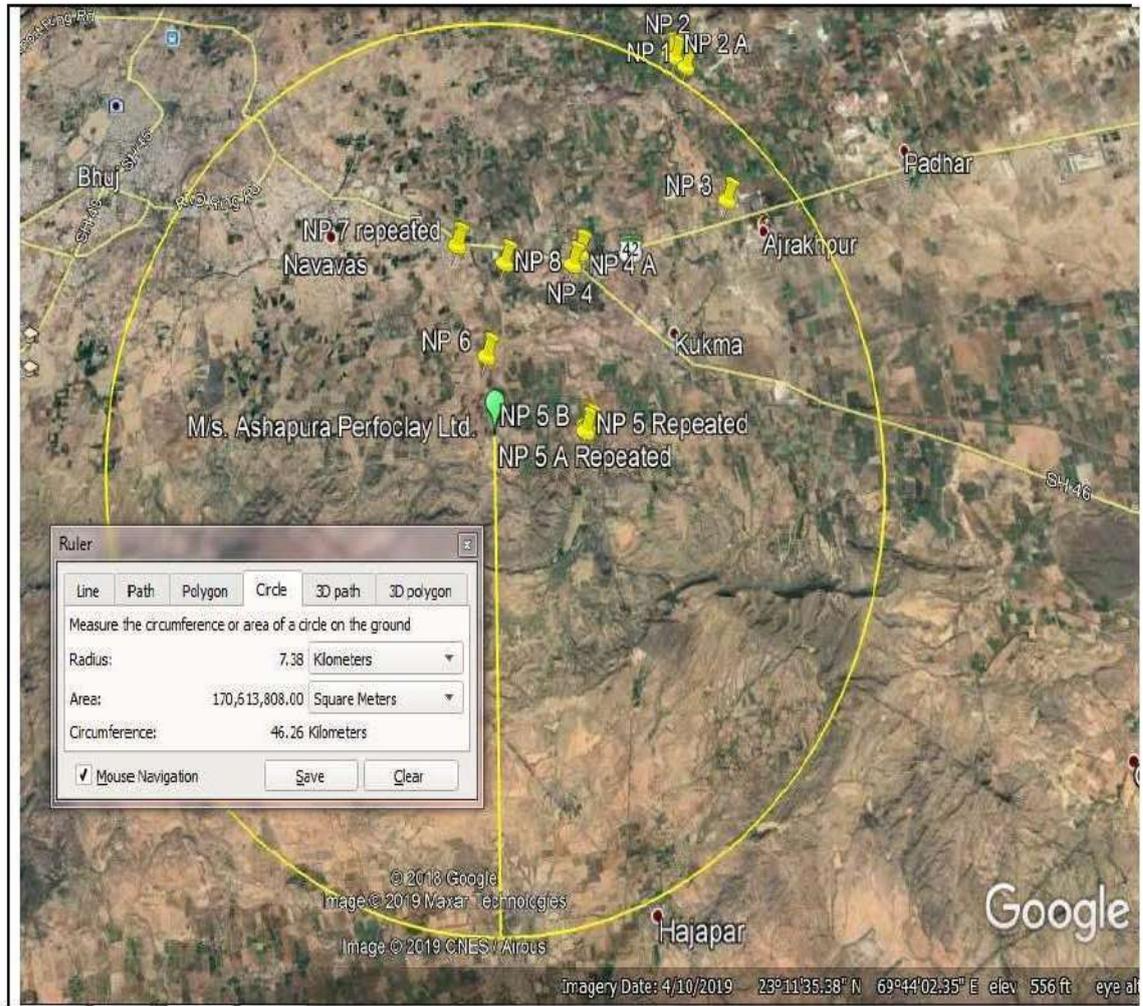
Annexure-4

<p>5.3</p>	<p>Near Block factory, Village: Ler 23° 12' 3.19" N 69° 45' 34.55" E</p>	<p>Gypsum is dumped for leveling of land.</p>	
<p>6</p>	<p>Land, Village: Ler 23° 12' 43.57" N 69° 44' 28.14" E</p>	<p>Trace of gypsum is observed with grass on surface.</p>	

Annexure-4

<p>7.</p>	<p>Maldhari Mangal Mandir Chhatralay, Bhujodi 23° 13' 45.11" N 69° 44' 8.96" E</p>	<p>Gypsum is dumped for leveling of land. Silica sand is observed on the top of gypsum.</p>	
<p>8.</p>	<p>Shri Vakal Mata Mandir, Village: Bhujodi 23° 13' 35.44" N 69° 44' 41.32" E</p>	<p>Gypsum is dumped for leveling of land.</p>	

Annexure-4



ANNEXURE V

Consolidated Consent & Authorization



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

By R.P.A.D.

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous & Other Waste (Management & Transboundary Movement) Rules-2016, framed under the Environmental (Protection) Act-1986. The board has granted the consent vide order no. PC/CCA-KUTCH-27(7)/GPCB ID-17774/406201, date: 04/03/2017.

And whereas Board has received application inward No. 136381 dated 16/04/2018 for the **Renewal Consolidated Consent and Authorization (CC&A)** of this Board under the provisions / rules of the aforesaid Acts. Consents & Authorization are hereby granted as under:

CONSENTS AND AUTHORISATION:

(Under the provisions /rules of the aforesaid environmental acts)

To
Ashapura Perfoclay Ltd,
Survey No. 167,
Vill: Ler, Nr. Bhujodi,
Anjar Bhuj Highway,
Tal: Bhuj,
Dist: Kutch.

1. Consent Order No. AWH-93521 Date of Issue: 11/06/2018.
2. The consent shall be valid up to 24/06/2023 for manufacture of the following products:

Sr. No.	Product	Quantity per Month
1.	Bleaching Clay	12,000 MT

SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS

1. You shall comply with all conditions of Environment Clearance issued vide letter no. SEIAA/GUJ/EC/2(b)/497/2016, dated 30/07/2016.
2. No ground water shall be withdrawn without obtaining prior permission from competent authority.
3. You shall operate Effluent Treatment Plant regularly and efficiently.
4. The gypsum generated from neutralizing spent acid shall be disposed in environmentally sound manner.

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ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

Page 1 of 8

3. CONDITIONS UNDER WATER ACT 1974:

- 3.1 The source of water shall be GWIL (Gujarat Water Infrastructure Ltd.).
- 3.2 The total industrial and domestic water consumption shall not exceed 838 KL/day.
- 3.3 The quantity of industrial effluent from manufacturing process and other ancillary operations shall not exceed 550 KL/day.
- 3.4 The quantity of the domestic waste water (Sewage) shall not exceed 6 KL/day.
- 3.5 The quality of the industrial effluent shall conform to the following standards:

PARAMETER	PERMISSIBLE LIMIT
pH	6.5 to 8.5
Temperature	40°C
Colour (Pt. Co. scale units)	100 units
Suspended Solids	100 mg/L
Oil & Grease	10 mg/L
Phenolic Compound	01 mg/L
Ammonical Nitrogen	50 mg/L
BOD (3 Days at 27°C)	30 mg/L
COD	100 mg/L
Chlorides	600 mg/L
Sulphates	1000 mg/L
Total Dissolved Solids	2100 mg/L
Sodium Absorption Ratio	26
Percent Sodium	60 %
Sulphides	02 mg/L
Total Chromium	02 mg/L
Hexavalent Chromium	0.1 mg/L
Copper	03 mg/L
Lead	0.1 mg/L
Mercury	0.01 mg/L
Nickel	03 mg/L
Zinc	05 mg/L
Cadmium	02 mg/L
Cyanides	0.2 mg/L
Arsenic	0.2 mg/L
Fluorides	02 mg/L

All efforts shall be made to remove colour & unpleasant odour as far as practicable.

- 3.6 The treated effluent @ 180 KL/day conforming to standards mentioned in 3.5 shall be used in gardening and plantation within premises.

- 3.7 The treated effluent @150 KL/day shall be reused in the process.



GUJARAT POLLUTION CONTROL BOARD

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- 3.8 The R.O. reject @ 220 KL/day shall be send to solar evaporation pond.
- 3.9 The applicant shall develop green belt area scientifically to utilize 180 KLD after achieving norms as mentioned in condition no. 3.5.
- 3.10 The pipeline network shall be proper and adequate for utilization of treated wastewater for gardening and plantation. Also adequate storage and handling of treated wastewater shall be developed.
- 3.11 Regular maintenance of pipes and pumps shall be done, such that there shall be no chock up in lines or failures of pumps.
- 3.12 The distribution of flow shall be maintained for plantation in such a way that there shall not be any ponding.
- 3.13 Records of plantation and growth rate shall be maintained and submitted to Regional Office, Kutch (West) and Head Office, Gandhinagar. Skilled person / in charge shall be nominated for specially this activity.
- 3.14 Sewage shall be disposed off through septic tank / soak pit system.

4. CONDITIONS UNDER AIR ACT 1981:

- 4.1 The following shall be used as fuel in proposed Steam Boilers/D. G Set and Dryer as following rates;

Sr. No.	Fuel	Quantity
1.	Coal	16 MT/day
2.	Furnace Oil	0.6 MT/day
3.	High Speed Diesel	120 Liter/Hour

- 4.2 The applicant shall install & operate air pollution control system in order to achieve flue gas emission norms as prescribed below.

Sr. no.	Stack attached to	Stack height in Meters	APCM	Parameter	Permissible limit
1.	Boiler -1 & 2 (3 MT/hr-each)	33	Multi Cyclone followed by Bag Filter	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm
2.	Boiler-3 (3 MT/hr)	33	Multi Cyclone followed by Bag Filter		
3.	Boiler-4 (3 MT/hr)	33	Multi Cyclone followed by Bag Filter		
4.	D.G. Set (500 KVA)	11	Adequate Stack Height		
5.	D.G. Set (250 KVA) stand by	11	Adequate Stack Height		

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Sr. no.	Stack attached to	Stack height in Meters	APCM	Parameter	Permissible limit
6.	D.G. Set (630 KVA) stand by	11	Adequate Stack Height		

4.3 The applicant shall install & operate air pollution control system in order to achieve process gas emission norms as prescribed below:

Sr. No.	Stack attached to	Stack height in Meters	APCM	Parameter	Permissible limit
1.	Pulverizer – 1 & 2	18	Cyclone Separator and Bag Filter	PM	150 mg/Nm ³
2.	Pulverizer – 3	15	Cyclone Separator and Bag Filter		
3.	Pulverizer – 4	15	Cyclone Separator and Bag Filter	PM	150 mg/Nm ³
4.	Pulverizer – 5 (6 MT/hour)	15	Cyclone Separator and Bag Filter		
5.	Pulverizer – 6 (6 MT/hour)	15	Cyclone Separator and Bag Filter	PM	150 mg/Nm ³
6.	De Dusting system -1	15	Cyclone Separator and Bag Filter		
7.	Classifier	15	Bag Filter		
8.	Floor Cleaner	15	Bag Filter	PM	150 mg/Nm ³
9.	Dryer – 1	18	Cyclone Separator and water Scrubber		
10.	Dryer – 2	18	Cyclone Separator and water Scrubber		
11.	Dryer – 3	18	Cyclone Separator and water Scrubber		

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GUJARAT POLLUTION CONTROL BOARD

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Sr. No.	Stack attached to	Stack height in Meters	APCM	Parameter	Permissible limit
12.	Dryer – 4 Stand by	18	Cyclone Separator and water Scrubber		
13.	Dryer – 5	18	Cyclone Separator and water Scrubber		
14.	Dryer – 6	18	Cyclone Separator and water Scrubber		
15.	Dryer – 7	18	Cyclone Separator and water Scrubber		
16.	Hot Air Generator attached with dryer -5	20	Cyclone Separator		

- 4.4 The concentration of the following parameters in the ambient air within the premises of the industry shall not exceed the limits specified hereunder as per National Ambient Air Quality Standards issued by MoEF&CC dated 16th November-2009.

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air in $\mu\text{g}/\text{m}^3$
1.	Sulphur Dioxide (SO_2)	Annual	50
		24 Hours	80
2.	Nitrogen Dioxide (NO_2)	Annual	40
		24 Hours	80
3.	Particulate Matter (Size less than $10 \mu\text{m}$) OR PM_{10}	Annual	60
		24 Hours	100
4.	Particulate Matter (Size less than $2.5 \mu\text{m}$) OR $\text{PM}_{2.5}$	Annual	40
		24 Hours	60

- 4.5 The applicant shall provide portholes, ladder, platform etc. at chimney(s) for monitoring the air emissions and the same shall be open for inspection. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted / displayed to facilitate identification.
- 4.6 The concentration of Noise in ambient air within the premises of industrial unit shall not exceed following levels:

Between 6 A.M. to 10 P.M.: 75 dB (A)

Between 10 P.M. to 6 A.M.: 70 dB (A)

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5. Authorization under Hazardous & Other Waste [Management & Transboundary Movement] Rules, 2016 & amended.

5.1 Authorization Number: AWH – 93521 and shall valid up to 24/06/2023.

5.2 Ashapura Perfoclay Ltd, is hereby granted an authorization to operate facility for following hazardous wastes after expansion on the premises situated at. Survey No: 167, Vill:- Ler, Nr: Bhujodi, Anjar Bhuj Highway. Bhuj, Dist - Kutch.

Sr. No.	Waste	Quantity per Year	Category	Mode of Disposal
1.	ETP Sludge	0.22 MT	35.3	Collection, storage, Transportation & disposal at TSDF
2.	Sludge From Wet Scrubbers	8.50 MT	37.1	Collection, storage, Transportation and send to Sanghi industry for co-processing.
3.	Used Oil	100 Litre	5.1	Collection, storage, Transportation & Disposal by selling out to authorized recyclers.
4.	Spent Acid	66000 MT	B15- II	Collection, storage, neutralize within factory premises and generated gypsum shall be send to cement industry for co-processing
5.	Evaporation Residue	1.0 MT	37.3	Collection, storage, Transportation & disposal at TSDF

5.3 The disposal mode for spent acid, as per EC condition the spent acid shall be neutralize within factory premises and generated gypsum shall be send to cement industry for co-processing.

5.4 The authorization is granted to operate a facility for collection, storage, within factory premises, transportation, and ultimate disposal of Hazardous wastes by selling out to authorized recyclers and disposal at TSDF.

5.5 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.

5.6 TERMS AND CONDITIONS OF AUTHORISATION:

- 1 The authorized person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the State Pollution Control Board.
3. The person authorized shall not rent, lend, sell transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

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5. The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time.
6. The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty"
7. It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
8. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
9. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.
10. The hazardous and other waste which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorization.
11. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
12. An application for the renewal of an authorization shall be made as laid down under these Rules.
13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.
14. Annual return shall be filed by June 30th for the period ensuring 31st March of the year.

6. GENERAL CONDITIONS: -

- 6.1 Unit shall develop green belt within premises as per the CPCB guidelines. However, if the adequate land is not available within premises, the unit shall tie up with local agencies like gram panchayat, school, social forestry office etc. for the plantation at suitable open land in nearby locality and submit an action plan of plantation for next three years to GPCB.
- 6.2 Adequate plantation shall be carried out all along the periphery of the industrial premises in such a way that the density of plantation is at least 1000 trees per acre of land and a green belt of 10 meters width is developed.
- 6.3 The applicant shall have to submit the returns in prescribed form regarding water consumption and shall have to make payment of water cess to the Board under the Water (Prevention and Control of Pollution) Cess Act- 1977.
- 6.4 In case of change of ownership/management the name and address of the new owners/partners/directors/proprietor should immediately be intimated to the Board.

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- 6.5 The applicant shall however, not without the prior consent of the Board bring into use any new or altered outlet for the discharge of effluent or gaseous emission or sewage waste from the proposed industrial plant. The applicant is required to make applications to this Board for this purpose in the prescribed forms under the provisions of the Water (Prevention and Control of Pollution) Act-1974, the Air (Prevention and Control of Pollution) Act-1981 and the Environment (Protection) Act-1986.
- 6.6 The overall noise level in and around the plant area shall be kept well within the standards by providing noise control measures including engineering control like acoustic insulation hoods, silencers, enclosures etc on all sources of noise generation. The ambient noise level shall conform to the standards prescribed under the Environment (Protection) Act, 1986 & Rules.
- 6.7 Applicant is required to comply with the manufacturing, Storage and Import of Hazardous Chemicals Rules-1989 framed under the Environment (Protection) Act-1986.
- 6.8 If it is established by any competent authority that the damage is caused due to their industrial activities to any person or his property in that case they are obliged to pay the compensation as determined by the competent authority
- 6.9 Applicant shall have to comply with all the guidelines / Directive issued / being issued by MoEF&CC / CPCB / DoEF from time to time.
- 6.10 Applicant shall not use/withdraw ground water either during construction and /or operation phase.
- 6.11 Environmental cell shall be setup and shall be responsible for the total Environmental management.
- 6.12 Monitoring in respect to Air, Water, Noise level shall be carried out and results shall be submitted to GPCB on quarterly basis.

For and on behalf of
GUJARAT POLLUTION CONTROL BOARD


(Sushil Vegda)
Senior Environment Engineer

NO: PC/ CCA- KUTCH-27(7)/GPCB ID – 17774/

Date:

ISSUED TO:
Ashapura Perfoclay Ltd,
Survey No. 167,
Vill: Ler, Nr. Bhujodi,
Anjar Bhuj Highway,
Tal. Bhuj, Dist. Kutch.

Page 8 of 8

ANNEXURE VI
Gypsum Analysis Report


POLLUCON LABORATORIES PVT. LTD.

TEST REPORT

QR/5.10/01-I

Customer's Name and Address :

Page: 1 of 4

M/S. ASHAPURA VOLCLAY LIMITED
VILLAGE LER, NEAR BHUJODI,
OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020
Test Report No.: **PLPL/130703009**Issue Date : **19/07/2013**Customer's Ref. : Lt No.AVL/STR/044/2013/2014
Dt:02/07/13

Description of Sample	: Gypsum [#]	Quantity/No. of Samples	: 05 Kg / One
Sampling By	: Sample Sent By Party	Sampling Procedure	: Sample Sent By Party
Sample Receipt Date	: 03/07/2013	Protocol (purpose)	: Sche.2 & 3 of HW Rules-2008, etc.
Packing/ Seal	: Sealed	Lab ID	: PLPL/130703009
Date of Starting of Test	: 03/07/2013	Date of Completion	: 18/07/2013
Test Method	: IS, APHA (22 nd Edition,2005), US EPA &, CPCB Guidelines-LATS/16/2003-2004 & others		
Observation	: Analyzed parameters of the submitted sample as per test report No. PLPL/130703009 are within the prescribed norms under schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008. And also the analyzed characteristics do not possess any of the hazardous characteristics indicated in test report as per Part C of, Schedule III of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008. Analyzed parameters of lechate are within the norms of CFR 40 261.24 of US EPA.		


H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager(Q)

- Recognised by MoEF, New Delhi Under Sec. 12 of Environmental Protection Act, 1986

- ISO 14001 : 2004

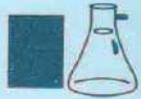
- OHSAS 18001 : 2007

- ISO 9001 : 2008

Note: This report is subject to terms & conditions mentioned overleaf.

544, Belgium Towers, Ring Road, Opp. Linear Bus Stand, SURAT-395003.(Guj.).

Tele-Fax : (0261) 2455751,2601106,2601224 E-mail : pollucon@gmail.com. Wabsite : www.polluconlab.com


POLLUCON LABORATORIES PVT. LTD.
TEST REPORT

QR/5.10/01-I

Customer's Name and Address :

Page: 2 of 4

M/S. ASHAPURA VOLCLAY LIMITED
VILLAGE LER, NEAR BHUJODI,
OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020
Test Report No.: **PLPL/130703009**Issue Date : **19/07/2013**Customer's Ref. : **LI No.AVL/STR/044/2013/014
Dt:02/07/13**
RESULT TABLE

SR. NO.	Code	HAZARDOUS CHARACTERISTICS AS PER PART C OF, SCHEDULE III OF HAZARDOUS WASTE (MANAGEMENT, HANDLING AND TRAN BOUNDARY MOVEMENT) RULES, 2008.	OBSERVATION
1.	H 4.1	Flammable Solids Hazardous Characteristic as per code E1 of, Schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008.: Solids, or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.	Not Flammable
2.	H 4.2	Substances or waste liable to spontaneous combustion Hazardous Characteristic as per code H 4.2 of Part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contact with air, and being then liable to catch fire	No spontaneous combustion observed.
3.	H 4.3	Substances or waste which, in contact with water emit flammable gases Hazardous Characteristic as per code H 4.3 of Part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.	No flammable gases emitted
4.	H 5.1	Oxidizing Hazardous Characteristic as per code H 5.1 of part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which, while in themselves not necessarily combustible, may, generally by yielding oxygen causes, or contribute to, the combustion of other materials.	Not yield oxygen and not capable for combustion
5.	H 6.1	Poisons (Acute) (Cyanide & Mercury) Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes liable either to cause death or Serious Injury or to harm health if swallowed or inhaled or by skin contact.	Not Detected
6.	H 6.2	Infectious Substances Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes containing viable micro organisms or their toxins which are known or suspected to cause disease in animals or humans.	No infectious substance present (E-coli, Staphylococcus aureus, Salmonella & pseudomonas sp. Are Absent)
7.	H 8	Corrosivity Hazardous Characteristic as per code H 8 of Part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards. USEPA CFR 261.22(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 260.11 of this chapter.	Non corrosive (to pH) – 7.74
8.	H 10	Liberation of toxic gases in contact with air or water Hazardous Characteristic as per code H 10 of Part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.	No toxic gas liberated (reactive & total CN, S : Not detected)

Continue.....

**H. T. Shah
Lab. Manager**


**Dr. Arun Bajpai
Lab Manager(Q)**

 Recognised by MoEF, New Delhi Under
 Sec. 12 of Environmental Protection Act, 1986.

ISO 14001 : 2004

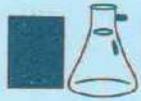
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POLLUCON LABORATORIES PVT. LTD.
TEST REPORT

QR/5.10/01-I

Customer's Name and Address :

Page: 3 of 4

M/S. ASHAPURA VOLCLAY LIMITED VILLAGE LER, NEAR BHUJODI, OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020	Test Report No. : PLPL/130703009
	Issue Date : 19/07/2013
	Customer's Ref. : LE No.AVL/STR/044/2013/2014 Dt:02/07/13

RESULT TABLE

Sr. No.	Code	Hazardous Characteristics	OBSERVATION			
9.	H 11	Toxicity (Delayed or Chronic)	Analyzed parameters are within the limit as per Schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008			
			Leachate analysis as per ASTM D 5233			
		Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects including carcinogenicity.				
		Sr. No.	Parameters	Unit	Observation	Limit as per Schedule 2 of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008
		11.1	Nickel as Ni	mg/kg	3.00	5000 Max
		11.2	Copper as Cu	mg/kg	0.72	5000 Max
		11.3	Zinc as Zn	mg/kg	3.75	20000 Max
		11.4	Cyanide as CN	mg/kg	ND*	50 Max
		11.5	Lead as Pb	mg/kg	0.84	5000 Max
		11.6	Mercury as Hg	mg/kg	ND*	50 Max
		11.7	Chromium Cr ⁺⁶	mg/kg	ND*	50 Max
		11.8	Cadmium as Cd	mg/kg	0.29	50 Max
11.9	Antimony as Sb	mg/kg	ND*	50 Max		
11.10	Arsenic as As	mg/kg	ND*	50 Max		
11.11	Vanadium as V	mg/kg	ND*	5000 max.		
10.		12.1	SiO ₂	%	0.57	Not Specified
		12.2	Fe ₂ O ₃	%	8.76	
		12.3	Al ₂ O ₃	%	5.79	
		12.4	CeO	%	20.56	
		12.5	MgO	%	0.37	

H. T. Shah
 Lab. Manager


Dr. Arun Bajpai
 Lab Manager(Q)

• Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986
 • ISO 14001 : 2004
 • OHSAS 18001 : 2007
 • ISO 9001 : 2008
 Note: This report is subject to terms & conditions mentioned overleaf.

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TEST REPORT

QR/5.10/01-I

Customer's Name and Address :

Page: 4 of 4

M/S. ASHAPURA VOLCLAY LIMITED
VILLAGE LER, NEAR BHUJODI,
OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020
Test Report No.: PLPL/130703009
Issue Date : 19/07/2013
**Customer's Ref. : LL No. AVL/STR/044/2013/2014
Dt: 02/07/13**
RESULT TABLE

Sr. No.	Code	Hazardous Characteristics	OBSERVATION
11.		LC 50 (Fish Acute toxicity 96 hour)	Sample is not toxic to fish as per Fish Acute toxicity 96 hours. (LC50 is greater than 500 mg/L) (no fatality of fish in 2000 mg/L of sample)
		Hazardous Characteristic: Toxicity : If LC50 is <500 mg/L as per California Ch.11Art. 3 Claus 66261.24 sub.c.6 Characteristic of toxicity	
12.	H 14	Capable	Lechate is not possessing any of the characteristics listed.
		Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Capable by any means, after disposal, of yielding another material, e.g. Lechate, which possesses any of the characteristics listed above.	
		Leachate analysis as per ASTM D 5233	Limit as per US EPA Title 40, Part-261.24 TCLP, March 2009
	14.1	Nickel as Ni	ppm 0.153 Not specified
	14.2	Copper as Cu	ppm 0.037 Not specified
	14.3	Zinc as Zn	ppm 0.019 Not specified
	14.4	Cyanides as CN	ppm ND* Not specified
	14.5	Lead as Pb	ppm 0.043 5.0 Max
	14.6	Mercury as Hg	ppm ND* 0.2 Max
	14.7	Chromium as Cr ⁶⁺	ppm ND* 5.0 Max
	14.8	Cadmium as Cd	ppm 0.015 1.0 Max
	14.9	Antimony as Sb	ppm ND* Not specified
	14.10	Arsenic as As	ppm ND* 5.0 Max

ND*: Not Detected (minimum detection limit for Hg, As, CN: 0.002 ppm, Pb, Cr, Cd, Sb : 0.01 ppm)

#: Detail given by party

*Waste constituents and their concentration limits given in this list are based on erstwhile BAGA (the Netherlands Environment Protection Agency) List of Hazardous Substances. In order to decide whether specific wastes listed above is hazardous or not, following points be taken into consideration:

- If a component of the waste appears in one of the five risk classes listed above (A,B,C,D or E) and the concentration of the component is equal to or more than the limit for the relevant risks class, the material is then classified as hazardous waste.
- If a chemical compound containing a hazardous constituent is present in the waste, the concentration limit does not apply to the compound, but only to the hazardous constituent itself.
- If multiple hazardous constituents from the same class are present in the waste, the concentrations are added together.
- If multiple hazardous constituents from different classes are present in the waste, the lowest concentration limit corresponding to the constituent(s) applies.
- For determining the concentration of the hazardous constituents in the waste "Toxicity Characteristics Leaching Procedure (TCLP)" as per ASTM-D5233-92 should be adopted.

**H. T. Shah
Lab. Manager**

- Recognised by MoEF, New Delhi Under Sec. 12 of Environmental Protection Act, 1986



ISO 14001 : 2004

OHSAS 18001 : 2007

ISO 9001 : 2008

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 Note: This report is subject to terms & conditions mentioned overleaf.
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ASHAPURA PERFOCLAY LTD.

Groundwater Remediation Action Plan at Ashapura Perfoclay Limited, Bhujodi, Bhuj, Kutch District

NOVEMBER 2019



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ASHAPURA PERFOCLAY LIMITED

Groundwater Remediation Action Plan at Ashapura Perfoclay Limited, Bhujodi, Bhuj, Kutch District

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1 INTRODUCTION

1.1 Project Overview

M/s. Ashapura Perfoclay Ltd. (hereinafter referred as 'APL') is located at Plot No. 167, Village Ler, Near Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India. The site is situated near Bhujodi off Anjar Bhuj State Highway (SH-46). Bhuj is the nearest city located at 10 km from project site. M/s. Parle Products Pvt. Ltd. is nearby industry located at approximately 2.40 km North-East of APL.

APL was established in 2001 having site area around 1, 11,994 sq.m. They have valid CC & A AWH 93521 by GPCB for production capacity of Bleaching Clay (12000 MTM) using raw materials like bentonite and Sulphuric acid. Coordinates of site are 23°12'11.94"N & 69°44'32.36"E; surrounded by hilly area and agricultural land and its related facilities.

The site location map is shown in **Figure 1** and the layout plan is shown in **Figure 2**.

1.2 Site History

Faced with the demand for urgent remedial intervention and closure notice from GPCB, APL approached M/s. Gujarat Industrial and Technical Consultancy Organization Limited – GITCO (Schedule-I Auditor) to carry out Geo-hydrological Study of Portable U/G contamination in and around the Site; report of the same was submitted in November 2018. M/s. Aqua Environ Excellency (AEE) was appointed to carry out hydrogeological investigations and designing Groundwater recharge and monitoring measures for restoration of contaminated bore well; report for the same was submitted in June 2019.

The unit was visited by GPCB, Vigilance team, CPCB & SEIAA officials at regular interval with reference to NGT order, closure and revocation to verify the various remediation actions taken and compliances done by the unit since last July 2018.

1.2.1 Compliance for Ground water Remediation

During closure & revocation in July 2018 enclosed vide **Annexure 1**, unit have taken various remedial measures as part of ground water remediation i.e. stopped use of lime sourced from GNFC and started using fresh lime, Installation of STP of 10 KLD, Construct two RCC storage tanks, Hydrogeology study done by GITCO, Gypsum disposal at Cement industry for co processing, ETP up gradation by installation of Clarifier – UF – RO, maintenance& repairing of all APCM's and green belt development same have been acknowledged in various orders, revocation issued by GPCB.

1.2.2 Compliance for Gypsum disposal

MoEFCC vide Letter No. F. No.23-161/2014-HSMD has already classified Gypsum as non-hazardous based on the analysis done by Pollucon Lab (MOEF Approved) for Schedule II parameters (as per HWM Rules 2008) in 2014; Letter of MoEF is enclosed vide **Annexure 2**.

The unit have CC & A (order no AWH-93521 vide letter no. PC/CCA-KUTCH 27(7) GPCB ID 7774/469190 date 20/09/2018 and amendment application inward ID No- 161357 dated 15/07/2019) valid up to 24/06/2023 condition no.4 granted only for the alternate mode of disposal of gypsum waste generated from neutralization of spent acid to mines back filling in the abandoned mines only when cement industries are not in operation and or not accepting the gypsum for co-processing with specific conditions; Analysis Report of gypsum from Pollucon Lab is enclosed vide **Annexure 3**.

APL also did analysis of gypsum in 2014 from SGS lab and analysis report are enclosed vide **Annexure 4**.

GPCB also analyzed gypsum sample in April 2019 and the parameters were well within limits as per HWM Rules 2016. Analysis Report is enclosed vide **Annexure 5**.

1.3 Need for Remediation & Appointment of Consultant

As per latest GPCB directions; APL felt the need for hiring an organization specializing in remediation projects to carry out groundwater remediation action plan and therefore approached M/s. Kadam Environmental Consultants ('KEC'). The team from KEC visited the site in July 2019 to know the site conditions and root cause of the issue and sent proposal for groundwater remediation considering major parameter of concern as Ammonical Nitrogen. Based on proposal, APL issued Work Order to KEC in August 2019 and appointed as Consultant.

1.4 Site Visit Conducted

After the issuance of work order a team from KEC consisting of Environmental Engineer and Geologist visited the site of APL on 20th and 21st August 2019. The objective of the site visit was to review the site operations, get required information with regards to topography and general geology of the study area and observed the location of alleged contaminated bore well.

To gain a general understanding of the site, site survey was carried out to identify potential hot spots and points related to the operational scheme of the facility and the layout of the plant was discussed with authorities of APL.

1.5 Scope of Work of KEC

Based on our proposal and discussion with client, following is our scope of work for groundwater remediation action plan study:

- Well inventory
- Lab analytical reports and interpretation with relevant standards
- Treatability study for reduction Ammonical Nitrogen (including various options tried and their outcomes; options; selected option/combination of options with justification)
- Plume delineation status
- Remediation Action Plan with suitable treatment technology description with justification in terms of efficiency, quality, cost and long-term reliability and basic drawings.
- Way Forward for Full Scale Remediation

1.6 Report Structure

The structure of the report is summarized below:

- Chapter 1: Introduction
- Chapter 2: Site Description and Conceptual Model
- Chapter 3: Site Investigation, Lab Study & Desk Study
- Chapter 4: Evaluation of Conceptual Model
- Chapter 5: Treatability Study of Groundwater Sample
- Chapter 6: Proposed Remediation Approach & Recommendations

1.7 Limitations

The report is based upon the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts

currently available within the limits of the existing data, scope of work, budget and schedule. To the extent that more definitive conclusions are desired by Client than are warranted by the currently available facts, it is specifically Kadam's intent that the conclusions and recommendations stated herein will be intended as guidance and not necessarily a firm course of action except where explicitly stated as such. The information provided to Client in this report is not to be construed as legal advice.

2 SITE DESCRIPTION & CONCEPTUAL MODEL

In this section we will provide information about the local setting, historical use, production details and applied processes at the APL site. Some general information about the neighboring sites will also be provided.

Based on aforementioned information the potential Components of Concern, the nature and extent of potential source zones, the potential spreading mechanisms, extent of a potential pollution and the potential receptors of such a pollution will be identified. On the basis of this a potential Site Conceptual Model will be elaborated. In subsequent chapters the results of the conducted field investigation will be evaluated against aforementioned potential Site Conceptual Model and subsequently conclusion will be drawn in how far this model is fitting with the obtained investigation results. If deemed appropriate the potential Site Conceptual Model will be adjusted accordingly after which a final Site Conceptual Model will be established.

Based on the final Site Conceptual Model the necessity of remediation or intervention measures can be evaluated and if required appropriate measures can be identified and put forward for further planning and implementation.

2.1 Site Profile

The unit consists of following main facilities:

- Main Office Building
- Effluent Treatment Plant
- Sewage Treatment Plant
- Reverse Osmosis Plant
- Utility Area
- Granulation Plant
- Acid Activation Plant
- Acid Dilution Plant
- Pulverization Plant
- Dryer Plant

The Satellite Image showing different units of facility is shown in **Figure 3**.

2.2 Land use (Immediate surroundings of site)

The immediate surroundings around APL is as follows:

- East: Agricultural Land
- West: Agricultural Land
- North: Agricultural Land
- South: Waste Land (Hilly Area)

2.3 Historic Use of Property

The unit was established in 2001; prior to industry, the land was an open land. Since 2001 land is used for production of bleaching clay.

2.4 Production Details

APL has a state-of-the-art Bleaching Earth manufacturing facility at Bhuj, Gujarat, in technological collaboration with Japan's Mizusawa Industrial Chemicals Limited further adds value to their brand.

The unit manufactures Bleaching Clay of 12,000 MT/Month as its product and Gypsum as its by-product. The unit is using hydrated lime for neutralization which is sourced from the authorized vendors. Source of raw material is shown in **Table 2-1**.

Table 2-1: Source of Raw Material

Sr. No.	Raw Material	Source of Raw Material
1	Hydrated Lime	Any authorized vendor

Bleaching Clay is sold to end users of refining of edible and non-edible oil while gypsum is sold to cement industry and backfilling of abandoned mines.

The production capacity by APL Unit is as shown in **Table 2-2**. (As per CCA Order No. AWH-93521 issued vide Letter No. PC/CCA—Kutch-27(7)/GPCB ID 17774/469190 dated 11/06/2018 and Amendment Consent Order No. 103222 dated 29/07/2019).

Table 2-2: Production Capacity

Sr. No.	Product	Quantity (MT/Month)
1	Bleaching Clay	12,000

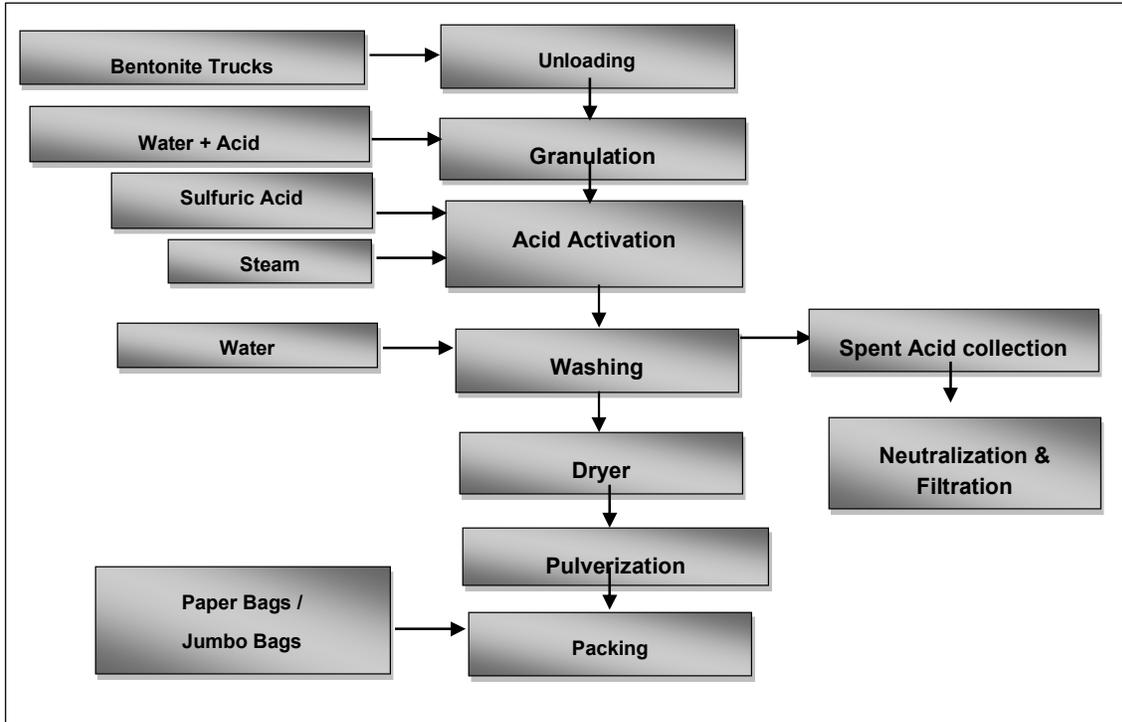
2.5 Manufacturing Process of Bleaching Earth

Bleaching clay is manufactured from the best quality, selectively mined and scientifically blended under stringent process controls. Bentonite and Sulphuric acid are main raw material and mainly five steps are involved in production of Acid Activated Bleaching clay are: [A] Granulation Section, [B] Acid Activation, [C] Drying, [D] Pulverization, [E] Neutralization & Filtration.

Bentonite from the approved heap is charged in feeding hopper and its send to crusher via belt conveyor after crushing its send to granulator. These granules are then carried to desired reactor in acid activation plant via belts. In acid activation operation required concentration of Sulphuric acid is prepared in the selected reactor it continue for 12 – 14 hour. After completion of acid activation granules are washed away with water. The first hour drain is collected as spent acid which is send to IFFCO for utilization. Activated granules are discharged in bin via belts for subsequent drying process. Wet granules are feed in Rotary-Dryer through belt weighed. Dried granules at outlet of dryer are stored in hoppers from where it is transferred to mill-hopper. Material is continuously fed by rotary valve to pulverization Mill. Pulverized material from mill is collected in storage hopper via screw conveyors where it transferred to packing hopper as per requirement for final packing.

A Bleaching Earth is activated adsorbent used for the general purpose of refining of edible and non-edible oil.

The process flow diagram is shown below:



2.5.1 Utilization of Spent Acid at IFFCO for fertilizer manufacturing

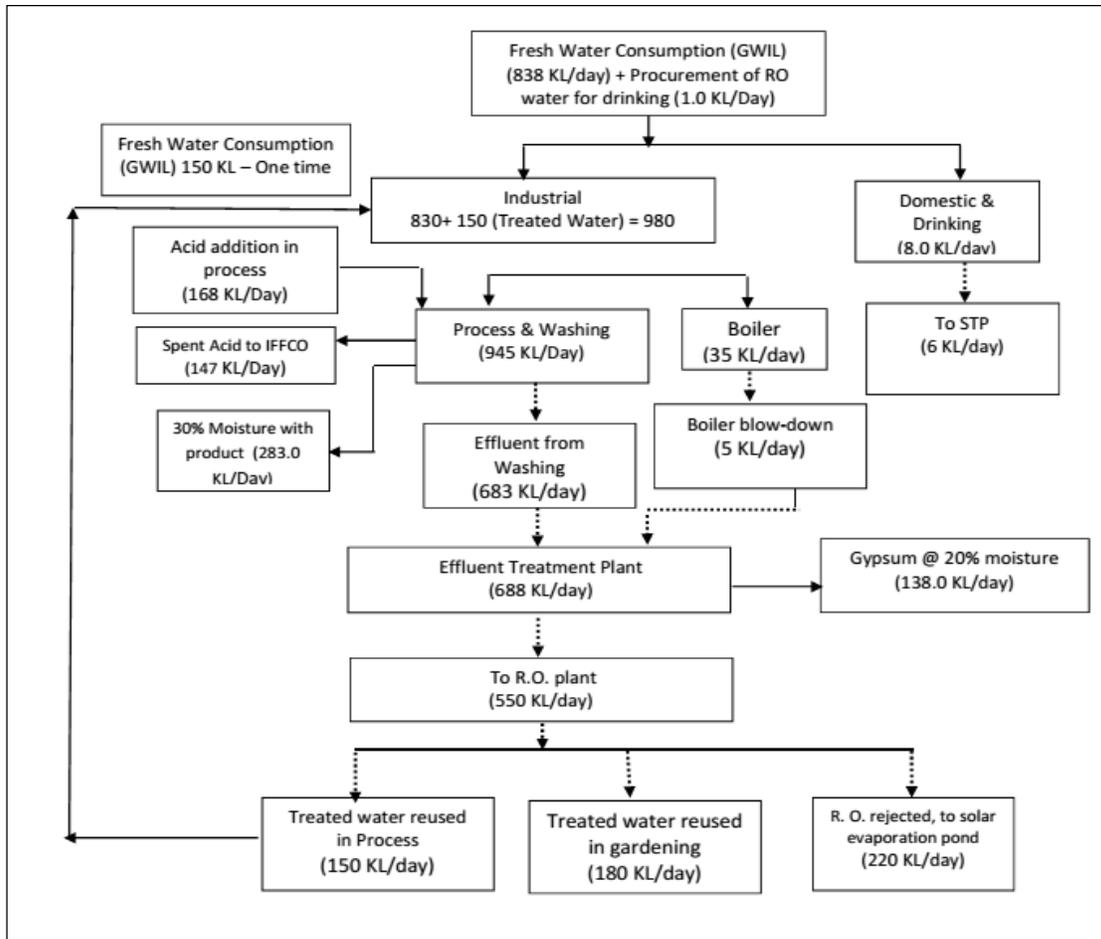
The recovered spent acid from first drain after completion of acid activation i.e. wet process is sent to IFFCO for utilization at their manufacturing process of NPK/DAP fertilizer.

2.5.2 Utilization of Gypsum

Gypsum is byproduct and it is recover from neutralization & filtration process & utilized in cement industry and backfilling of abandoned mines.

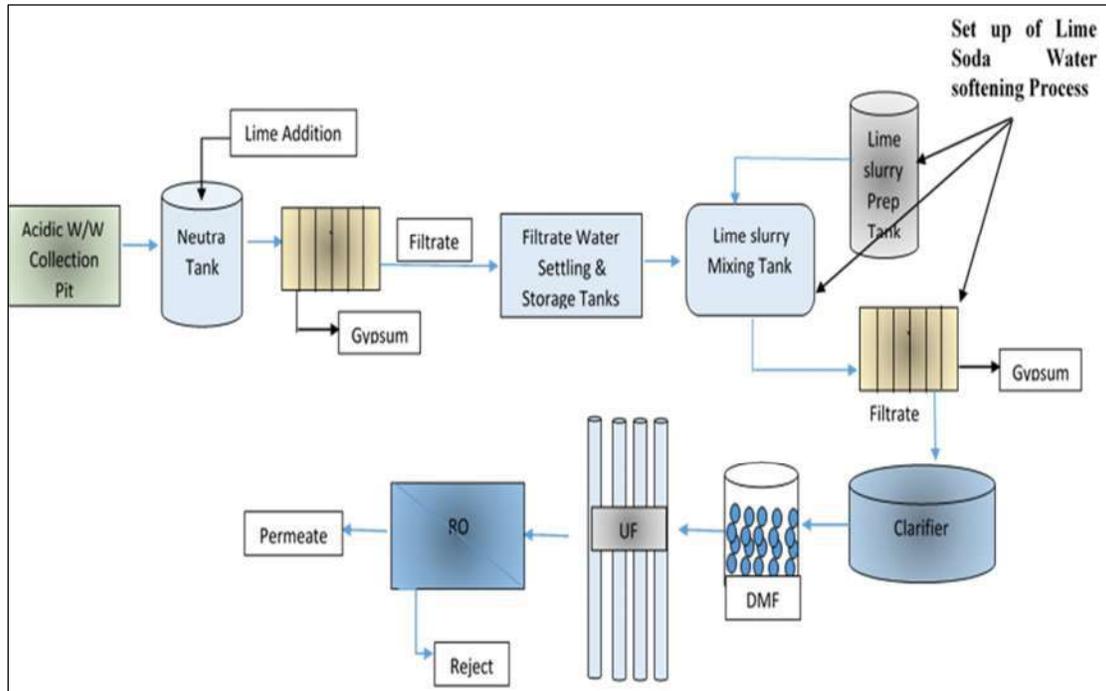
2.6 Water Consumption

Overall freshwater requirement as per CCA (Order No. AWH-93521 dated 11/6/2018 and amended CCA Order No. 103222 dated 29/07/2019)) is 838KLD. The average water supply is 600-675 KLD by Gujarat Water Infrastructure Ltd. (GWIL) and remaining 125-175 KLD is abstracted from existing APL borewell within the premises. Total water consumption for industrial use is around 830 KLD and Domestic is around 8.0 KLD. Treated water from RO is reused in process & gardening. The water balance diagram showing details of water consumption and wastewater generation is shown below;



2.7 Waste (Water) Generation and Treatment

Waste water generation from washing is around 550 KLD. Total Capacity of Effluent Treatment plant is 800 KLD. Acidic wastewater is carried to neutralization tank by pump. For neutralization, hydrated lime is added to reactor. Then it is circulated by means of agitator in reactor for getting 7 pH. The total cycle time is 6-7 hours; after the neutralization process, the slurry is transferred to filter press by means of high pressure pump. Gypsum which will remain in clothes of press is removed manually and transferred to sun drying storage area. Gypsum is dried and is sold to cement manufacturing industry. As a part of soda lime softening process; by addition of lime slurry, filtrate water pH will rise to 11 so hardness will be removed and excess sulphate will precipitate. This slurry is sent to filter press where filtrate and gypsum are separated. Filtrate is sent to clarifier where various dosing of soda ash, pH correction and polyelectrolyte is given. After proper settlement it is feed to ultra-filtration and dual media filter. The effluent from filter press is treated in RO. The capacity of RO is 50 m³/hr. About 60% permeate water from RO is reuse in process and gardening. The remaining 40% RO reject is sent to solar evaporation pond. Solid waste is generated in form of Residues/Sediments of solar evaporation pond and is disposed off to TSDF site of SEPPL. Sewage Treatment Plant of capacity 10 KLD is provided to treat sewage generated from the unit. Treated Sewage water is used for gardening.



As per data given by APL; Generation of waste water in current year 2018-19 is shown below in **Table 2-3** and RO Reject water characteristics are shown in

Table 2-4 which is stored in Solar Evaporation pond.

Table 2-3: Waste Water Generation for the year 2018-19

Sr. No.	Month	Quantity of Wastewater per month treated in ETP (KLD)	Quantity of Wastewater per month treated in RO (KLD)	Quantity of Reject sent to Evaporation Pond (KLD)
1.	April-2018	20396	12237	8158
2.	May-2018	21127	12676	8451
3.	June-2018	20430	12258	8172
4.	July-2018	19739	12830	6909
5.	August-2018	5882	3529	2353
6.	September-2018	18415	11970	6445
7.	October-2018	17157	10294	6863
8.	November-2018	18045	10827	7218
9.	December-2018	16784	9231	7553
10.	January-2019	20833	12291	8542
11.	February-2019	17617	10570	7047
12.	March-2019	11097	6658	4439
	Total	2,07,522	1,25,371	82,150

Table 2-4: RO Reject Water Characteristics (2018-19)

Sr. No.	Parameters	Unit	Analysis Result
1	pH	-	7.5 to 8.5
2	Total Dissolved Solids (TDS)	mg/l	20000 - 25000
3	Total Hardness	mg/	5000 – 70000
4	Sulphate	mg/	2000 - 4000
5	Ammonical Nitrogen	mg/	5 – 10

2.8 Site Conceptual Model

On the basis of the initial site visit and results of earlier studies, discussions with the Client and desk reviews; a preliminary potential Site Conceptual Model have been elaborated. This Site Conceptual Model is presented in the following section. The Site Conceptual Model has provided the basis for the applied investigation strategy as presented in Section 3. In Section 4, Site Conceptual Model will be verified with the obtained site investigation results.

As the site is not surrounded by any other industries potential Components of Concern and/or potential pollution sources are related to site activities as described earlier in site history.

2.8.1 Potential Components Of Concern

Based on the production process, potential Components of Concern (CoC) along with impacts that these may cause are mentioned in **Table 2-5**.

Table 2-5: Potential Components of Concern

S. No.	Chemical of Concern	Potential Impact on following Parameters due to Leaching	Remarks
1	Lime in process (originally used lime sourced from GNFC and later fresh lime)	Ammonical Nitrogen, Nitrate and Nitrite	Infiltration of these components to the subsoil may also lead to elevated concentrations of pH, ammonical nitrogen, nitrate, nitrite, TDS, COD, chloride, sulphate in the groundwater
2	Sulphuric Acid (H ₂ SO ₄)	pH	
3	Treated wastewater stored for evaporation in evaporation ponds	Ammonical Nitrogen, Nitrate and Nitrite, Total Dissolved Solids, Chemical Oxygen Demand, Chloride and Sulphate	

Although the results of a previous study in the area revealed that groundwater may be impacted by ammonical nitrogen and higher values are observed in bore wells within and outside bore wells adjacent to APL site, it can be interpreted that the source may be within the site. As direct link between NH₃-N and above potential Components of Concern could be established, for contamination of the groundwater. In this, NH₃N may be released due to contaminated lime sourced from GNFC for neutralization of acid which was containing some nitrogenous contamination used in the process and leaching of same into groundwater may be one of the reasons.

In this study ammonical nitrogen in the groundwater is considered as a potential Component of Concern.

Given the nature of the potential Components of Concern and previously observed contamination levels in the GITCO study, it is expected that contamination will manifest itself as aqueous phase liquid and will rest in the bottom layer of the confined layer of aquifer.

2.8.2 Potential Pollution Sources

At the APL site, the following potential pollution sources are identified:

- Solar evaporation ponds storing wastewater
- Processing units
- Storage and processing facilities of raw materials (Lime storage area)
- Wastewater treatment facilities (including connecting pipelines)
- Maintenance facilities

On the basis of above observation the most significant potential pollution sources at the APL can be Impure Lime which may have been stored on unlined surface; also it can be wastewater percolation from existing evaporation ponds which may be earlier unlined. Due to this Components of Concern may penetrate vertically into groundwater as per soil characteristics.

Initial observation at bore well GW-1 (only bore well present at the site) & bore well GW-6 (adjacent to the industry) shows elevated concentration of Ammonical Nitrogen in line with this statement.

Given the nature of aforementioned potential pollution sources it is most likely that a pollution of the subsoil will manifest itself through elevated concentrations in the groundwater.

2.8.3 Potential Path Ways

Given the preliminary observation at the APL site, surface runoff/infiltration of contaminated water appeared relevant path ways for migration of potential pollution. Also intended infiltration of waste water is considered to be relevant for the APL site.

Infiltration of contaminated liquids and/or leachate through the soil towards the groundwater and further vertical spreading in the groundwater present the major path way for any potential pollution originating from APL site.

Given the observed depth of the groundwater (about 110 m-bgl). It is estimated that contamination may require a decade to infiltrate through the soil and to reach the groundwater.

In & around the project area, ground water occurs under unconfined & semi-confined condition. However, due to excessive development of ground water, there is a fall in water-level and resulted more than 100m depth below ground level. Surrounding the project site, the existing bore-wells were deeper from ~180m to ~250m. Fresh water yield is available from aquifer around 150m deep.

General understanding is that in the study area groundwater flow is from south west to northeast. However preferential flow paths and local groundwater abstraction (bore well GW-1) may cause local variations in the groundwater flow pattern. Preliminary desk research indicates that groundwater gradient is undulating.

Based on above observations the following is anticipated with regards to the potential pathways in the groundwater:

- In general groundwater flow follows surface topography i.e. according to groundwater flow direction from south-west to north-east.
- Infiltrating contamination may reach groundwater within a decade or so as per soil characteristics.
- Vertical component of infiltration is expected as top soil cover is sandy and is having higher permeability values. According to Pump test analysis transmissivity is 36.67m²/day and permeability of aquifer is 0.52m/day (which is low), hence horizontal spread of contamination if any will be low.
- Groundwater contamination will be more in vertical direction and limited to horizontal spread, Horizontal extend can be limited due to the abstraction of water in new abstraction wells on the NE boundary of the site adjacent to GW-6;

As the exact horizontal groundwater flow pattern at the site is not known in sufficient detail, the recommended investigation strategy has to anticipate that contaminated groundwater may leave the site in any direction between Northeast to East.

2.8.4 Potential Receptors

It is anticipated that potential exposure of the on-site laborers to potential Components of Concern is dominated by the applied production processes at the APL site. For this reason exposure of laborers to potential Components of Concern originating from soil / groundwater contamination is deemed to be relevant.

In section 2.8.3 it has been presented those potential pathways for contamination are limited to groundwater. Given the depth of the groundwater and the lack of surface water in the direct vicinity of the

APL site, potential exposure to contamination is only possible after abstraction of contaminated groundwater from bore wells in the vicinity of the APL site. The following receptors might potentially be impacted:

- Human population in the surrounding area by use of contaminated groundwater for domestic purposes
- Human population by consumption of food crops irrigated with contaminated groundwater or consumption of animal products impacted by polluted groundwater
- Human population applying contaminated groundwater for agricultural reasons (dermal contact)
- Local fauna and flora exposed to contaminated groundwater applied for irrigation

Actual receptors can be identified through an inventory of the bore wells in the study area and analytical testing of the water from these bore wells.

3 SITE INVESTIGATION, LAB STUDY & DESK STUDY

Our site investigation consists of well inventory and groundwater sampling. Laboratory study consists of analysis and treatability study of groundwater samples for basic parameters. Desk study consists of abstraction of contaminated groundwater and plume behavior around the project site. The photographs of site investigation are shown in **Annexure 6**.

The timeline of activities for site investigation and lab study is shown below in **Table 3-1**.

Table 3-1: Timeline of Activities

Sr. No.	Activity	Date	
		From	To
1	Meeting with client, site walkover, well inventory and collecting groundwater samples	20 th August 2019	21 st August 2019
2	Groundwater Analysis	26 th August 2018	19 th September 2019
3	Treatability Study of groundwater	20 th September 2019	7 th October 2019

3.1 Site Setting

3.1.1 Topography

Topographically the area around the site is undulating. The streams flowing in and around the project area are ephemeral and originate from the central high portion and in general surface water flows from South to North.

3.1.2 Geology

The study area is located in central part of District Kachchh which is dominated by the *Bhuj Sandstone*. In & around project site, the soil occurs with silt and sand developed from the parent material – dominated by sandstone and associated by shale. They are reddish brown in colour and loamy in texture.

Lithological, the Bhuj Sandstone comprises of fine to coarse grained sandstone inter-bedded with siltstone and shale. The rock formations of the area show their age ranging from Middle Jurassic to the recent age. The main rock formations of the area are sandstone and shale with a few basaltic intrusions. The oldest rock formations in the area are shale and fine grain sandstone of the Chhari and Katrol series of the Middle and Upper Jurassic.

There is frequent intercalation between the shale and sandstone, as well as with limited limestone deposits in the region. On average, the formation shows gentle dip towards south at its shallowest the sandstone is only 18m deep and deepens to 123 m at its southern tip. The belt of cretaceous sandstone is the region's only good aquifer, but has a risk of high salinity due to the naturally saline nature of the sandstone and proximity to iron and shale deposits.

The soil particularly at site is silty and sandy.

3.1.3 Hydrogeology

The sandstone formations which forms the most prolific aquifer system are belonging to Bhuj (or Umia) series. In & around the project area, ground water occurs under unconfined & semi-confined condition. However, due to excessive development of ground water, there is a fall in water-level and resulted more than 100m depth below ground level. Surrounding the project site, the existing bore-wells were deeper from ~180m to ~250m.

3.1.4 Physiography

The project site is a part of Kachchh Mainland which is situated in the foot hills of Katrol Hill range. The general ground gradient is from south to north towards plains. The major habitants namely village Ler is located ~1.5km in SE direction and village Bhujodi is located ~2 km in NNW direction from the project site. Around the project site, agricultural fields are located which is the major source of employment for localities. The forest area is adjacent to the project site in SW direction.

3.1.5 Drainage

There is a tiny drain passing adjacent to this unpaved road originating from Katrol hill range (in south of APL) flowing further towards the North direction. This drain was observed flowing with very less amount of rain water from south to north direction verifying the ground gradient, although it is non-perennial in nature.

3.2 Outcome of Field Surveys (From the study of previous consultant)

3.2.1 Topographical Survey of site

As per topographical survey, it is inferred that the general topography of the site is from South-West to North-East. The topographical survey Map is shown in **Figure 4**.

3.2.2 Contour Survey

As per contour survey and reduced level map, it is inferred that the general groundwater direction is from South-West to North-East. The Reduce Level Map is shown in **Figure 5**.

3.2.3 Vertical Electrical Soundings

Vertical Electrical Sounding (VES) survey is a method of resistivity survey proposed by Schlumberger to identify various strata below the earth surface. Total 05 numbers of VES points had been surveyed in study area. Based on this survey, following bore logs are obtained as shown in

Table 3-2. The bore logs of all the locations are shown in **Figure 6**.

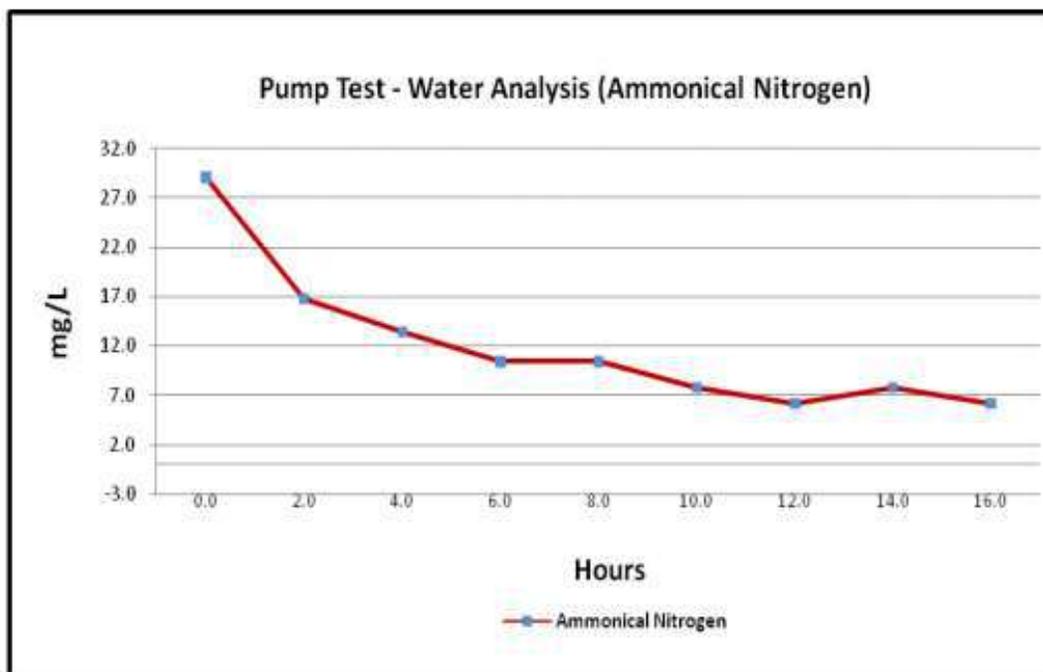
Table 3-2: Bore log observations

Sr. No.	Drilling and Sampling Locations	Depth of (m bgl)	Observations
1	Location-1	262	<ul style="list-style-type: none"> 0 to 3.8m bgl: Alluvium with loose sand and clay with Kankar mix (Dry) 3.8 to 32m bgl: White to pinkish friable medium to coarse sandstone dry 32 to 42m bgl: Yellowish to greyish clay layer no water 42 to 106m bgl: Medium - fine -coarse grained pink sandstone with thin layers of shale and water level around 93m bgl 106 to 262m bgl: Shale sandstone intercalation and water level around 168m bgl
2	Location-2	224	<ul style="list-style-type: none"> 0 to 7.5m bgl: Alluvium with loose sand and clay with Kankar mix (Dry) 7.5 to 45m bgl: White to pinkish friable medium to coarse sandstone dry 45 to 224m bgl: Medium - fine -coarse grained pink sandstone with thin layers of shale and water level around 124m bgl
3	Location-3	250	<ul style="list-style-type: none"> 0 to 4m bgl: Alluvium with loose sand and clay with Kankar mix (Dry) 4 to 14.5m bgl: White to pinkish friable medium to coarse sandstone dry

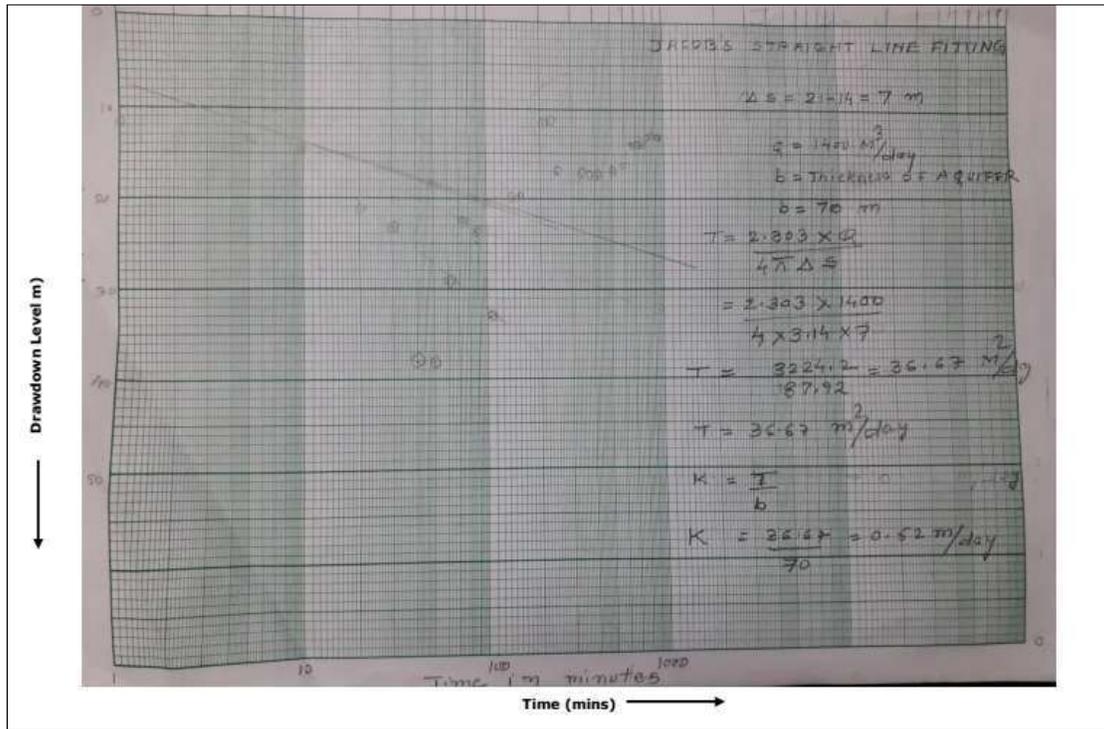
Sr. No.	Drilling and Sampling Locations	Depth of (m bgl)	Observations
			<ul style="list-style-type: none"> 14.5 to 20m bgl: Yellowish to greyish clay layer no water 20 to 157m bgl: Medium - fine -coarse grained pink sandstone with thin layers of shales and water level around 118m bgl 157 to 250m bgl: Shale sandstone intercalation
4	Location-4	239	<ul style="list-style-type: none"> 0 to 6.5m bgl: Alluvium with loose sand and clay with Kankar mix (Dry) 6.5 to 116m bgl: White to pinkish friable medium to coarse sandstone 116 to 239m bgl: Medium - fine -coarse grained pink sandstone with thin layers of shales and water level around 118m bgl
5	Location-5	223	<ul style="list-style-type: none"> 0 to 3.7m bgl: Alluvium with loose sand and clay with Kankar mix (Dry) 3.7 to 29m bgl: White to pinkish friable medium to coarse sandstone dry 29 to 223m bgl: Medium - fine -coarse grained pink sandstone with thin layers of shales and water level around 112m bgl

3.3 Pumping Test

Pump test was carried out at the bore well GW-1 located near Gate No.2; with constant discharge of 55m³/hr. for 18 hours. The static water levels in the pump well GW-1 was noted before starting the test. During continued pumping, water samples were collected at regular interval of 2 hrs and chemical analysis of these samples was carried out to determined dilution of chemical parameters, with major focus of ammonical nitrogen, nitrate and nitrite. It is observed that initial concentration of ammonical nitrogen was 28 mg/L, which reduce to the concentration of 6.2 mg/L at the end of continuous pumping for 18 hrs. The graph showing reduction in Ammonical nitrogen concentration with pumping interval is shown below;



From the observations of pumping test data it is inferred that there is very high drawdown. For yielding a discharge @ 52 m³/hour the drawdown observed was 38.10 m.



From the analysis of pumping test data and Drawdown Curve as shown below, the transmissivity is calculated as 36.67 m²/day and permeability of aquifer is calculated as 0.52 m/day, which is low. Hence it indicates that spread of the said aquifer is quite low. It means that horizontal spread of contamination if any, will be low in aquifer.

3.4 Soil investigation

Drilling of shallow boreholes of 3m depth was executed by manual hand auger and collected soil samples at every depth of 1m, 2m and 3m from 5 different locations. Details of soil permeability is shown in **Table 3-3**.

Table 3-3: Details of soil permeability

Soil Sample Location	Coordinates	Permeability (cm/hr)			
		1m depth	2m depth	3m depth	Average
S1 (Near Gate No. 2 Old Gypsum Storage Area)	23°11'56.27"N 69°44'31.07"E	6.955	8.864	6.811	7.543
S2 (Old pond for neutralization)	23°12'4.72"N 69°44'27.54"E	7.030	6.933	6.830	6.931
S3 (Behind Solar Evaporation Pond)	23°12'17.43"N 69°44'39.36"E	7.442	7.133	6.980	7.185
S4 (Gypsum Storage Area)	23°12'7.38"N 69°44'45.94"E	7.021	7.262	7.934	7.406
S5 (Between Evaporation Pond & Ramesh Pindoria)	23°12'12.85"N 69°44'43.85"E	7.641	7.541	7.730	7.637

Soil analysis results up to the depth of 3 mt. indicates that there is no significant distribution of Ammonical nitrogen in soil. This is due to inference that the top soil cover is sandy which makes easy entry of any pollutant (NH₃-N in our case) from the top soil cover into underneath environment.

3.5 Groundwater sampling

Groundwater sampling was done from 16 Nos. of borewells within and around APL. From groundwater analysis results, it was observed that ammonical nitrogen was present in one of the industrial borewell and few surrounding borewells located North-East of industry.

3.6 Additional Field Surveys by KEC

3.6.1 Well Inventory

We identified sixteen locations of the bore wells; and also took a surface water sample of Ler Lake. Groundwater samples from all the bore wells were collected on 20th and 21st August 2019. Total 16 Nos. of groundwater samples including one surface water sample from Ler Lake were collected. The nomenclature of on-site and off-site bore wells is shown in **Table 3-4**. The drawing showing well inventory and groundwater sampling locations is shown in **Figure 7**.

Table 3-4: Well Inventory

Sr. No.	Bore Well No.	Name of Owner	Coordinates	
			Latitude	Longitude
1	GW-1	In Industry (Nr. Gate-2)	23°11'57.54"N	69°44'29.82"E
2	GW-2	In Industry (Nr. Admin Office)	23°12'12.13"N	69°44'29.95"E
3	GW-3	Govind Harji Gorasia (Ler Village)	23°12'18.47"N	69°44'46.05"E
4	GW-4	Shyam Veljibhai Devasia (Ler Village)	23°12'28.30"N	69°44'35.35"E
5	GW-5	Ramesh Harji Gorasia (Ler Village)	23°12'24.75"N	69°44'34.40"E
6	GW-6	Ramesh Pindoria (Ler Village)	23°12'14.75"N	69°44'54.53"E
7	GW-7	Vasudev Pindoria (Ler Village)	23°12'12.81"N	69°44'55.45"E
8	GW-8	Hitubha Jalubha Jadeja (Ler Village)	23°12'5.73"N	69°45'41.57"E
9	GW-9	Kishorbhai Govindbhai Pindoria (Ler Village)	23°11'59.42"N	69°45'0.99"E
10	GW-10	Ranubha Pindoria (Ler Village)	23°11'56.29"N	69°44'52.63"E
11	GW-11	Sama Vadh Samiti (Ler Village)	23°12'6.47"N	69°44'24.92"E
12	GW-12	Harji Samji (Ler Village)	23°12'11.68"N	69°45'12.30"E
13	GW-13	Laljibhai Shamjibhai (Ler Village)	23°12'13.16"N	69°45'13.31"E
14	GW-14	Dream Resort (Bhujodi Village)	23°12'59.15"N	69°44'32.77"E
15	GW-17	Vishram Kanji Hirani (Ler Village)	23°12'21.00"N	69°45'13.00" E
16	GW-18	Kirti Varsani (Ler Village)	23°12'15.00"N	69°45'5.00" E
17	SW-A	Ler Lake	23°11'39.75"N	69°45'29.19" E

3.6.2 Groundwater Sampling

The groundwater sampling strategy was to cover groundwater bore wells identified as part of the study. Accordingly, groundwater samples were collected from 16 Nos. of bore wells. (On-site: 2 Nos. and Off-site: 14 Nos.) and surface water sample from Ler Lake. The groundwater samples were filled directly into

sampling bottles from discharge point after allowing sufficient quantity of water to overflow as purging in order to avoid any internal pipe contamination.

The groundwater and surface water samples collected in sampling bottles were sealed, labelled and placed into a bag. The samples were then transferred to a refrigerator for holding, prior to shipment to laboratory with chain of custody data for analysis.

All samples were analyzed for basic parameters from our own laboratory Kadam Environmental Consultants (NABL accredited), Vadodara.

All the samples were analyzed for 27 parameters as described in Groundwater sampling plan in **Table 3-5**.

Table 3-5: Groundwater Sampling Plan

Sr. No.	Bore Well No./ Surface Water No.	Coordinates		Tested for Parameters
		Latitude	Longitude	
1	GW-1	23°11'57.54"N	69°44'29.82"E	1) pH 2) Colour 3) Ammonical Nitrogen 4) Nitrate 5) Nitrite 6) Total Dissolved Solids 7) Total Alkalinity 8) Total Hardness 9) Total Chromium 10) Total Suspended Solids 11) Chloride 12) Sulphate 13) Chemical Oxygen Demand 14) Biochemical Oxygen Demand 15) Phenol 16) Iron 17) Zinc 18) Oil and Grease 19) Copper 20) Phosphate 21) Sodium Adsorption Ratio, 22) Percentage Sodium 23) Sodium 24) Potassium 25) Total Organic Carbon
2	GW-2	23°12'12.13"N	69°44'29.95"E	
3	GW-3	23°12'18.47"N	69°44'46.05"E	
4	GW-4	23°12'28.30"N	69°44'35.35"E	
5	GW-5	23°12'24.75"N	69°44'34.40"E	
6	GW-6	23°12'14.75"N	69°44'54.53"E	
7	GW-7	23°12'12.81"N	69°44'55.45"E	
8	GW-8	23°12'5.73"N	69°45'41.57"E	
9	GW-9	23°11'59.42"N	69°45'0.99"E	
10	GW-10	23°11'56.29"N	69°44'52.63"E	
11	GW-11	23°12'6.47"N	69°44'24.92"E	
12	GW-12	23°12'11.68"N	69°45'12.30"E	
13	GW-13	23°12'13.16"N	69°45'13.31"E	
14	GW-14	23°12'59.15"N	69°44'32.77"E	
15	GW-17	23°12'21.00"N	69°45'13.00" E	
16	GW-18	23°12'15.00"N	69°45'5.00" E	
17	SW-A	23°11'39.75"N	69°45'29.19" E	

3.7 Chemical Analysis of Groundwater Sample

The chemical analytical results of all sixteen groundwater samples for basic parameters from Kadam laboratory are shown in **Table 3-6** and Lab Certificate from Kadam Lab is shown in **Annexure 7**.

Table 3-6: Analysis Result of Groundwater Sample from Kadam Lab

Sr. No.	Parameters	Unit	LOR	Result																	
				GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	GW-9	GW-10	GW-11	GW-12	GW-13	GW-14	GW-17	GW-18	SW-A	
1	pH		2	6.98	7.35	7.38	6.92	7.42	7.50	7.12	7.12	7.48	7.64	7.60	7.61	7.86	8.40	7.72	7.80	8.90	
2	Colour	Pt. Co.	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	25
3	TDS	mg/l	3	5951	6838	6548	7214	3164	5834	7167	2128	4063	4345	4615	2085	3672	2269	3067	3142	3684	
4	Sulphate	mg/l	1	3169	2223	2752	1619	607	2453	2434	805	1603	1481	2423	478	597	842	521	374	626	
5	Chlorides	mg/l	1	736	2280	1663	3468	1430	1449	2375	428	998	665	665	929	1264	428	1226	1328	1758	
6	Alkalinity	mg/l	5	48	50	46	24	28	50	50	56	32	38	52	46	60	50	52	64	16	
7	Sodium	mg/l	1	1214	1805	2462	1999	1135	2103	1769	656	604	934	1044	521	1450	281	2214	2035	24	
8	Potassium	mg/l	1	47	30	24	54	45	22	33	28	35	44	27	18	23	15	32	39	7	
9	Ammonical Nitrogen	mg/l	0.05	20.59	1.5	10.52	3.85	1.06	51.6	21.14	3.90	3.85	10.97	4	0.45	3.39	2.1	1.31	1.37	<0.05	
	Ammonia (Theoretical Interpretation)	mg/l	-	0.15	0.02	0.18	0.03	0.02	1.13	0.18	0.03	0.08	0.29	0.11	0.01	0.18	0.32	0.04	0.06	0.00	
10	Total Hardness	mg/l	2	760	2336	2212	1316	880	2760	3040	960	760	1460	1552	630	1700	544	840	1000	224	
11	Total Chromium	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
12	TSS	mg/l	2	<2	<2	<2	8	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	4	
13	COD	mg/l	5	<5	<5	<5	<5	<5	10	<5	8	8	<5	<5	<5	<5	<5	<5	<5	10	
14	Phenol	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
15	Iron	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
16	Zinc	mg/l	0.03	0.34	0.04	0.08	<0.03	0.07	<0.03	0.14	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.12	
17	BOD	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
18	Oil & Grease	mg/l	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
19	Copper	mg/l	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
20	Phosphate	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
21	% Sodium	%	0.01	76.22	62.08	70.27	75.70	16.57	61.86	55.27	58.74	62.00	57.01	58.64	9.00	15.22	51.98	33.11	27.86	18.29	
22	SAR	-	0.01	19.10	16.16	22.65	23.87	72.32	17.31	13.88	9.18	9.53	10.57	11.47	63.28	64.37	5.23	84.45	80.70	0.69	
23	Nitrate	mg/l	0.1	39.73	55.95	13.33	18.59	42.62	14.65	76.65	4.56	0.00	1.32	56.39	4.56	37.25	23.77	0.0	39.73	51.92	
24	Nitrite	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
25	TOC	mg/l	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

Note: (-) Values not mentioned in standards

4 EVALUATION OF CONCEPTUAL MODEL

4.1 Assessment Based on Field Surveys

4.1.1 Local Geology

From the Google Earth Elevation, surface level at the site is found at 131m.

Based on the bore logs, the ERT survey results and the regional geology the local geology is described in

Table 4-1. The permeability is calculated based on the earlier study results of the physical analysis on soil samples. In the table literature reference values representative for the encountered soil types are listed.

Table 4-1: Local Geology

Depth (m BGL)	Geo hydrological entity	Soil type	*Porosity (%)	Permeability (m/d)
0 - 7	Top Layer	Alluvium with loose sand and clay with Kankar mix (Dry)	literature value: 10 - 35	Aquifer permeability based on pump test is 0.52m/day (Report of GITCO dated November 2018)
7-114	Intermediate Layer	White to pinkish friable medium to coarse sandstone dry	literature value: 5 to 30	
114 -234	Aquifer	Medium - fine -coarse grained pink sandstone with thin layers of shales and water level around 103 to 124 m with TDS > 4000 ppm. TDS value will become high as the depth increases	literature value: 5 to 30	
234 and 256	Aquitard/Confining Bed	Shale sandstone intercalation with very high saline water TDS > 6000 ppm and water level around 166-167 m	literature value: 1 to 10	
256 and below		Clay-Shale-Limestone intercalated strata saline no water		

***Note: Porosity values are taken from Groundwater & wells 3rd edition by Robert J. Sterrett**

4.2 Assessment Based on Laboratory Results

4.2.1 Quality of Groundwater & Surface Water

All sixteen groundwater and one surface water samples were analyzed for basic parameters from NABL accredited laboratory Kadam Environmental Consultants, Vadodara.

Comparison of analysis results of all seventeen water samples were compared with Indian Drinking Water Standards IS 10500:2012 as shown in **Table 4-2.**

Observations based on comparison with standards is as shown in **Table 4-3.**

Table 4-2: Comparison of Analysis Result of Groundwater Samples with IS 10500:2012

Sr. No.	Parameters	Unit	LOR	Result																	Drinking Water Standards IS 10500 (Permissible Limit in absence of alternate source)	
				GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	GW-9	GW-10	GW-11	GW-12	GW-13	GW-14	GW-17	GW-18	GW-A		
1	pH	-	2	6.98	7.35	7.38	6.92	7.42	7.50	7.12	7.12	7.48	7.64	7.60	7.61	7.86	8.40	7.72	7.80	8.90	6.5-8.5	
2	Colour	Pt. Co.	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	25	15	
3	TDS	mg/l	3	5951	6838	6548	7214	3164	5834	7167	2128	4063	4345	4615	2085	3672	2269	3067	3142	3684	2000	
4	Sulphate	mg/l	1	3169	2223	2752	1619	607	2453	2434	805	1603	1481	2423	478	597	842	521	374	626	400	
5	Chlorides	mg/l	1	736	2280	1663	3468	1430	1449	2375	428	998	665	665	929	1264	428	1226	1328	1758	1000	
6	Alkalinity	mg/l	5	48	50	46	24	28	50	50	56	32	38	52	46	60	50	52	64	16	600	
7	Sodium	mg/l	1	1214	1805	2462	1999	1135	2103	1769	656	604	934	1044	521	1450	281	2214	2035	24	-	
8	Potassium	mg/l	1	47	30	24	54	45	22	33	28	35	44	27	18	23	15	32	39	7	-	
9	Ammonical Nitrogen	mg/l	0.05	20.59	1.5	10.52	3.85	1.06	51.6	21.14	3.90	3.85	10.97	4	0.45	3.39	2.1	1.31	1.37	<0.05	-	
	Ammonia (Theoretical Interpretation)	mg/l		0.15	0.02	0.18	0.03	0.02	1.13	0.18	0.03	0.08	0.29	0.11	0.01	0.18	0.32	0.04	0.06	0.00	0.5	
10	Total Hardness	mg/l	2	760	2336	2212	1316	880	2760	3040	960	760	1460	1552	630	1700	544	840	1000	224	600	
11	Total Chromium	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-
12	TSS	mg/l	2	<2	<2	<2	8	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	4	-	
13	COD	mg/l	5	<5	<5	<5	<5	<5	10	<5	8	8	<5	<5	<5	<5	<5	<5	<5	10	-	
14	Phenol	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-
15	Iron	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3
16	Zinc	mg/l	0.03	0.34	0.04	0.08	<0.03	0.07	<0.03	0.14	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.12	15	
17	BOD	mg/l	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-
18	Oil & Grease	mg/l	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
19	Copper	mg/l	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	1.5
20	Phosphate	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-
21	% Sodium	%	0.01	76.22	62.08	70.27	75.70	16.57	61.86	55.27	58.74	62.00	57.01	58.64	9.00	15.22	51.98	33.11	27.86	18.29	-	
22	SAR	-	0.01	19.10	16.16	22.65	23.87	72.32	17.31	13.88	9.18	9.53	10.57	11.47	63.28	64.37	5.23	84.45	80.70	0.69	-	
23	Nitrate	mg/l	0.1	39.73	55.95	13.33	18.59	42.62	14.65	76.65	4.56	0.00	1.32	56.39	4.56	37.25	23.77	0.0	39.73	51.92	45	
24	Nitrite	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
25	TOC	mg/l	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-

Note: (-) Values not mentioned in standards

Table 4-3: Observations/Findings of Groundwater Quality

Sr. No.	Sample Location	Findings	Interpretation
1	GW-1	• Ammonical Nitrogen, TDS, Sulphate, Total Hardness are above limit when compared with IS 10500:2012	<ul style="list-style-type: none"> • Presence of Ammonical nitrogen and nitrate in groundwater may be due ; - Use of impure lime in neutralization process in the past. - Use of fertilizer (Urea) in agricultural lands. • Elevated levels of total dissolved solids, chloride, Sulphate, Nitrate etc. may be due to local geology.
2	GW-2	• TDS, Sulphate, Chloride, Magnesium, total Hardness and Nitrate are above limit when compared with IS 10500:2012	
3	GW-3	• Ammonical Nitrogen, TDS, Sulphate, Chloride, and Total Hardness are above limit when compared with IS 10500:2012	
4	GW-4	• TDS, Sulphate, Chloride and Total Hardness are above limit when compared with IS 10500:2012	
5	GW-5	• TDS, Sulphate, Chloride and Total Hardness are above limit when compared with IS 10500:2012	
6	GW-6	• Ammonical Nitrogen, TDS, Sulphate, Chloride, and Total Hardness are above limit when compared with IS 10500:2012	
7	GW-7	• Ammonical Nitrogen, TDS, Sulphate, Chloride, Total Hardness and Nitrate are above limit when compared with IS 10500:2012	
8	GW-8	• Sulphate and Total Hardness are above limit when compared with IS 10500:2012	
9	GW-9	• TDS, Sulphate and Total Hardness are above limit when compared with IS 10500:2012	
10	GW-10	• Ammonical Nitrogen, TDS, Sulphate and Total Hardness are above limit when compared with IS 10500:2012	
11	GW-11	• TDS, Sulphate , Total Hardness and Nitrate are above limit when compared with IS 10500:2012	
12	GW-12	• TDS, Sulphate and Total Hardness are above limit when compared with IS 10500:2012	
13	GW-13	• TDS, Sulphate, Chloride and Total Hardness are above limit when compared with IS 10500:2012	
14	GW-14	• Sulphate are above limit when compared with IS 10500:2012	
15	GW-17	• TDS, Sulphate, Chloride and Total Hardness are above limit when compared with IS 10500:2012	
16	GW-18	• TDS, Chloride and Total Hardness are above limit when compared with IS 10500:2012	
17	SW-1	• pH, Colour, TDS, Sulphate, Chloride and Nitrate are above limit when compared with IS 10500:2012	

The drawing showing Contamination Levels of ammonical nitrogen on all seventeen sampling locations is shown in **Figure 8**.

4.3 Evaluation of Site Conceptual Model

4.3.1 Plume delineation

In general groundwater flow follows surface topography i.e. according to groundwater flow direction from south-west to north-east. Infiltrating contamination have reached groundwater as per soil characteristics.

Vertical component of infiltration is expected as top soil cover is sandy and is having higher permeability values. According to Pump test analysis transmissivity is $36.67\text{m}^2/\text{day}$ and permeability of aquifer is $0.52\text{m}/\text{day}$ (which is low), hence horizontal spread of contamination if any will be low.

Plume delineation is broadly defined as zone of influence of contaminated groundwater. In our study, plume delineation is identified based on the groundwater sample analysis results. The likely Plume delineation was drawn by plotting potential component of concern as Ammonical Nitrogen ($\text{NH}_3\text{-N}$) & Ammonia and it depicts that likely plume delineation is in borewell GW-1, GW-3, GW-6, GW-7 and GW-10. The zone highlighted in dark red colour, circling GW-1, GW-6 and GW-7 is considered to be the affected zone wherein $\text{NH}_3\text{-N}$ is observed in the range of 10.52 to 51.6 mg/l; whereas the zone highlighted in light red colour, circling (GW-1 & GW-3) and (GW-1 & GW-10) is considered to be the less affected zone wherein NH_3N is observed in the range of 10.52 to 20.59 mg/l and 10.52 to 10.97 mg/l respectively.

Hence plume is limited to horizontal spread up to GW-6. Extent of the Plume based on the current data and distance is around 880 m (From Google Earth Image) up to GW-6 which is located in NE direction to the site along the general groundwater direction. The drawing showing likely plume delineation is shown in **Figure 9**.

4.3.2 Groundwater abstraction volume

Based on plume delineation, data of geo-hydrological studies, contour survey and pump test; volume of groundwater abstraction calculated is $70\text{ m}^3/\text{day}$; considering permeability as $0.52\text{ m}/\text{day}$, porosity as 0.01-0.35 (As per literature from 3rd Edition by Robert J. Sterrett) and gradient of site is calculated as 0.01 m/m (based on Google Earth Elevation and Contour Survey carried out at Site).

4.3.3 Recommendations based on Site Assessment

Based on the Site Assessment & Plume Study following recommendations are made to proceed;

- Horizontal extend can be limited due to the abstraction of water in new abstraction wells on the NE boundary of the site adjacent to GW-6. Placing of two abstraction wells AW-1 and AW-2 as shown in **Figure 11** to achieve horizontal delineation of the groundwater pollution in northeast and east direction of the Site.
- Analyze a selection of bore wells on micro pollutants to obtain a better understanding of the potential risks by the use of groundwater.
- This remediation strategy is focusing on removal of ammonical nitrogen for groundwater contamination by the use of pump-and-treat technologies.
- Improve the onsite management practices by M/s. APL industries to avoid groundwater contamination.

5 TREATABILITY STUDY OF GROUNDWATER SAMPLE

5.1 Aim of Treatability Study

Lab scale treatability study was carried out in order to design an optimized treatment scheme for removal of ammonical nitrogen from groundwater.

5.2 Techniques for removal of ammonical nitrogen

The removal of Ammonical nitrogen can be possible by passing through applying following three treatment:

- a) Primary Treatment
- b) Biological Treatment
- c) Tertiary Treatment

a) Primary Treatment

In primary treatment includes the Air stripping, pH adjustment, coagulation and flocculation. By applying these treatment, the 10%-15% of Ammonical nitrogen can be reduced.

b) Biological Treatment

There are various methods to remove Ammonical nitrogen by biological nitrification system. The extended aeration treatment can also be used to ease for operation of the treatment process. In the treatment process; converting ammonia to nitrate using aerobic autotrophic bacteria. Nitrification is actually a two-step process for removing ammonia using two different types of autotrophic bacteria that oxidize ammonia to nitrite (nitrosomonas) and then oxidize nitrite to nitrate (nitrobacter). Biological nitrification system are designed to completely convert all ammonia to nitrate. Both types of autotrophic bacteria require proper biomass concentrations (MLSS), specific environmental conditions (temperature, pH, alkalinity), enough residence time in the treatment process, and significantly more air than is required to treat for BOD. Nitrification requires over four times the amount of oxygen that is required for BOD removal.

Another factor that required to consider is that loss of alkalinity. For that, adding of alkalinity can be done by in the form of sodium hydroxide or other chemicals.

Based on above consideration, the hydraulic residence time suggested to be 3 to 5 days (by giving two stage aeration) and sludge residence time required to be over 20 days at design flow rates and organic loadings. By supplying enough air, nitrification will occur easily in extended aeration processes.

The advantages is, due to higher hydraulic and solids residence times; extended aeration treatment processes are more forgiving and can provide high quality treated water. Here total 80-90% removal of Ammonical nitrogen can be possible.

c) Tertiary Treatment

If in any circumstances, a biological process upset due to shock load, temperature change; the efficiency of the biological system can decrease. Due to such case, the breakpoint chlorination can be done to remove further Ammonical nitrogen. It can be applied before filtration unit. The efficiency will depend on the amount of chlorine applied and necessity of Ammonical nitrogen removal.

5.3 Approach for Treatability Studies

Our approach of Treatability is to treat ammonical nitrogen particularly in two bore wells i.e. GW-1 & GW-6 respectively as these wells are highly contaminated.

Groundwater sample were collected in 5 litres carboy from Well GW-1 (On-site) and GW-6 (Off-site-Affected BW) on 20th & 21st August 2019 for conducting analysis and treatability study from Kadam Lab.

Methods were tried in our lab for removal of ammonical nitrogen as shown below:

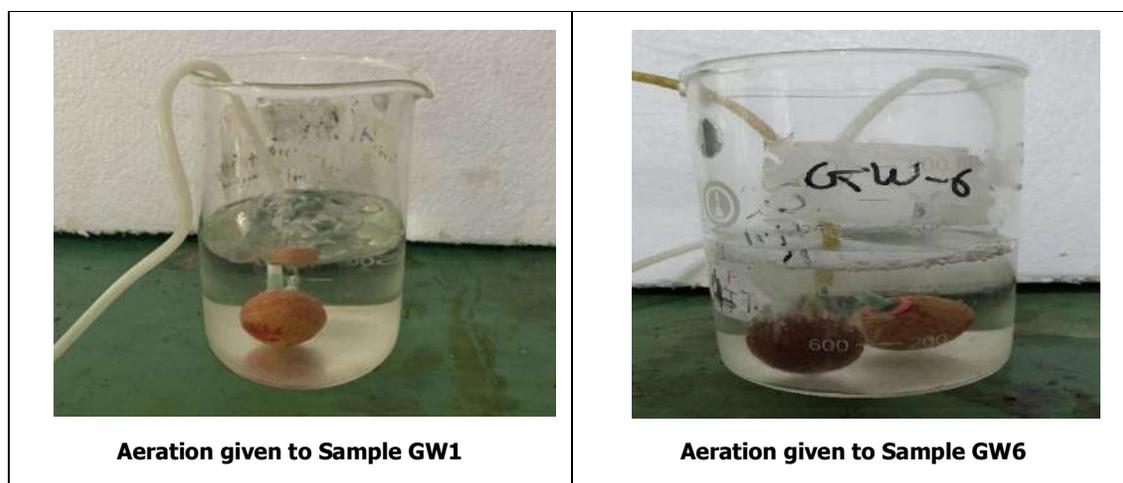
- Simple aeration with air diffusers was worked out for initially 2-3 hrs. then kept for 24 hrs. and gradually up to 7 days.
- Simple aeration with air diffusers and pH adjustment

5.3.1 Primary treatment – Simple Aeration with air diffusers

Primary treatment includes the simple aeration with air diffusers.

Following treatment was given on groundwater sample GW1 & GW-6 of 500 ml quantity:

500 ml sample of GW1 & GW6 were taken and given plain aeration for 3 hours; thereafter sample was analysed for Ammonical nitrogen only; reduction of about 50% was observed; As GW-1 values were within limits compared to prescribed standards of Indian Drinking water Standards IS 10500:2012, only GW-6 sample with higher value of Ammonical nitrogen was kept in aeration for 24 hrs. and then a weeks' time but no major reduction was observed.



Analysis results before and after treatment are as shown respectively in **Table 5-1**.

Table 5-1: Simple Aeration for GW-6

Sr. No.	Parameter	Unit	Before Treatment	After Treatment
1	pH	-	6.98	7.01
2	Ammonical Nitrogen	mg/l	51.6	13.39
3	Nitrate	mg/l	39.73	30.26
4	Total Hardness	mg/l	760	760
5	Total Dissolved Solids (TDS)	mg/l	4251	4251
6	Chloride	mg/l	736	736
7	Sulphate	mg/l	3169	3169

Treatability Study of Ammonical Nitrogen was conducted for six continuous days by simple aeration method in order to observe any reduction. The reduction in Ammonical Nitrogen is as shown in **Table 5-2**.

Table 5-2: Reduction in Ammonical Nitrogen in the Aeration treatment for GW-6

Sr. No.	Days	Analysis Results (mg/l)
		Initial Analysis
1	Day 1	20.59
2	Day 2	16.20
3	Day 3	15.90
4	Day 4	15.20

Sr. No.	Days	Analysis Results (mg/l)
		Initial Analysis
5	Day 5	14.30
6	Day 6	14.00
7	Day 7	13.00

From the treatability study, it is observed that major reduction takes place in first three or four hours only. From the above table, it is clear that there is negligible amount of reduction in ammonical nitrogen from Day 1 to Day 7.

5.4 Conclusion of Treatability Study

As 50% reduction was achieved in Aeration by Diffuser System no further techniques were tried.

Hence final treatment scheme to be given for treating contaminated groundwater of ammonical nitrogen is aeration by diffuser system with retention of the tank not more than one day.

6 PROPOSED REMEDIATION APPROACH & RECOMMENDATIONS

6.1 Corrective measures taken at the Site

The unit has already initiated corrective measures as follows;

- The unit is using the fresh lime supplied by the authorized vendors since July 2018. The unit have stopped using the lime supplied by Fertilizer Company and the unused lime was disposed to TSDF site since July 2018.
- The unit have installed sewage treatment plant of 10 KLD capacity.
- Unit has provided GCL Liner in Solar evaporation pond; details enclosed vide **Annexure 8**.

6.2 Conclusion & Recommendations

Based on the above studies, corrective actions and interpretations we conclude and recommend following actions for Remediation;

6.2.1 Hydraulic Containment of Groundwater

- Pump and treat method for hydraulic containment of groundwater for removal of ammonical nitrogen from groundwater. Drilling and installation of 2 Nos. of abstraction wells (up to a depth where groundwater is tapped) are proposed in order to extract groundwater of total 70m³/day; on the North-East boundary of the site adjacent to the contaminated off-site borewells. As per treatability study carried out by KEC, pump the groundwater from these wells and collect it into a tank where aeration treatment (with diffusers) should be given for removal of ammonical nitrogen and further this water should be treated at existing RO system, permeate to be reused in process and reject water sent to existing solar evaporation pond. The schematic process flow diagram showing groundwater treatment scheme and layout showing location of abstraction wells is shown in **Figure 10** and **Figure 11** respectively.
- If possible and farmers permit, groundwater can be abstracted from GW-6 and GW-7 and provide treatment for the same. If groundwater abstraction from GW-6 and GW-7 is allowed then drilling and installation of two abstraction wells as mentioned above is not required.

6.2.2 On-site monitoring of RAP of Pump and Treat method for 3 Months

- Provide ambient air quality monitoring network on the boundary of factory premises to monitor the ammonical nitrogen released as against the prescribed norms.
- Quarterly Monitoring of groundwater quality from on-site and off-site bore wells to know the effect of remediation on contamination (Ammonical Nitrogen).
- To submit quarterly monitoring reports of air quality and groundwater quality to concerned authority.

6.2.3 On-site performance evaluation of RAP of Pump and Treat method for 3 Months

- On basis of performance evaluation of on-site pilot trial run with pump and treat method, there will be assessment of analysis w.r.t. air and groundwater quality and efficiency of the system.

Thereafter, full-fledged installation and commissioning will be done of this RAP technique for groundwater restoration.

6.2.4 Time bound action plan

Proposed time bound action plan for groundwater remediation is enclosed vide ***Annexure 9***.

List of Figures

Figure 1: Site Location Map

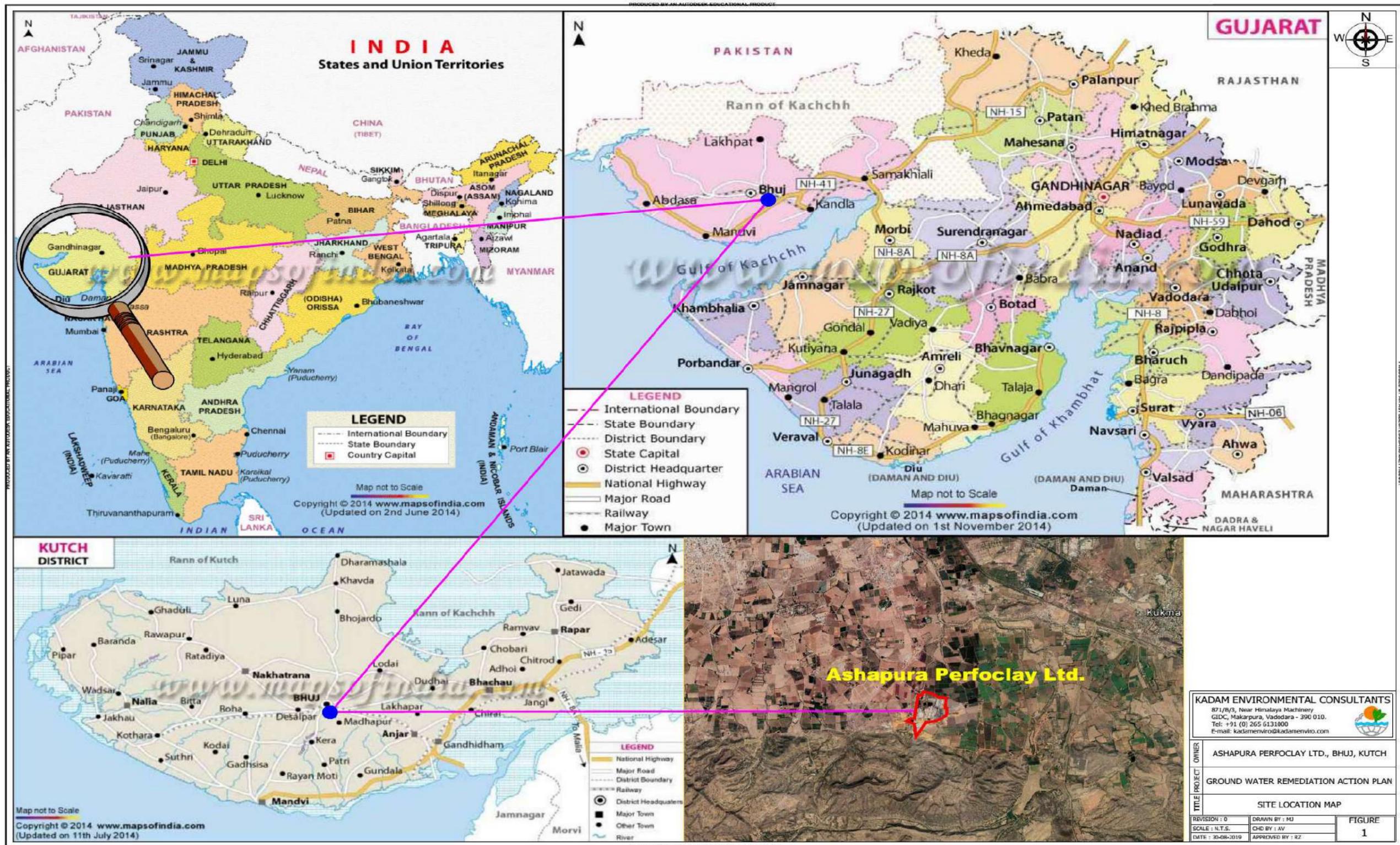


Figure 2: Site Layout Plan

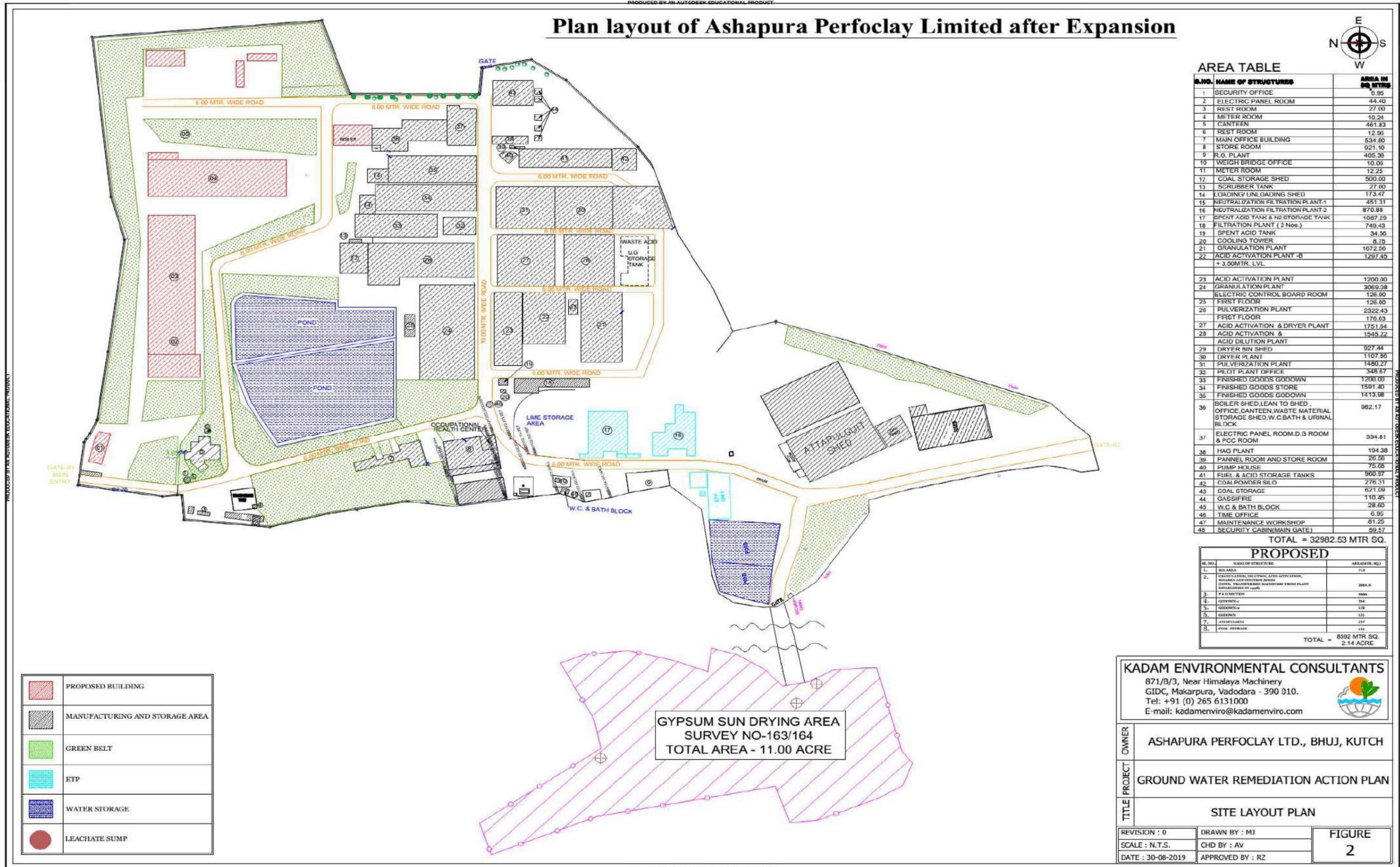
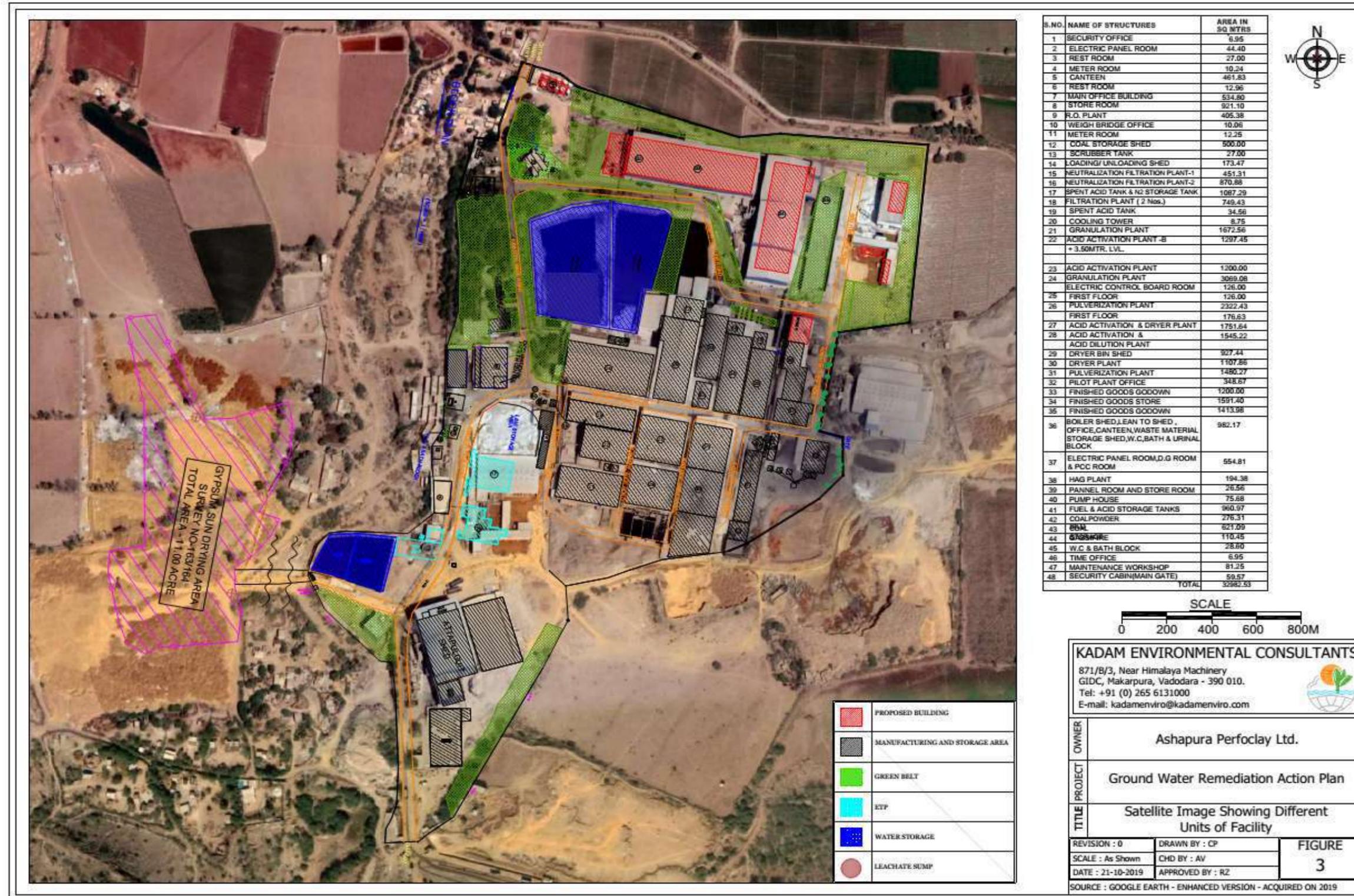
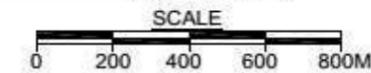


Figure 3: Satellite image showing different units of facility



S.NO.	NAME OF STRUCTURES	AREA IN SQ MTRS
1	SECURITY OFFICE	6.95
2	ELECTRIC PANEL ROOM	44.40
3	REST ROOM	27.00
4	METER ROOM	10.24
5	CANTEEN	461.83
6	REST ROOM	12.96
7	MAIN OFFICE BUILDING	534.80
8	STORE ROOM	921.10
9	R.O. PLANT	405.38
10	WEIGH BRIDGE OFFICE	10.06
11	METER ROOM	12.25
12	COAL STORAGE SHED	500.00
13	SCRUBBER TANK	27.00
14	LOADING/ UNLOADING SHED	173.47
15	NEUTRALIZATION FILTRATION PLANT-1	451.31
16	NEUTRALIZATION FILTRATION PLANT-2	870.89
17	SPENT ACID TANK & H ₂ O STORAGE TANK	1087.29
18	FILTRATION PLANT (2 Nos.)	749.43
19	SPENT ACID TANK	34.56
20	COOLING TOWER	8.75
21	GRANULATION PLANT	1672.56
22	ACID ACTIVATION PLANT -B + 3.50MTR. LVL.	1297.45
23	ACID ACTIVATION PLANT	1200.00
24	GRANULATION PLANT	3069.08
25	ELECTRIC CONTROL BOARD ROOM	126.00
26	FIRST FLOOR	126.00
27	PULVERIZATION PLANT	2322.43
28	FIRST FLOOR	176.63
29	ACID ACTIVATION & DRYER PLANT	1751.64
30	ACID ACTIVATION & ACID DILUTION PLANT	1545.22
31	DRYER BIN SHED	927.44
32	DRYER PLANT	1107.86
33	PULVERIZATION PLANT	1480.27
34	PILOT PLANT OFFICE	348.67
35	FINISHED GOODS GODOWN	1200.00
36	FINISHED GOODS STORE	1591.40
37	FINISHED GOODS GODOWN	1413.98
38	BOILER SHED,LEAN TO SHED, OFFICE,CANTEEN,WASTE MATERIAL STORAGE SHED,W.C,BATH & URINAL BLOCK	982.17
39	ELECTRIC PANEL ROOM,D.G ROOM & PCC ROOM	554.81
40	HAG PLANT	194.38
41	PANNEL ROOM AND STORE ROOM	26.56
42	PUMP HOUSE	75.68
43	FUEL & ACID STORAGE TANKS	960.97
44	COAL POWDER	276.31
45	BBM	621.09
46	W.C & BATH BLOCK	28.80
47	TIME OFFICE	6.95
48	MAINTENANCE WORKSHOP	81.25
49	SECURITY CABIN(MAIN GATE)	59.57
	TOTAL	32962.53



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OWNER	Ashapura Perfoclay Ltd.	
PROJECT	Ground Water Remediation Action Plan	
TITLE	Satellite Image Showing Different Units of Facility	
REVISION : 0	DRAWN BY : CP	FIGURE 3
SCALE : As Shown	CHD BY : AV	
DATE : 21-10-2019	APPROVED BY : RZ	
SOURCE : GOOGLE EARTH - ENHANCED VERSION - ACQUIRED ON 2019		

Figure 4: Topographical Survey Map and general gradient (By Crystal Engineers)

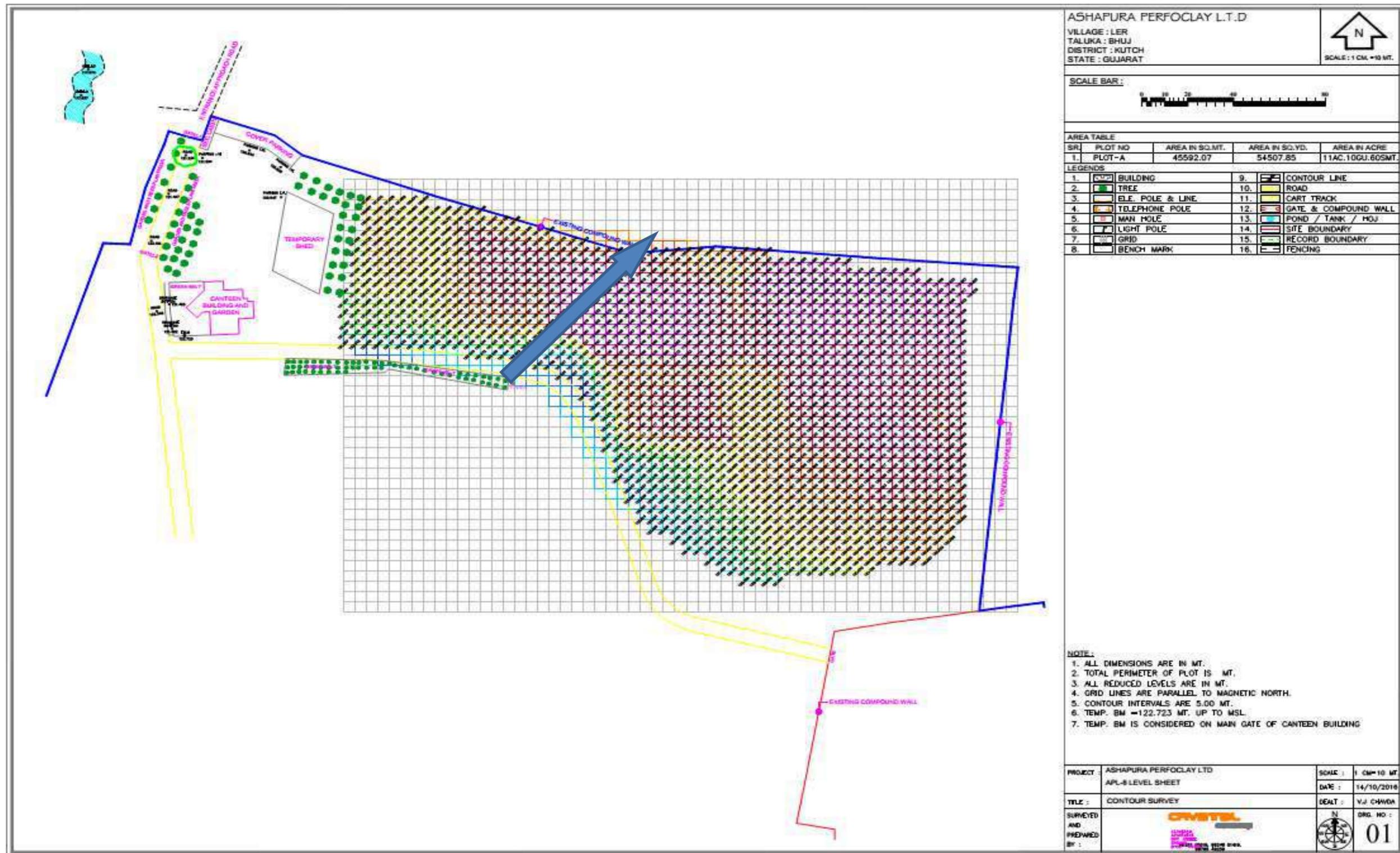


Figure 5: Contour survey drawing showing reduced levels and groundwater flow direction (By GITCO)

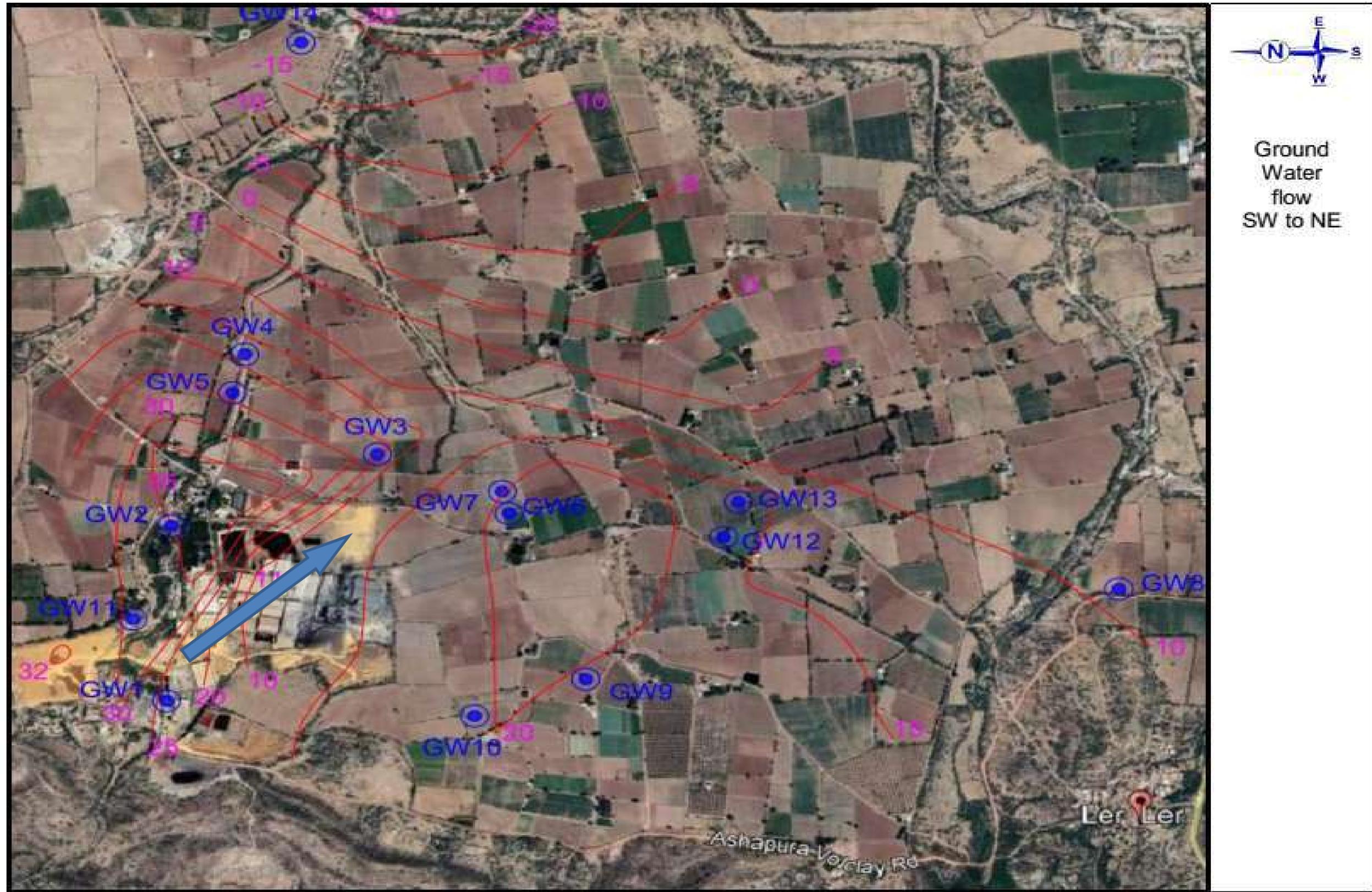


Figure 6: General Bore Log of the site (By AEE)

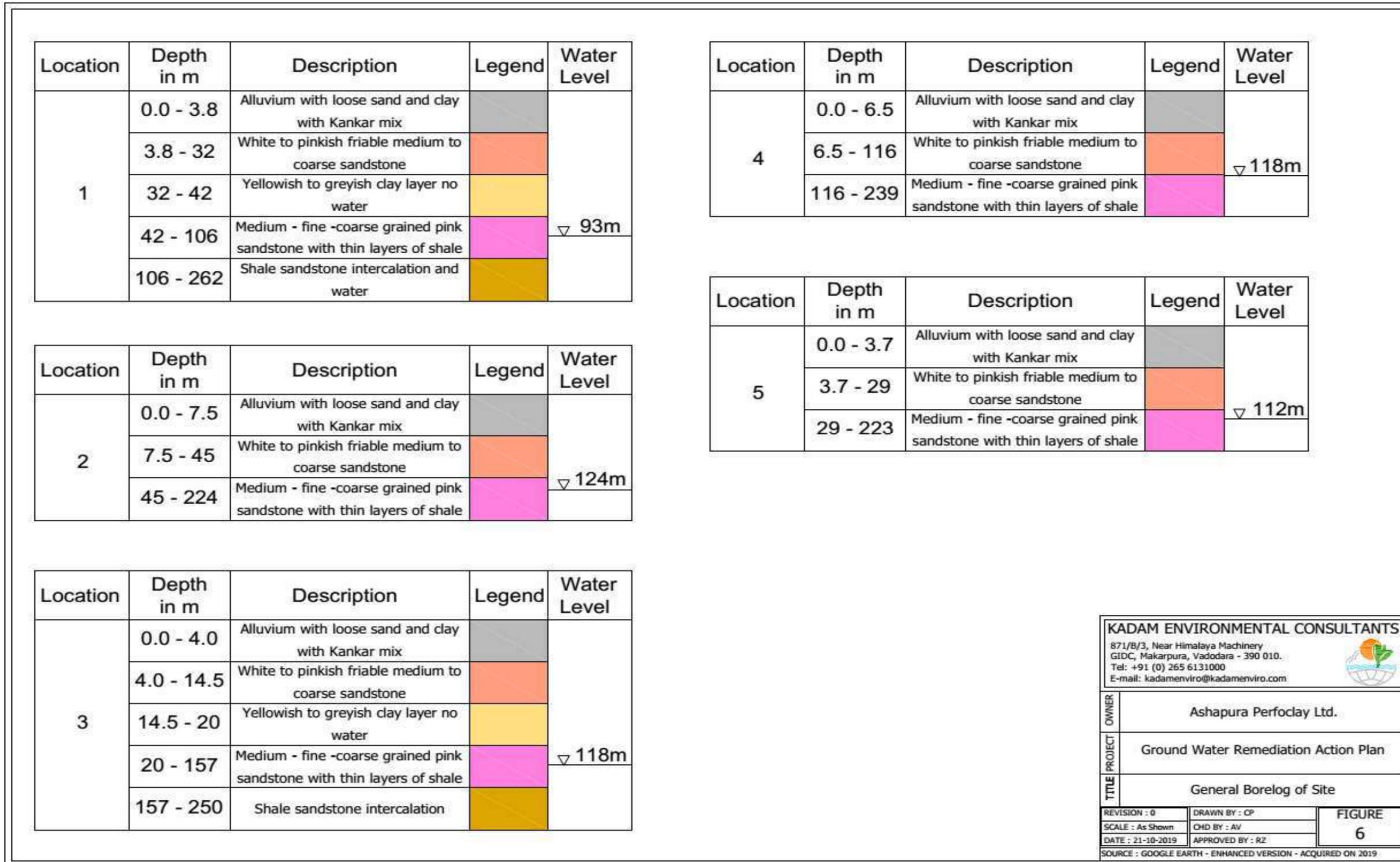


Figure 7: Well inventory and Groundwater Sampling Plan

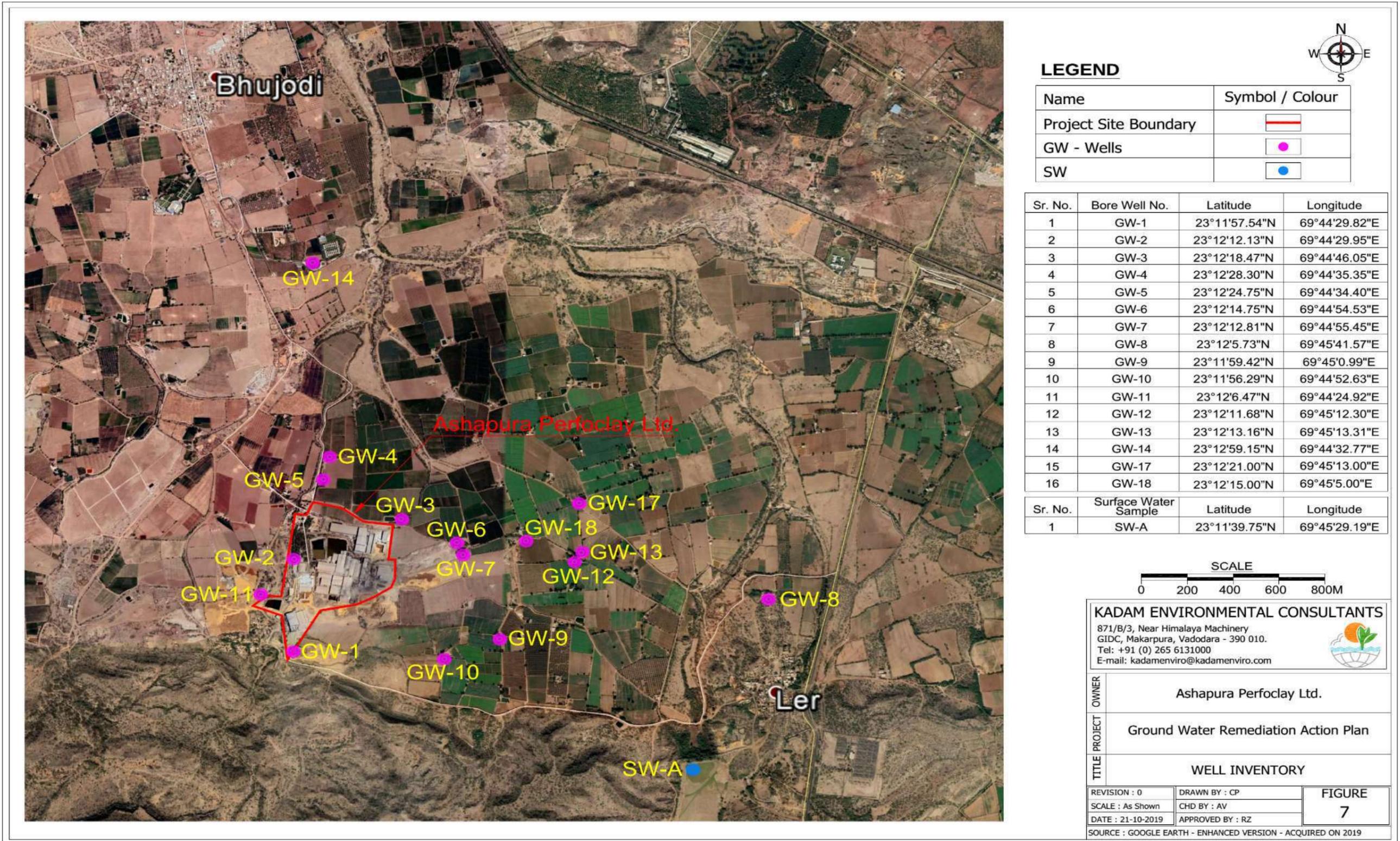


Figure 8: Mapping of ammonical nitrogen at all seventeen locations

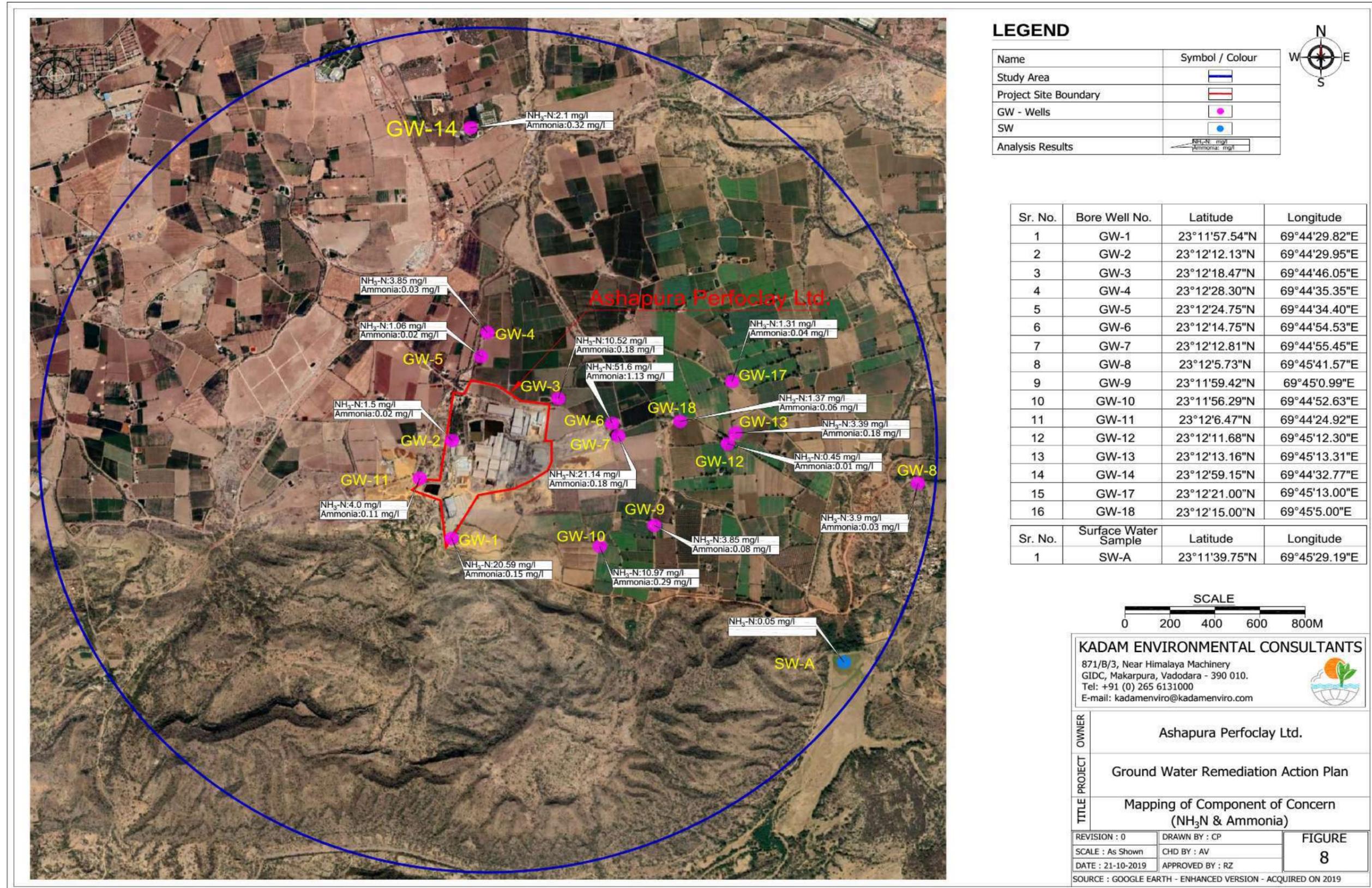


Figure 9: Plume Delineation

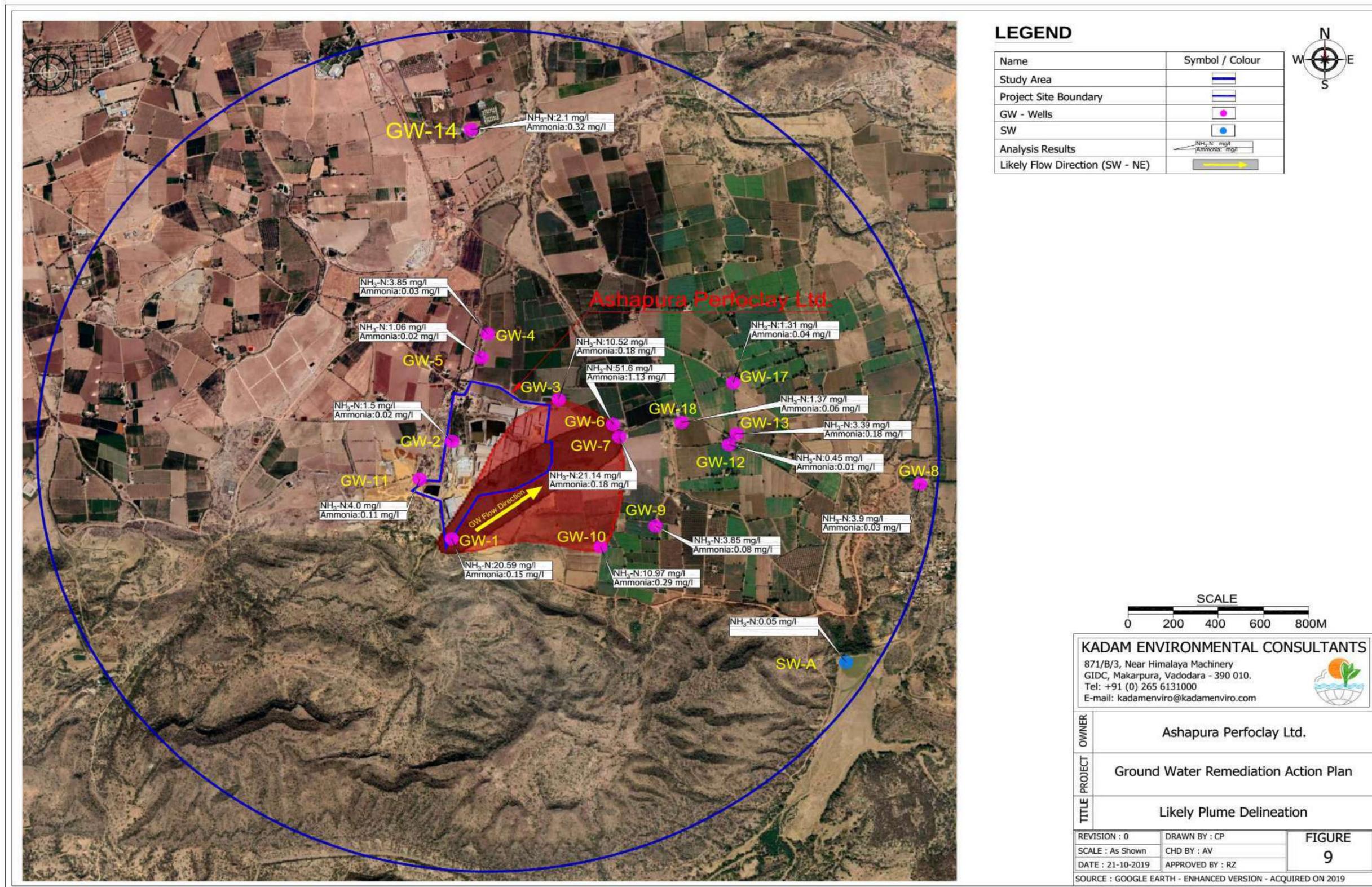


Figure 10: Process flow diagram of final treatment scheme of contaminated groundwater

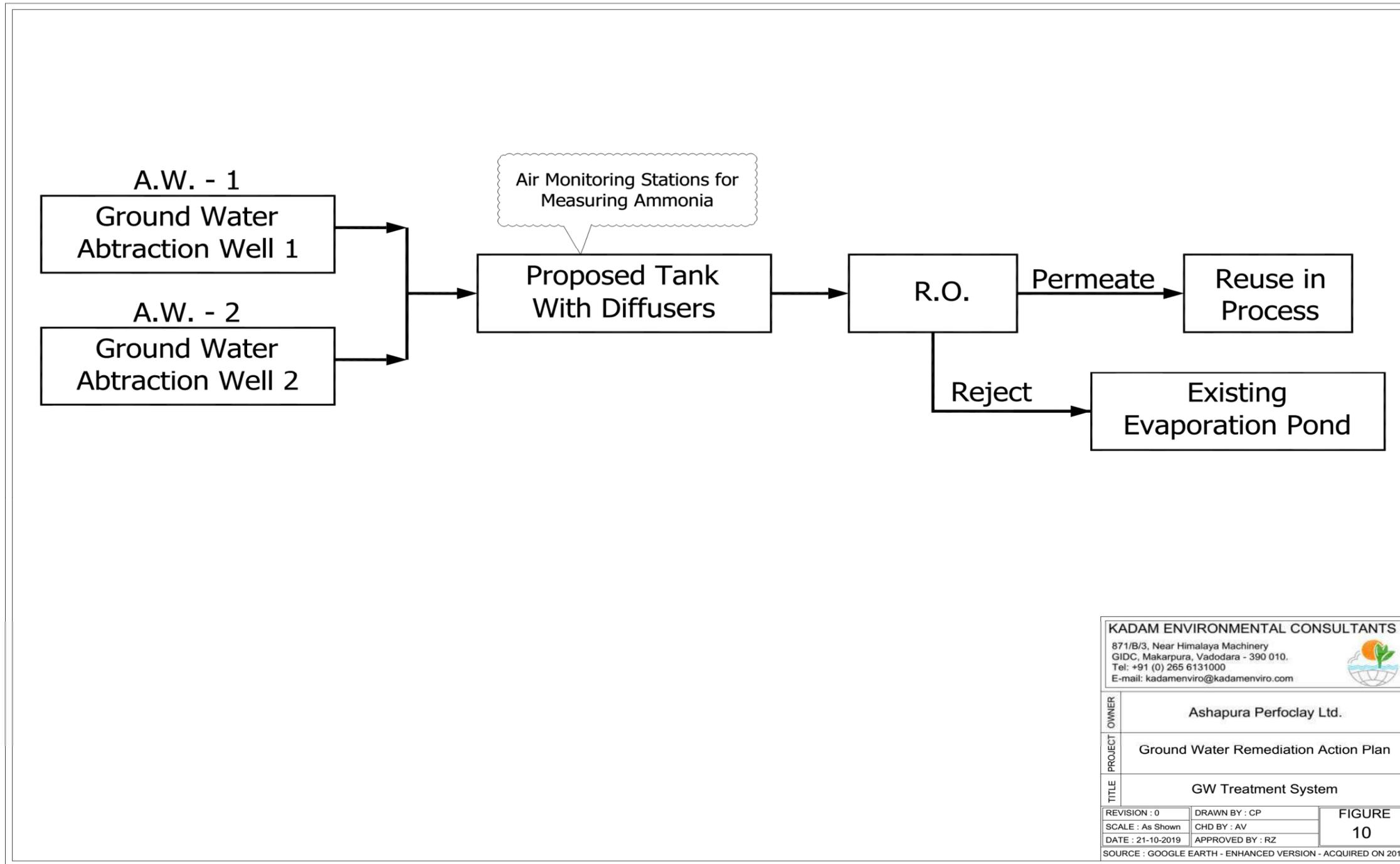
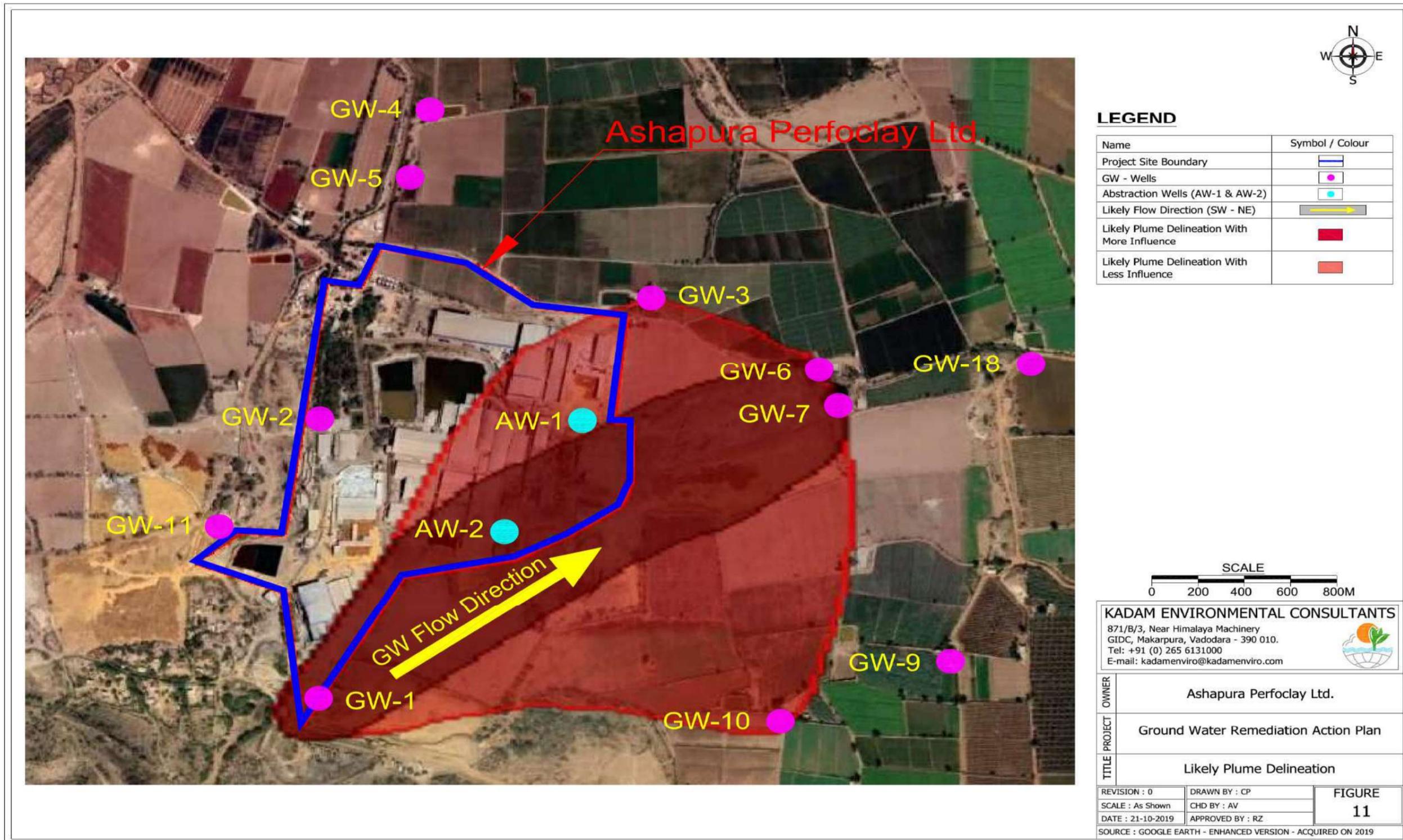


Figure 11: Tentative Layout showing location of abstraction wells



List of Annexures

Annexure 1: GPCB Closure Orders and Revocation Orders**Closure Order****GUJARAT POLLUTION CONTROL BOARD**

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

DIRECTION UNDER SECTION 33(A) OF THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT-1974 (HEREINAFTER REFERRED TO AS THE WATER ACT) AS AMENDED FROM TIME TO TIME.

WHEREAS you are having an industrial plant for manufacturing of Bleaching clay earth at Survey No. 167, Vill: Ler, near Bhujodi, Anjar-Bhuj Highway, Tal: Bhuj, Dist. Kutch.

AND WHEREAS the Gujarat Pollution Control Board has granted you consent under the provisions of the Water Act vide consent Order No. AWH- 93521 for operation of the industrial plant for the manufacture of above said products at the above site.

AND WHEREAS the Gujarat Pollution Control Board issued Closure Direction on 10/07/2018, on the basis of the compliance report of unit and compliance verification report the revocation was issued on trial with conditions on 27/08/2018. Thereafter, the trial was further extended vide order dated 10/12/2018 and 02/05/2019 with conditions mentioned in it.

AND WHEREAS, during the inspection of your industrial plant on 17/05/2019 under Section-23 of the Water Act by the officials of vigilance cell with reference to complaint and following was observed:

1. Huge quantity of gypsum stock was observed on survey no. 163 & 164 near industry.
2. Disposal of gypsum in small to huge quantities was observed on nearly 27 places, for filling up abandoned mines, levelling of land, strengthening of bund/slope of farm/structures, reclaiming lands of natural drains, low lying area, road sides etc.
3. The upstream of check dam of Sardar Jal Sanchay Yojna is also block due to dumping of gypsum.
4. At many locations fresh dumping of gypsum was observed.
5. During inspection samples from bore-well were collected and analysis report shows the presence of ammonical nitrogen.
6. During inspection ETP was in operation and samples of RO feed tank, filtrate / holding tank and evaporation pond were taken, the analysis report shows the acidic pH. This shows ETP is not operated efficiently.
7. Leakages were observed in Dryer 3, due to which fugitive emission was observed.
8. Dusting was observed on the pomegranate tree plantation in nearby farms.

AND WHEREAS, the GPCB had issued Directions u/s 33(A) for the curtailing the production up to 50% as the haphazard dumping of gypsum waste was observed and Notice of Direction u/s 31(A) was issued directing to take adequate measures to control fugitive emission.

AND WHEREAS, the unit has failed to comply with the directions issued time to time by the Board.

Clean Gujarat Green Gujarat

ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

Page 1 of 3

UNDER THE CIRCUMSTANCES, I Smt. U. K. Upadhyay, Environmental Engineer of Gujarat Pollution Control Board is directed to re-implement the directions under Section -33(A) of the Water (Prevention and Control of Pollution) Act-1974 as under:

1. To prohibit you from manufacturing of above said products.
2. To close down the operation of your industrial plant on the above mentioned site with immediate effect.
3. To direct the concerned authority to stop supply of electricity and water.
4. To pay compensation with reference to Hon'ble NGT order dated 27/05/2019 of Rs. 97,50,000/- as the Environment damage / loss.
5. To submit the action taken report for the disposal of the gypsum till date. Further, submit the time bound action plan for disposing gypsum by sending to cement industry for co-processing.
6. To submit a comprehensive time bound action plan for restoration of ground water quality.
7. To carry out the detailed geo-hydrological study and submit the report.
8. Not to operate new plant without the permission of the Board.
9. To submit the time bound action plan including the area to be developed with complete details.
10. To submit the action taken report to control the fugitive emission.
11. If your plant runs on captive power plant or DG-Set, then you shall stop them also.
12. This order is issued with immediate effect from date of issue.

If the above directions are not complied, you are liable for prosecution under Section 41(2) of the Water (Prevention and Control of Pollution) Act-1974 which provides punishment with imprisonment for a term not less than one year and six months and may extend to six years and with fine.

**For and on behalf of
Gujarat Pollution Control Board**

**(Smt. U. K. Upadhyay)
Environmental Engineer
Date:**

NO: CCA-KUTCH-27(13)/GPCB ID:17774/

Issued to:
Ashapura Perfoclay Ltd.
Survey No. 167,
Village: Ler, Nr. Bhujodi,
Anjar-Bhuj Highway,
Ta. Bhuj, Dist. Kutch

Page 2 of 3



GPCB

To,

- 1) The Superintendent Engineer (SE)
 Paschim Gujarat Vij Company Limited (PGVCL),
 Circle Office, Nr. Bus Station,
 Ta – Anjar, Dist – Kutch – 370110.....

I am directed to request you to disconnect supply of electricity with immediate effect from date of issue of this order to the industrial plant of Ashapura Perfoclay Ltd. located at Survey No. 167, Vill: Ler, Nr. Bhujodi, Anjar- Bhuj Highway, Ta. Bhuj, Dist. Kutch.

- 2) The Senior Manager,
 Gujarat Water Infrastructure Ltd. (GWIL)
 Nr. Municipal Tube-well No.4
 Anjar-Bhuj State Highway,
 Anjar, Kutch-370 110.....

I am directed to request you to disconnect supply of water with immediate effect from date of issue of this order to the industrial plant of Ashapura Perfoclay Ltd. located at Survey No. 167, Vill: Ler, Nr. Bhujodi, Anjar- Bhuj Highway, Ta. Bhuj, Dist. Kutch.

For and on behalf of
 Gujarat Pollution Control Board

(Signature)
 (Smt. U. K. Upadhyay)
 Environmental Engineer

Outward No: 509533, 11/06/2019

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Page 3 of 3

Revocation Order**GUJARAT POLLUTION CONTROL BOARD**

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

BY RPAD**REVOCATION ORDER OF CLOSURE ORDER ISSUED UNDER SECTION 33(A) OF THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT-1974.**

WHEREAS you are having an industrial plant located at Sr. No. 167, Vill: Ler. Near Bhujodi, Tal: Bhuj, Dist:- Kutch.

AND WHEREAS the Gujarat Pollution Control Board has granted Consent to manufacture products mentioned in Consent order NO AWH-93521, which is valid upto 24.6.2023 with subject mentioned therein.

AND WHEREAS the closure order was issued by vide letter no. GPCB/CCA-KUTCH-27(8)/GPCB ID 17774/463339, dated 26/07/2018. Thereafter on basis of inspection report and your submission revocation order for three months was issued on 27/08/2018. It was extended for further three months on 10/12/2018 and on 02/05/2019 with conditions stated in it.

AND WHEREAS considering the observations of inspection report and Honble NGT order in matter of O.A. 669/2018 the closure was re-implemented u/s 33(A) of Water Act on 11/06/2019 with immediate effect.

AND WHEREAS you have applied for Revocation along with progress report and your industry was visited by the officials of Regional Office on 01/07/2019 and on 16/07/2019 following observations were made

- (1) The unit was not in operation and power supply was disconnected on 19/06/2019 and water supply was disconnected on 21/06/2019.
- (2) Out of 27 places where gypsum waste was dumped unit has lifted the waste from 7 locations and for the 20 locations unit has submitted the affidavit of the owner of the respective land.
- (3) Gypsum waste from survey no. 164 is cleared and from survey no. 163 was going on by sending gypsum waste to cement industry through co-processing.
- (4) Gypsum disposed from January - 2019 to 15th July, 2019 is 68903 MT by sending to cement industry through co-processing.
- (5) Unit has paid the Environment compensation of Rs. 97,50,000/- through RTGS.
- (6) Unit has repaired the leakages in Dryer 3.
- (7) For the restoration of ground water quality and hydro geo-logical study unit has given work order to M/s. Kadam Enviro Consultants, Vadodra.

AND WHEREAS, the matter O.A. 669/2018 is pending before Honble National Green Tribunal and advisory note was given by the advocate

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Under the circumstances I, Smt. U. K. Upadhyay, Environmental Engineer, Gujarat Pollution Control Board is hereby directed to revoke the closure order for **ONE MONTH** from the date of issue of order with following conditions:

1. To manufacture product at 50% capacity, i.e. Bleaching Clay earth – 6000 MT/Month
2. Unit shall maintain the record of the production and submit to the Regional Office
3. To completely dispose the existing gypsum waste as per the CCA conditions.
4. Not to operate new plant without prior permission of the Board.
5. To submit the detailed report of ground water quality restoration and geo-hydrological study along with the conclusion.
6. Unit shall continue to use fresh hydrated lime for neutralization process
7. In no case the gypsum waste shall be disposed at any other places.
8. The record of quantity of gypsum generation and disposal shall be maintained on day to day basis
9. Unit shall comply with the conditions of CTE and CCA.

For and on behalf of
Gujarat Pollution Control Board.

(Smt. U. K. Upadhyay)
Environmental Engineer
Date:

NO: GPCB/ CCA-KUTCH-27 (12)/ GPCB ID-17774/

ISSUED TO: .

Ashapura Perfoclay limited
Sr No. 167 Vill. Ler
Near Bhujodi, Tal. Bhuj
Tal. Bhuj, Dist- Kutch

COPY TO: -

To,

- 1) The Superintendent Engineer (SE)
Paschim Gujarat V, Company Limited (PGVCL),
Division office, Power House compound,
Hospital Road, Bhuj, Dist – Kutch – 370110

I am directed to request you to extend the supply of electricity for **ONE MONTH** from date of issue of this order to the industrial plant of M/s Ashapura Perfoclay Ltd. located at Survey No 167, Vill. Ler, Nr. Bhujodi, Anjar-Bhuj Highway Tal. Bhuj, Dist. Kutch.

Outward No: 514891, 25/07/2019



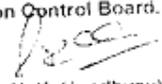
GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, **Gandhinagar** 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

- 2) Senior Manager,
Gujarat Water Infrastructure Ltd. (GWIL),
Near Municipal Bore Well,
No.4, Anjar, Bhuj Highway, DIST: KUTCH - 370106

I am directed to request you to extend the water supply for **ONE MONTH** from date of issue of this order to the industrial plant of M/s Ashapura Perfoclay Ltd located at Survey No. 157, Vill. Ler Nr. Bhujodi, Anjar- Bhuj Highway, Ta. Bhuj, Dist. Kutch.

For and on behalf of
Gujarat Pollution Control Board.


(Smt. U. K. Upadhyay)
Environmental Engineer

Outward No: 514891, 25/07/2019

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GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

BY RPAD

REVOCATION ORDER OF CLOSURE ORDER ISSUED UNDER SECTION 33(A) OF THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT-1974.

WHEREAS you are having an industrial plant located at Sr. No. 167, Vill: Ler. Near Bhujodi, Tal: Bhuj, Dist:- Kutch

AND WHEREAS the Gujarat Pollution Control Board has granted Consent to manufacture products mentioned in Consent order no. AWH-93521, which is valid upto 24.6.2023 with subject mentioned therein

AND WHEREAS, the closure order was issued by vide letter no. GPCB/CCA-KUTCH-27(8)/GPCB ID 17774/463339, dated 26/07/2018. Thereafter on basis of inspection report and your submission revocation order for three months was issued on 27/08/2018. It was extended for further three months on 10/12/2018 and on 02/05/2019 with conditions stated in it.

AND WHEREAS, considering the observations of inspection report and Hon'ble MGT order in matter of O.A. 669/2018 the closure was re-implemented u/s 33(A) of Water Act on 11/06/2019 with immediate effect.

AND WHEREAS, with reference to observations of inspection report and compliance report of unit, the trial revocation order was issued for one month with 50% production manufacturing capacity on 25/07/2019 and on 28/08/2019 with conditions stated therein.

AND WHEREAS you have applied for Revocation along with progress report and your industry was visited by the officials of Regional Office on 17/09/2019 and following observations were made;

- (1) The unit has provided gypsum storage area at survey no. 163 with lining system and along with the leachate collection system. Unit has provided the compound wall
- (2) At present stock of approximately 25000 MT of gypsum is stored at survey no. 167 i.e. within the premises.
- (3) The gypsum disposed by unit to cement industries for co-processing is as follows;
 - June'19 – 18977.62 MT
 - July'19 – 24021.22 MT
 - August'19 – 2964.33 MT
- (4) New plant was not in operation.
- (5) Unit is using hydrated lime.

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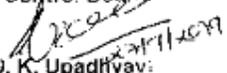
(6) For the ground water quality restoration and geo-hydrological study is given to the M/s. Kadam Enviro Consultants. the interim report is submitted.

AND WHEREAS the matter O.A. 669/2018 is pending before Hon'ble National Green Tribunal.

Under the circumstances, i. Smt. U. K. Upadhyay, Environmental Engineer, Gujarat Pollution Control Board is hereby directed to revoke the closure order for **THREE MONTHS** from the date of issue of order with following conditions:

1. Unit shall manufacture product as per the existing CCA and unit shall comply with all the conditions of the CCA and Amendment thereof.
2. Unit shall maintain the record of the production, spent acid generation, gypsum generation and its disposal on day to day basis.
3. Unit shall dispose the gypsum waste as per the CCA conditions.
4. Unit shall comply with the conditions for the storage and disposal of gypsum as per CCA conditions.
5. In no case the gypsum waste shall be disposed at any other places. If such observations are made unit shall be held responsible.
6. Not to operate new plant without prior permission of the Board.
7. To submit the detailed report of ground water quality restoration and geo-hydrological study along with the conclusion.
8. Unit shall continue to use fresh hydrated lime for neutralization process.
9. Unit shall submit the data of the production, spent acid generation, gypsum generation and disposal of gypsum & spent acid on monthly basis to regional office, Kutch and Head Office, Gandhinagar.
10. Unit shall comply with the conditions of CTE and CCA.

For and on behalf of
Gujarat Pollution Control Board


Smt. U. K. Upadhyay;
Environmental Engineer

Date:

NO: GPCB/CCA-KUTCH-27(16)/GPCB ID-17774/

ISSUED TO: .

Ashapura Perfoclay limited
Sr. No: 167, Vill: Ler,
Near Bhujodi, Tal: Bhuj,
Tal: Bhuj, Dist:- Kutch



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, **Gandhinagar** 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

COPY TO: -

To,

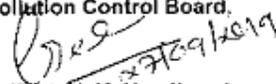
- 1) The Superintendent Engineer (SE)
Paschim Gujarat Vij Company Limited (PGVCL),
Division office, Power House compound,
Hospital Road, Bhuj, Dist – Kutch – 370110.....

I am directed to request you to extend the supply of electricity for **THREE MONTHS** from date of issue of this order to the industrial plant of M/s Ashapura Perfoclay Ltd, located at Survey No. 167, Vill: Ler, Nr. Bhujodi, Anjar- Bhuj Highway, Ta. Bhuj. Dist. Kutch.

- 2) Senior Manager,
Gujarat water Infrastructure Ltd. (GWIL),
Near Municipal Bore Well,
No.4. Anjar. Bhuj Highway. DIST: KUTCH - 370106.....

I am directed to request you to extend the water supply for **THREE MONTHS** from date of issue of this order to the industrial plant of M/s Ashapura Perfoclay Ltd, located at Survey No. 167, Vill: Ler, Nr. Bhujodi, Anjar- Bhuj Highway, Ta. Bhuj. Dist. Kutch.

For and on behalf of
Gujarat Pollution Control Board,


(Smt. U. K. Upadhyay)
Environmental Engineer

Outward No: 522922, 27/09/2019

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3

Annexure 2: Letter from MoEF

2

F. No.23-161/2014-HSMD
Government of India
Ministry of Environment & Forests
HSM Division



सत्यमेव जयते

2nd Floor, Jal Block
Indira paryavaran Bhawan
Jor Bagh Road, Aliganj
New Delhi - 110 003
Date: 17th October 2014

Subject: - Permission for backfilling of mines by M/s Ashapura volclay Ltd., Bhuj-Kutch -reg.

This is with reference to letter dated 16/06/2014 regarding the subject cited above from M/s Ashapura Volclay Ltd. (copy enclosed)

2. The matter was considered in this Ministry during the 32nd Meeting of Technical Review Committee held on 24th September 2014. The committee was informed that the gypsum is produced by the neutralization of sulphuric acid containing leach liquor obtained from the leaching of bentonite clay, by lime. The analysis reports by SGS and Pollucon laboratories, Surat submitted by the applicant does not indicate the presence of any hazardous constituents above the limits.

3. Accordingly, as per recommendation of the committee, the Ministry is of the view that the gypsum from this source **can be categorized as non-hazardous.**

This issue with the approval of competent authority.


 (Dr. Shruti Rai Bhardwaj)
 Joint Director/Scientist 'D'
 Telefax- 24695333

To ✓ M/S Ashapura Volclay Limited
Village Ler, Near Bhujodi,
Off Anjar-Bhuj Highway,
Bhuj-Kutch-370020

CC to:
The Member Secretary,
Gujarat Pollution Control Board (GPCB),
Paryavaran Bhavan Sector-10A,
Gandhinagar-382010, Gujarat

Annexure 3: Analysis Report of Gypsum from Pollucon Lab

 POLLUCON LABORATORIES PVT. LTD.	
TEST REPORT	
QR/5.10/01-1	
Customer's Name and Address :	
Page: 1 of 4	
M/S. ASHAPURA VOLCLAY LIMITED VILLAGE LER, NEAR BHUJODI, OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020	Test Report No.: PLPL/130703009 Issue Date : 19/07/2013 Customer's Ref. : <small>LE No.AVL/STR/044/2013/2014 Dt:02/07/13</small>
Description of Sample : Gypsum[#]	Quantity/No. of Samples : 05 Kg / One
Sampling By : Sample Sent By Party	Sampling Procedure : Sample Sent By Party
Sample Receipt Date : 03/07/2013	Protocol (purpose) : Sche.2 & 3 of HW Rules-2008, etc.
Packing/ Seal : Sealed	Lab ID : PLPL/130703009
Date of Starting of Test : 03/07/2013	Date of Completion : 18/07/2013
Test Method : IS, APHA (22nd Edition,2005), US EPA &, CPCB Guidelines-LATS/16/2003-2004 & others	
Observation :	Analyzed parameters of the submitted sample as per test report No. PLPL/130703009 are within the prescribed norms under schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008. And also the analyzed characteristics do not possess any of the hazardous characteristics indicated in test report as per Part C of, Schedule III of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008. Analyzed parameters of lechate are within the norms of CFR 40 261.24 of US EPA.
 H. T. Shah Lab. Manager	 Dr. Arun Bajpai Lab Manager(Q)
<ul style="list-style-type: none"> • Recognised by MoEF, New Delhi Under Sec. 12 of Environmental Protection Act, 1986 • ISO 14001 : 2004 • OHSAS 18001 : 2007 • ISO 9001 : 2008 <p style="text-align: center; font-size: small;">Notes: This report is subject to terms & conditions mentioned overleaf.</p> <p style="text-align: center; font-size: x-small;">544, Belgium Towers, Ring Road, Opp. Linear Bus Stand, SURAT-395003.(Guj.). Tele-Fax : (0261) 2455751,2601106,2601224 E-mail : pollucon@gmail.com. Wabsite : www.polluconlab.com</p>	

**TEST REPORT**

QR/5.10/01-I

Customer's Name and Address :

Page: 2 of 4

M/S. ASHAPURA VOLCLAY LIMITED VILLAGE LER, NEAR BHUJODI, OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020	Test Report No.: PLPL/130703009 Issue Date : 19/07/2013 Customer's Ref. : <small>L1 No.AVL/STR/044/2013/2014 Dt:02/07/13</small>
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RESULT TABLE

SR. NO.	Code	HAZARDOUS CHARACTERISTICS AS PER PART C OF, SCHEDULE III OF HAZARDOUS WASTE (MANAGEMENT, HANDLING AND TRAN BOUNDARY MOVEMENT) RULES, 2008.	OBSERVATION
1.	H 4.1	Flammable Solids Hazardous Characteristic as per code E1 of, Schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008.: Solids, or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.	Not Flammable
2.	H 4.2	Substances or waste liable to spontaneous combustion Hazardous Characteristic as per code H 4.2 of Part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contact with air, and being then liable to catch fire	No spontaneous combustion observed.
3.	H 4.3	Substances or waste which, in contact with water emit flammable gases Hazardous Characteristic as per code H 4.3 of Part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.	No flammable gases emitted
4.	H 5.1	Oxidizing Hazardous Characteristic as per code H 5.1 of part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which, while in themselves not necessarily combustible, may, generally by yielding oxygen causes, or contribute to, the combustion of other materials.	Not yield oxygen and not capable for combustion
5.	H 6.1	Poisons (Acute) (Cyanide & Mercury) Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes liable either to cause death or Serious injury or to harm health if swallowed or inhaled or by skin contact.	Not Detected
6.	H 6.2	Infectious Substances Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes containing viable micro organisms or their toxins which are known or suspected to cause disease in animals or humans.	No infectious substance present (E-coli, Staphylococcus oureus, Salmonella & pseudomonas sp. Are Absent)
7.	H 8	Corrosivity Hazardous Characteristic as per code H 8 of Part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or waste which, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards. USEPA CFR 261.22(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 260.11 of this chapter.	Non corrosive (to pH) – 7.74
8.	H 10	Liberation of toxic gases in contact with air or water Hazardous Characteristic as per code H 10 of Part C of, Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.	No toxic gas liberated (reactive & total CN, S : Not detected)

Continue.....


H. T. Shah
Lab. Manager

Recognised by MoEF, New Delhi Under
Sec. 12 of Environmental Protection Act, 1986



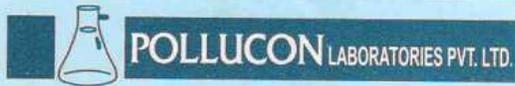
ISO 14001 : 2004

OHSAS 18001 : 2007

ISO 9001 : 2008


Dr. Arun Bajpai
Lab Manager(Q)

544, Belgium Towers, Ring Road, Opp. Linear Bus Stand, SURAT-395003.(Guj.).
Tele-Fax : (0261) 2455751,2601106,2601224 E-mail : pollucon@gmail.com. Website : www.polluconlab.com

**TEST REPORT**

QR/5.10/01-1

Customer's Name and Address :

Page: 3 of 4

M/S. ASHAPURA VOLCLAY LIMITED VILLAGE LER, NEAR BHUJODI, OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020	Test Report No.: PLPL/130703009 Issue Date : 19/07/2013 Customer's Ref. : LE No.AVL/STR/044/2013/2014 <small>DT:02/07/13</small>
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RESULT TABLE

Sr. No.	Code	Hazardous Characteristics	OBSERVATION			
9.	H 11	Toxicity (Delayed or Chronic)	Analyzed parameters are within the limit as per Schedule II of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008 Leachate analysis as per ASTM D 5233			
		Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects including carcinogenicity.				
		Sr. No.	Parameters	Unit	Observation	Limit as per Schedule 2 of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008
		11.1	Nickel as Ni	mg/kg	3.00	5000 Max
		11.2	Copper as Cu	mg/kg	0.72	5000 Max
		11.3	Zinc as Zn	mg/kg	3.75	20000 Max
		11.4	Cyanide as CN	mg/kg	ND*	50 Max
		11.5	Lead as Pb	mg/kg	0.84	5000 Max
		11.6	Mercury as Hg	mg/kg	ND*	50 Max
		11.7	Chromium Cr ⁺⁶	mg/kg	ND*	50 Max
		11.8	Cadmium as Cd	mg/kg	0.29	50 Max
		11.9	Antimony as Sb	mg/kg	ND*	50 Max
11.10	Arsenic as As	mg/kg	ND*	50 Max		
11.11	Vanadium as V	mg/kg	ND*	5000 max.		
10.		12.1	SiO ₂	%	0.57	Not Specified
		12.2	Fe ₂ O ₃	%	8.76	
		12.3	Al ₂ O ₃	%	5.79	
		12.4	CaO	%	20.56	
		12.5	MgO	%	0.37	


H. T. Shah
Lab. Manager




Dr. Arun Bajpai
Lab Manager(Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986
Note: This report is subject to terms & conditions mentioned overleaf.
ISO 14001 : 2004 OHSAS 18001 : 2007 ISO 9001 : 2008

544, Belgium Towers, Ring Road, Opp. Linear Bus Stand, SURAT-395003.(Guj.).
Tele-Fax : (0261) 2455751,2601106,2601224 E-mail : pollucon@gmail.com. Website : www.polluconlab.com



TEST REPORT

QR/5.10/01-1

Customer's Name and Address :

Page: 4 of 4

M/S. ASHAPURA VOLCLAY LIMITED VILLAGE LER, NEAR BHUJODI, OFF ANJAR-BHUJ HIGHWAY, BHUJ-KUTCH.-370 020	Test Report No.: PLPL/130703009 Issue Date : 19/07/2013 Customer's Ref. : <small>LT No.AVL/STR/044/2013/2014 Dt:02/07/13</small>
---	--

RESULT TABLE

Sr. No.	Code	Hazardous Characteristics	OBSERVATION	
11.		LC 50 (Fish Acute toxicity 96 hour)	Sample is not toxic to fish as per Fish Acute toxicity 96 hours ;(LC50 is greater than 500 mg/L) (no fatality of fish in 2000 mg/L of sample)	
		Hazardous Characteristic: Toxicity : If LC50 is <500 mg/L as per California Ch.11Art. 3 Claus 66261.24 sub.c.6 Characteristic of toxicity		
		Capable	Lechate is not possessing any of the characteristics listed.	
		Hazardous Characteristic as per schedule 3 part C of Hazardous Wastes (Management, Handling and Tran boundary Movement) Rules, 2008: Capable by any means, after disposal, of yielding another material, e.g. Lechate, which possesses any of the characteristics listed above.		
		Leachate analysis as per ASTM D 5233		Limit as per US EPA Title 40, Part-261.24 TCLP, March 2009
		14.1 Nickel as Ni	ppm	0.153
		14.2 Copper as Cu	ppm	0.037
		14.3 Zinc as Zn	ppm	0.019
		14.4 Cyanides as CN	ppm	ND*
		14.5 Lead as Pb	ppm	0.043
		14.6 Mercury as Hg	ppm	ND*
		14.7 Chromium as Cr ⁺⁶	ppm	ND*
		14.8 Cadmium as Cd	ppm	0.015
		14.9 Antimony as Sb	ppm	ND*
		14.10 Arsenic as As	ppm	ND*

ND*: Not Detected (minimum detection limit for Hg, As, CN: 0.002 ppm, Pb, Cr, Cd, Sb : 0.01 ppm

#: Detail given by party

*Waste constituents and their concentration limits given in this list are based on erstwhile BAGA (the Netherlands Environment Protection Agency) List of Hazardous Substances. In order to decide whether specific wastes listed above is hazardous or not, following points be taken into consideration:

- If a component of the waste appears in one of the five risk classes listed above (A,B,C,D or E) and the concentration of the component is equal to or more than the limit for the relevant risks class, the material is then classified as hazardous waste.
- If a chemical compound containing a hazardous constituent is present in the waste, the concentration limit does not apply to the compound, but only to the hazardous constituent itself.
- If multiple hazardous constituents from the same class are present in the waste, the concentrations are added together.
- If multiple hazardous constituents from different classes are present in the waste, the lowest concentration limit corresponding to the constituent(s) applies.
- For determining the concentration of the hazardous constituents in the waste "Toxicity Characteristics Leaching Procedure (TCLP) as per ASTM-D5233-92 should be adopted.


H. T. Shah
Lab. Manager

- Recognised by MoEF, New Delhi Under Sec. 12 of Environmental Protection Act, 1986



ISO 14001 : 2004

OHSAS 18001 : 2007

ISO 9001 : 2008


Dr. Arun Bajpai
Lab Manager(Q)

544, Belgium Towers, Ring Road, Opp. Linear Bus Stand, SURAT-395003.(Guj.)

Tele-Fax : (0261) 2455751,2601106,2601224 E-mail : pollucon@gmail.com. Website : www.polluconlab.com

Annexure 4: Analysis Report of Gypsum from SGS Lab**Test Report**

Print Date : 13/06/2014

SAMPLE NOT DRAWN BY LABORATORY

Report No : CG14-013765.001

JOE No : CG14-013765

 Report Control No : CGR0000200369
 Sample described by customer as : GYPSUM

 Customer Name : ASHAPURA VOLCLAY LTD
 Customer Address : VILLAGE LER, NEAR BHUJODI,
 : OFF TO ANJAR, BHUJ HIGHWAY,
 City : BHUJ - KUTCH
 Postal Code : 370020
 State : GUJARAT
 Country : INDIA
 Sample Type : GYPSUM
 Received : 05/06/2014
 Sample Qty. Recd. : 500G
 Test Start : 05/06/2014
 Test End Date : 12/06/2014

Test/Parameter	Method	Result	Unit
Calcium sulphate.dihydrate (CaSO4.2H2O)	IS 1288 : 1982	77.33	% (w/w)
Free water at 45°C	IS 1288 : 1982	0.38	% (w/w)
Combined water at 230°C	IS 1288 : 1982	20.91	% (w/w)
Magnesium Oxide (as MgO)	IS 1288 : 1982	0.49	% (w/w)
Calcium Oxide (as CaO)	IS 1288 : 1982	23.19	% (w/w)
Phosphorus (as P2O5)	SGSIN/CHML/SOP/MIN-04	0.45	% (w/w)
Sulphur trioxide (as SO3)	IS 1288 : 1982	35.97	% (w/w)
pH (of 10% aqueous solution)	by pH meter	7.7	-
Solubility in Water	IS 695 : 1986	5.55	% (w/w)
Bulk Density	IS 2850 : 1993	0.871	g/cc
Potassium (as K2O)	SO-IN-MUL-TE-109	0.022	% (w/w)
Sodium (as Na2O)	SO-IN-MUL-TE-109	0.51	% (w/w)
Aluminum (as Al2O3)	SO-IN-MUL-TE-109	4.37	% (w/w)
Titanium (as Ti)	SO-IN-MUL-TE-109	0.023	% (w/w)
Iron (as Fe2O3)	IS 4032 : 1985	7.82	% (w/w)

Page 1 of 2

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**Test Report**

Print Date : 13/06/2014

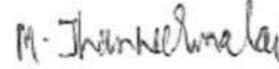
SAMPLE NOT DRAWN BY LABORATORY

Report No : CG14-013765.001

JOE No : CG14-013765

Report Control No : CGR0000200369

Per pro SGS India Private Ltd

M Thaneermalai
Authorized Signatory

****End of Report****

Page 2 of 2

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Annexure 5: Analysis Report of Gypsum from GPCB Lab
**ANALYSIS REPORT FOR Hazardous
WASTE TYPE : SOL**

Gujarat Pollution Control Board
Rajkot
Race Course, Ring Road,
Near Race Course,
Rajkot - 360 001
Tele:(0281) 2474524 , 2459831

Sample ID:257566 - Analysis Completion 10/05/2019

Mining and ore beneficiation / LAB Inward : 21103

1. Name &	: M/s Ashapura Perfoclay Ltd - 17774
2. Address of the Unit	: 167,S.NO-167,VILLAGE-LER,,NR-BHUJODI Ler - 370020 , Taluka : Bhuj, District : Kutch West, GIDC : Not In Gidc
3. Nature of Sample	: REP-Representative/Grab , (Insp Type : APP-On Application)
4. Sample Collected By	: Dr. S. N. Agravat, Lab Head
5. Date & Time of Collection & Receipt	: 25-Apr-2019, (1530 to 1535)
6. Date of Start & Completion of Analysis	: 30/04/2019 17:44:56 & 10/05/2019
7. Sampling Point	: Gypsum from the Gypsum storage area (survey no. 163, 164) ~
8. Physical State	: Solid
9. Disposal Mode	: Partial cement industries for Co-processing & partial Onland
10. Waste Category	: ---
11. Temperature on Collection	: & Color & Appearance : Yellowish
12. Hazardous Sampled (SPM-M3)	: @ 7-8 on pH strip & Carboys Marks : H-1

Sr	Parameter	Unit	Test Method	Range of Testing	Result
1	pH	Unit	4500 B APHA Std.Methods 22nd edi.-2012	1 – 14	7.62
2	Ammonical Nitrogen	gm/kg	1).Titrimetric method 2).Nesslerization method. (4)	0.5 - 5000 mg/l.	0.028
3	BioChemical Oxygen Demand (3 Days 27o	gm/kg	3 day BOD test(IS 3025 Method)	1-60000mg/kg	0.15
4	Chemical Oxygen Demand	gm/kg	APHA (22nd Edition)- 5220 B Open Reflux Method	5.0- 50000 &	0.79
5	Oil & oil emulsions *	gm/kg	Liquid – Liquid Partition Gravimetric method. (5520	01 – 1000	0.06
6	Phenolic Compounds *	gm/kg	4 Amino Antipyrine method without Chloroform Ext	1 – 50 mg/l	BDL
7	Copper *	gm/kg	3111 B APHA 21st edi)	0.1-300 mg/kg	0.002 gm/kg
8	Nickel *	gm/kg	3111 B APHA 21st edi)	0.2-300 mg/kg	BDL
9	Lead *	gm/kg	3111 B APHA 21st edi)	0.5-300 mg/kg	BDL
10	Zinc	gm/kg	3111 B APHA 21st edi)	0.05-200mg/l	0.0034 gm/kg
11	Cadmium *	gm/kg	3111 B APHA 21st edi)	0.02-200 mg/kg	BDL
12	Mangnese *	gm/kg	3500-mn B APHA 21st edi)	2.557-592.71mg/kg	0.021 gm/kg
13	Hexavalent Chromium *	gm/kg	APHA 21st edi. - 3500 -Cr B :	0.01667-5.9998mg/kg	BDL
14	Iron *	gm/kg	3111 B APHA 21st edi)	0.2-300mg/kg	2.05 gm/kg
15	Acidity *		IS:3025,(part-22)-1986)	10-500000mg/kg	0.2 gm/Kg.
16	Alkalinity *		2320 B APHA 21st edi)	10-500000mg/l	0.716 gm/Kg

Laboratory Remarks : ----- By:486-r.o_486 Dt.: 11/05/2019


A.M. Gadhiya, RO Head

Field Observation :

n i c

18/05/2019

Annexure 6: Site Investigation Photographs

 <p>Granulation Unit of bleaching clay</p>	 <p>Acid Activation unit of bleaching clay</p>
 <p>Drying unit of bleaching clay</p>	 <p>Pulverisation and Packing unit of bleaching clay</p>
 <p>Neutralization operation of ETP</p>	 <p>Filter press area of ETP</p>
 <p>Lime Storage Yard</p>	 <p>Gypsum Storage Yard</p>



Clarifier-UF-Ro Operation



Clarifier-UF-Ro Operation



Solar Evaporation Pond



STP



Groundwater sampling from Off-site bore well (GW-4)



Groundwater Sampling from on-site bore well near Gate-2 (GW-1)

Annexure 7: Lab Certificate of groundwater sample from Kadam Lab**KADAM ENVIRONMENTAL CONSULTANTS**

An ISO 9001 -2015 Certified Company

(MoEF Approved)

871/B/3, Near Himalaya Machinery, GIDC Makarpura, Vadodara-10.
Phone : (O) 0265 - 6131000, 6131001**ENVIRONMENTAL MONITORING REPORT**

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/01**SAMPLE DETAILS**

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	
2.	Sample ID: 1941258377- 305AU19W01	3. Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5. Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7. Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9. Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11. Sample Category: Grab
12.	Sampling Location: GW-1	

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	6.98	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	5951	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	3169	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	736	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	48	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1214	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	47	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	20.59	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	760	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.34	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	76.22	N.A.	APHA 23 rd Edition
22	SAR	-	19.10	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	39.73	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

NOTE: 1) Reports may be reproduced, if required, but only in full and only with written approval of the laboratory.

2) Re analysis of sample will be done, if requested within 7 days from the date of Reporting of sample if the samples are not consumed during analysis.

3) The results reported above relate to the sample identified under Sample Details.

-----END OF REPORT-----

Page 1 of 1

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER

DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/02

SAMPLE DETAILS

1. Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	3. Client Representative: Mr. Amit Das
2. Sample ID: 1941258377- 305AU19W02	5. Sample Collected By: Mr. Ameya Vaze
4. Sample Date : 20.08.2019	7. Analysis Completed on: 19.09.2019
6. Analysis commenced on: 26.08.2019	9. Test Requirement: Water Analysis
8. Reporting Date: 20.09.2019	11. Sample Category: Grab
10. Packing Condition & Quantity: Sealed ✓	
12. Sampling Location: GW-2	

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.35	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	6838	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	2223	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	2280	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	50	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1805	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	30	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	1.5	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	2336	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.04	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	62.08	N.A.	APHA 23 rd Edition
22	SAR	-	16.16	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	55.95	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

NOTE: 1) Reports may be reproduced, if required, but only in full and only with written approval of the laboratory.

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3) The results reported above relate to the sample identified under Sample Details.

-----END OF REPORT-----

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Phone : (O) 0265 - 6131000, 6131001



ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/03

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W03	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-3		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.38	N.A.	APHA 23 rd Edition 4500-H* B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	6548	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	2752	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1663	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	46	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	2462	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	24	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	10.52	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	2212	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.08	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	70.27	N.A.	APHA 23 rd Edition
22	SAR	-	22.65	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	13.33	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/04

SAMPLE DETAILS

1. Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	3. Client Representative: Mr. Amit Das
2. Sample ID: 1941258377- 305AU19W04	5. Sample Collected By: Mr. Ameya Vaze
4. Sample Date : 20.08.2019	7. Analysis Completed on: 19.09.2019
6. Analysis commenced on: 26.08.2019	9. Test Requirement: Water Analysis
8. Reporting Date: 20.09.2019	11. Sample Category: Grab
10. Packing Condition & Quantity: Sealed ✓	
12. Sampling Location: GW-4	

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	6.92	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	7214	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	1619	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	3468	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	24	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1999	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	54	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	3.85	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	1316	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	8	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	75.70	N.A.	APHA 23 rd Edition
22	SAR	-	23.87	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	18.59	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/05

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India
2.	Sample ID: 1941258377- 305AU19W05
3.	Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019
5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019
7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019
9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓
11.	Sample Category: Grab
12.	Sampling Location: GW-5

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.42	N.A.	APHA 23 rd Edition 4500-H* B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	3164	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	607	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1430	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	28	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1135	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	45	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	1.06	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	880	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.07	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	72.32	N.A.	APHA 23 rd Edition
22	SAR	-	16.57	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	42.62	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/06

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W06	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-6		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.50	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	5834	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	2453	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1449	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	50	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	2103	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	22	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	51.6	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	2760	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	10	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	61.86	N.A.	APHA 23 rd Edition
22	SAR	-	17.31	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	14.65	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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**ENVIRONMENTAL MONITORING REPORT****LABORATORY TEST REPORT - WATER**

DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/07**SAMPLE DETAILS**

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	3.	Client Representative: Mr. Amit Das
2.	Sample ID: 1941258377- 305AU19W07	4.	Sample Collected By: Mr. Ameya Vaze
3.	Sample Date : 20.08.2019	5.	Analysis Completed on: 19.09.2019
4.	Analysis commenced on: 26.08.2019	6.	Reporting Date: 20.09.2019
5.	Reporting Date: 20.09.2019	7.	Test Requirement: Water Analysis
6.	Packing Condition & Quantity: Sealed ✓	8.	Sample Category: Grab
7.	Sampling Location: GW-7		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.12	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	7167	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	2434	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	2375	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	50	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1769	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	33	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	21.14	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	3040	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.14	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	55.27	N.A.	APHA 23 rd Edition
22	SAR	-	13.88	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	76.65	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER

DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/08

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W08	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-8		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.12	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	2128	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	805	N.A.	APHA 23 rd Edition 4500 - SO ₄ E
5	Chlorides	mg/l	428	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	56	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	656	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	28	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	3.90	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	960	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	8	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	58.74	N.A.	APHA 23 rd Edition
22	SAR	-	9.18	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	4.56	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (II)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER

DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/09

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	
2.	Sample ID: 1941258377- 305AU19W09	3. Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5. Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7. Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9. Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11. Sample Category: Grab
12.	Sampling Location: GW-9	

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.48	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	4063	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	1603	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	998	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	32	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	604	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	35	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	3.85	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	760	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	8	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	62.00	N.A.	APHA 23 rd Edition
22	SAR	-	9.53	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	0.00	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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Phone : (O) 0265 - 6131000, 6131001**ENVIRONMENTAL MONITORING REPORT**

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/10**SAMPLE DETAILS**

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W10	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 20.08.2019	5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-10		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.64	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	4345	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	1481	N.A.	APHA 23 rd Edition 4500 - SO ₄ E
5	Chlorides	mg/l	665	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	38	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	934	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	44	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	10.97	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	1460	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.05	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	57.01	N.A.	APHA 23 rd Edition
22	SAR	-	10.57	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	1.32	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/11

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	3.	Client Representative: Mr. Amit Das
2.	Sample ID: 1941258377- 305AU19W11	5.	Sample Collected By: Mr. Ameya Vaze
4.	Sample Date : 20.08.2019	7.	Analysis Completed on: 19.09.2019
6.	Analysis commenced on: 26.08.2019	9.	Test Requirement: Water Analysis
8.	Reporting Date: 20.09.2019	11.	Sample Category: Grab
10.	Packing Condition & Quantity: Sealed ✓		
12.	Sampling Location: GW-11		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.60	N.A.	APHA 23 rd Edition 4500-H* B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	4615	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	2423	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	665	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	52	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1044	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	27	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	4	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	1552	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	58.64	N.A.	APHA 23 rd Edition
22	SAR	-	11.47	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	56.39	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/12

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W12	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 21.08.2019	5.	Sample Collected By: Mr. Armeya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-12		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.61	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	2085	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	478	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	929	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	46	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	521	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	18	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	0.45	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	630	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	63.28	N.A.	APHA 23 rd Edition
22	SAR	-	9.00	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	4.56	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/13

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India		
2.	Sample ID: 1941258377- 305AU19W13	3.	Client Representative: Mr. Amit Das
4.	Sample Date : 21.08.2019	5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab
12.	Sampling Location: GW-13		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.86	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	3672	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	597	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1264	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	60	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	1450	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	23	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	3.39	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	1700	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	64.37	N.A.	APHA 23 rd Edition
22	SAR	-	15.22	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	37.25	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

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Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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**ENVIRONMENTAL MONITORING REPORT****LABORATORY TEST REPORT - WATER**

DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/14**SAMPLE DETAILS**

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India
2.	Sample ID: 1941258377- 305AU19W14
3.	Client Representative: Mr. Amit Das
4.	Sample Date : 21.08.2019
5.	Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019
7.	Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019
9.	Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓
11.	Sample Category: Grab
12.	Sampling Location: GW-14

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	8.40	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	2269	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	842	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	428	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	50	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	281	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	15	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	2.1	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	544	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	51.98	N.A.	APHA 23 rd Edition
22	SAR	-	5.23	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	23.77	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :**Authorized By -****Name : R.G. Kotasthane**
Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/15

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India				
2.	Sample ID: 1941258377- 305AU19W15	3.	Client Representative: Mr. Amit Das		
4.	Sample Date : 21.08.2019	5.	Sample Collected By: Mr. Armeya Vaze		
6.	Analysis commenced on: 26.08.2019	7.	Analysis Completed on: 19.09.2019		
8.	Reporting Date: 20.09.2019	9.	Test Requirement: Water Analysis		
10.	Packing Condition & Quantity: Sealed ✓	11.	Sample Category: Grab		
12.	Sampling Location: GW-17				

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.72	N.A.	APHA 23 rd Edition 4500-H ⁺ B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	3067	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	521	N.A.	APHA 23 rd Edition 4500 - SO ₄ E
5	Chlorides	mg/l	1226	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	52	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	2214	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	32	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	1.31	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	840	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	84.45	N.A.	APHA 23 rd Edition
22	SAR	-	33.11	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	0.0	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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ENVIRONMENTAL MONITORING REPORT

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/16

SAMPLE DETAILS

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	
2.	Sample ID: 1941258377- 305AU19W16	3. Client Representative: Mr. Amit Das
4.	Sample Date : 21.08.2019	5. Sample Collected By: Mr. Ameya Vaze
6.	Analysis commenced on: 26.08.2019	7. Analysis Completed on: 19.09.2019
8.	Reporting Date: 20.09.2019	9. Test Requirement: Water Analysis
10.	Packing Condition & Quantity: Sealed ✓	11. Sample Category: Grab
12.	Sampling Location: GW-18	

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	7.80	N.A.	APHA 23 rd Edition 4500-H* B
2	Colour	Pt. Co.	10	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	3142	N.A.	APHA 23 rd Edition 2540 C
4	Sulphate	mg/l	374	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1328	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	64	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	2035	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	39	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	1.37	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	1000	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	<2	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	<5	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23 rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	80.70	N.A.	APHA 23 rd Edition
22	SAR	-	27.86	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	39.73	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

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Phone : (O) 0265 - 6131000, 6131001**ENVIRONMENTAL MONITORING REPORT**

LABORATORY TEST REPORT - WATER		
DOC. NO.: LAB-FMT-055	Issue No.: 02	Revision No.: 00
Effective Date: 01-01-2015	Issue Date: 01-01-2015	Revision Date: 01-01-2015

REPORT NO.: AUG19/305/17**SAMPLE DETAILS**

1.	Name & Address of Client: M/s. Ashapura Perfoclay Ltd; Plot No. 167, Village Ler, Nr. Bhujodi, Taluka Bhuj, District Kutch, Gujarat, India	3.	Client Representative: Mr. Amit Das
2.	Sample ID: 1941258377- 305AU19W17	5.	Sample Collected By: Mr. Ameya Vaze
4.	Sample Date : 21.08.2019	7.	Analysis Completed on: 19.09.2019
6.	Analysis commenced on: 26.08.2019	9.	Test Requirement: Water Analysis
8.	Reporting Date: 20.09.2019	11.	Sample Category: Grab
10.	Packing Condition & Quantity: Sealed ✓		
12.	Sampling Location: SW-A		

TEST RESULTS

S.No.	Parameters	Unit (SI)	Results	Specification/ SPCB Norms	Method Used
1	pH	-	8.90	N.A.	APHA 23 rd Edition 4500-H* B
2	Colour	Pt. Co.	25	N.A.	APHA 23 rd Edition 2120 B
3	TDS	mg/l	3684	N.A.	APHA 23rd Edition 2540 C
4	Sulphate	mg/l	626	N.A.	APHA 23 rd Edition 4500 - SO4 E
5	Chlorides	mg/l	1758	N.A.	APHA 23 rd Edition 4500 - Cl- B
6	Alkalinity	mg/l	16	N.A.	APHA 23 rd Edition 2320 B
7	Sodium	mg/l	24	N.A.	APHA 23 rd Edition 3500 - Na B
8	Potassium	mg/l	7	N.A.	APHA 23 rd Edition 3500 - K B
9	Ammonical Nitrogen	mg/l	<0.05	N.A.	IS 3025 (Part 34): 1988 (RA 2014)
10	Total Hardness	mg/l	224	N.A.	APHA 23 rd Edition 2340 C
11	Total Chromium	mg/l	<0.02	N.A.	APHA 23 rd Edition 3500 Cr - B
12	TSS	mg/l	4	N.A.	APHA 23 rd Edition 2540 D
13	COD	mg/l	10	N.A.	APHA 23 rd Edition 5220 B
14	Phenol	mg/l	<0.02	N.A.	APHA 23 rd Edition 5530 D
15	Iron	mg/l	<0.05	N.A.	APHA 23 rd Edition 3111B & 3500 Fe-B
16	Zinc	mg/l	0.12	N.A.	APHA 23 rd Edition 3111 B
17	BOD	mg/l	<2	N.A.	IS 3025 (Part 44) : 1993 (RA 2014)
18	Oil & Grease	mg/l	<1	N.A.	APHA 23rd Edition 5520 B
19	Copper	mg/l	<0.03	N.A.	APHA 23 rd Edition 3111B & 3500 Cu-B
20	Phosphate	mg/l	<0.02	N.A.	APHA 23 rd Edition 4500 P - C
21	% Sodium	%	18.29	N.A.	APHA 23 rd Edition
22	SAR	-	0.69	N.A.	APHA 23 rd Edition
23	Nitrate	mg/l	51.92	N.A.	IS 3025 (Part 34): 1988 (RA 2014) (ii)
24	Nitrite	mg/l	<0.05	N.A.	IS 3025 (Part-34): 1988 (RA 2014)
25	Total Organic Carbon	mg/l	<1	N.A.	APHA 23 rd Edition 5220 B

Remark :

Authorized By -

Name : R.G. Kotasthane

Designation : Head of Department (Lab)

NOTE: 1) Reports may be reproduced, if required, but only in full and only with written approval of the laboratory.

2) Re analysis of sample will be done, if requested within 7 days from the date of Reporting of sample if the samples are not consumed during analysis.

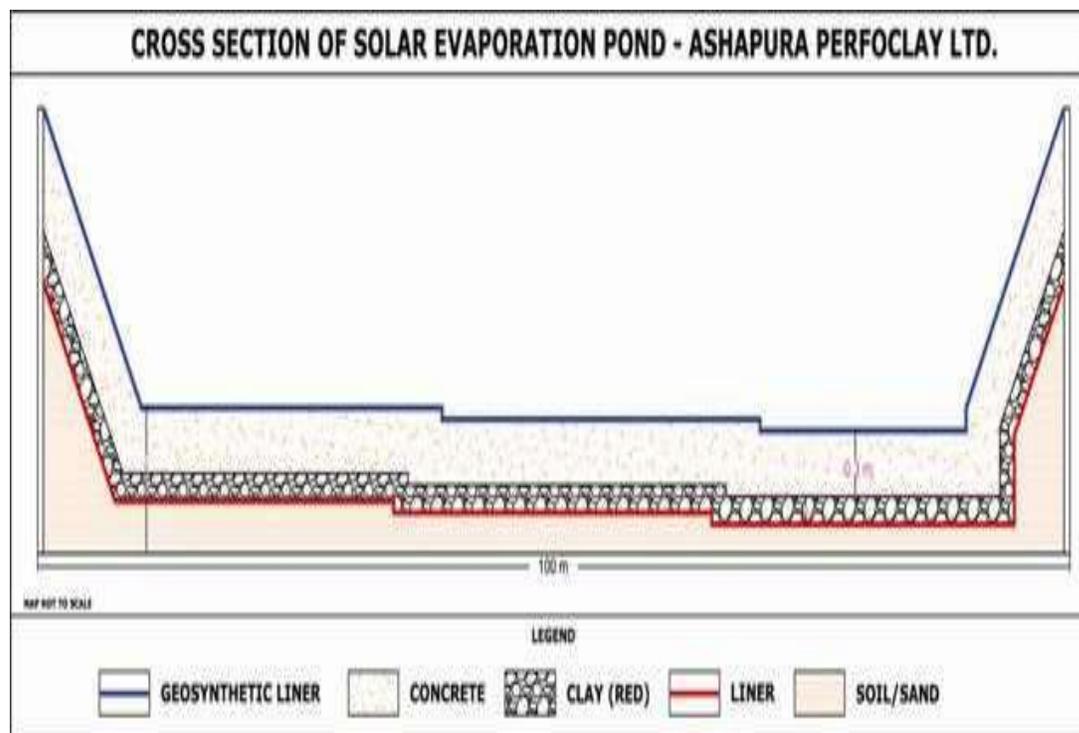
3) The results reported above relate to the sample identified under Sample Details.

-----END OF REPORT-----

Page 1 of 1

Annexure 8: Specifications and cross section of Solar Evaporation Pond**Specifications:**

- Evaporation pond is a solar pond containing a body of liquid to be heated by solar radiation. Evaporation pond comprises of multi-layer bottom construction over the natural earth and underlying the complete pond. Bottom layer consists of layer of sand and HDPE liner, an intermediate layer consists of layer of clay and upper layer of concrete and impermeable layer of GCL (geo synthetic liner).
- In the solar pond vertically extending salt concentration gradients is produced to produce a vertically extending temperature gradient to enable the pond to act as solar energy collector in which the concentrated solution at the bottom of the pond is heated a high temperature, e.g. up to 100°C and above.
- The unit has provided solar evaporation pond, which is adequate for evaporation of reject water from RO.

Cross section of solar evaporation pond

Annexure 9: Time bound action plan for groundwater remediation

PROPOSED TIME BOUND ACTION PLAN FOR GROUNDWATER REMEDIATION																			
Task	Weeks																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Pilot Run Phase																			
Performance evaluation on site for pilot trial run at 20% capacity of final abstraction rate (for 3 Months)																			
Design & Engineering Phase																			
Evaluation of existing system/treatment of wastewater in order to propose new of existing structures for remediation and Finalizing numbers and locations of Abstraction Wells																			
Detailed Engineering of remediation system including abstraction well design, additional storage tanks, additional units if required, interconnecting piping route, adequate capacity of pump																			
Preparation of Detailed GA Drawings of abstraction wells, collection and conveyance system (Tanks, Piping works and Pumps)																			
Preparation of structural design and drawings for additional units if required based on soil investigation data																			
Preparation of technical specifications of equipment and materials required in remediation																			
Preparation of Detailed Project Report (DPR)																			
Approval of DPR from Client																			
Procurement and Implementation Phase																			
Procurement of tanks (if required), pumps & panels, diffusers and piping items at site																			
Drilling and installation of Abstraction Wells																			
Execution of civil works, installation of pumps & panels and piping works, diffuser system in the Tank at site																			
Installation of air monitoring stations																			
Commissioning Phase																			
Testing & Commissioning of groundwater remediation system as per abstraction rate																			
Note: Drilling & installation of abstraction wells is dependent on the site condition																			
Tentative start of week one is 25/11/2019																			

Annexure 10: Consultant's Organization and Experience

Kadam Environmental Consultants, Vadodara, India

Established in April 1981, Kadam Environmental Consultants (KEC) is one of the oldest and largest Environment, Health and Safety (EHS) consulting companies in India, providing comprehensive environmental solutions from concept to commissioning under one roof.

Headquartered at Vadodara (Gujarat) with branch offices at Gurgaon (Haryana) and Kolkata besides project offices at other locations, Kadam Group of Companies (including Kadam Environmental Consultants, Kadam Pollution Control Pvt. Ltd. and Kadam Enviro Projects LLP), have a total staff strength of ~200 persons covering most of the specializations in the Environment, Health and Safety sphere.

Kadam operates its own laboratory (accredited to NABL) covering relevant physical, chemical and biological parameters for analysis of pollutants in air, water and soil. Kadam also carries out treatability studies for water, wastewater, groundwater and soil.

KEC is the largest Accredited Consulting Organization for EIA studies in India (accredited by NABET) based on diversity of sectors covered.

Clientele include Public Sector Enterprises, Private Industries, Multinationals, MoEFCC, SPCBs and World Bank is current clients across several prestigious projects. Several Fortune 500 clients regularly work with Kadam. Group Turnover is ~INR 25 crores.

The services offered by engineering department are as follows:



Kadam worked on many projects on Contaminated Sites Management Projects in India.

- Soil and groundwater investigations
- Risk assessment studies
- Preparation of Remediation / Rehabilitation Action Plan
- Remediation, abatement and disposal
- Solid waste / landfills
- Design and tendering
- Capacity building
- Remediation Supervision

The list of projects completed by Kadam along with its partners Witteveen+Bos, COWI and Tauw are shown below:

• **Relevant Project Experience**

(1) Firm: Kadam Environmental Consultants, W+B & COWI

Assignment name: Inventory and mapping of probably contaminated sites in India	
Country: India Location within country: Nationwide	Duration of assignment: 12 months
Name of client: Ministry of Environment and Forests	Total no. of staff-months of the assignment: 42
Start date: May 2012 Completion date: Ongoing	No. of professional staff-months provided by associated consultants: 24
Name of associated consultants, if any: Kadam Environmental Consultants Witteveen+Bos Tauw	
Narrative description of project: The objective of the assignment is to elaborate a national inventory of contaminated sites in India. The project includes collection of information at the state levels/NGO's etc., development of approaches for identification and assessment of contaminated sites, development and delivery of a data base with GIS (Geo Environ) for data management, field visits with soil and groundwater sampling and analysis for a selected number of sites according to the risk they pose to the human health and the environment.	
Description of actual services provided within the assignment: <ul style="list-style-type: none"> - Planning and management of data collection at State Pollution Control Boards, Ministries, NGO's, Municipalities, etc. - Development of approaches for screening levels, identification and assessment of contaminated sites - Planning and of an assessment programme including sampling and analysis of soil and groundwater - Adjustment and delivery of a data base for data management and GIS integration - Development of a risk assessment tool to be integrated in the data base - Risk assessment and periodization of sites - Reporting 	

(2) Firm: Kadam Environmental Consultants & W+B

Assignment Name: Soil & Groundwater Remediation for Provision of Consultancy services and bought items-Testing, analysis, connecting pipe work, drilling and installation of wells for Pilot Testing prior to commencement of Full-Scale Remediation Works.	
Country: India Location within country: Toansa, Punjab	Duration of assignment (months): 12
Name of Client: Sun Pharmaceutical Industries Ltd.	Total number of staff-months of the assignment:
Address: Village Toansa, Punjab, India-144533	
Start Date (Month/Year): August 2014 Completion Date (Month/Year): February 2016	No. of professional staff-months provided by associated Consultants: 11

Name of associated Consultants, if any:	
Witteveen+Bos, Netherlands	
Narrative description of Project:	Analytical report indicated that groundwater quality at the site was either impacted or significantly impacted with various Chemicals of Concerns (COCs) and concentrations of the reported COCs exceed the respective guideline values as mentioned in DWS 10500:2012/Dutch Guideline Values. These results were presented in the meeting with the representatives from the client and the Punjab Pollution Control Board (PPCB).
Description of actual services provided within the assignment:	The Punjab Pollution Control Board (PPCB) has sanctioned a Pilot Project. The project is implemented by a consortium of Witteveen+Bos and Kadam Environmental Consultants.
Scope of services provided:	<ul style="list-style-type: none"> • Design and planning of the pilot test. • Preparation of the specifications of the required equipment and wells • Assisted Sun Pharma in procuring Container from Netherlands. • Drilling services and interconnecting pipe works to container. • Installation of Injection, Abstraction, Monitoring and Piezometric Wells. • Sampling & Analysis of various parameters for Soil and Groundwater. • In situ remediation techniques of Air Sparging/Soil Vapour Extraction (AS/SVE). • GPR Survey for detecting utilities below ground so as to avoid obstruction during drilling. • Top of Casing Survey for ascertaining groundwater flow direction at site.

(3) Firm's Name: Kadam Environmental Consultants & Witteveen+Bos

Assignment Name:	
Consulting services for sampling, investigation of soil and groundwater at IS Dyestuff, Karakhadi, Vadodara	
Country:	Duration of assignment (months):
India	12
Location within country:	
Dudhwada, Padra	
Name of Client:	Total number of staff-months of the assignment:
Is Dyestuff	
Address:	
576/568, Village Dudhwada, Taluka Padra, Vadodara	
Start Date (Month/Year): August 2015	No. of professional staff-months provided by associated Consultants:
Completion Date (Month/Year): June 2016	11
Name of associated Consultants, if any:	
Witteveen+Bos, Netherlands	
Narrative description of Project:	Analytical report indicated that groundwater quality at the site was either impacted or significantly impacted with various Chemicals of Concerns (COCs) and concentrations of the reported COCs exceed the respective guideline values as mentioned in DWS 10500:2012/Dutch Guideline Values. These results were presented in the meeting with the representatives from the client and the Gujarat Pollution Control Board (GPCB).
Description of actual services provided within the assignment:	The Gujarat Pollution Control Board (GPCB) has sanctioned a Pilot Project. The project is implemented by a consortium of Witteveen+Bos and Kadam Environmental Consultants.
Scope of services provided:	<ul style="list-style-type: none"> – Design and planning of the pilot test. – Preparation of the specifications of the required equipment and wells – Drilling services and interconnecting pipe works to container. – Installation of Abstraction and Monitoring Wells. – Sampling & Analysis of various parameters for Soil and Groundwater. – In situ remediation techniques / pump & treat. – GPR Survey for detecting utilities below ground so as to avoid obstruction during drilling. – Top of Casing Survey for ascertaining groundwater flow direction at site.

(4) Firm's Name: Kadam Environmental Consultants & Witteveen+Bos

Assignment Name: Pilot Scale Remediation for treating colored groundwater by Groundwater Treatment Unit (Container based) at Mayur Dye Chem Intermediates LLP, Karakhadi, Vadodara.	
Country: India Location within country: Dudhwada, Padra	Duration of assignment (months): 24
Name of Client: Undisclosed	Total number of staff-months of the assignment:
Address: Karkahadi, Vadodara	
Start Date (Month/Year): December 2016 Completion Date (Month/Year): December 2018	No. of professional staff-months provided by associated Consultants:
Name of associated Consultants, if any: Witteveen+Bos, Netherlands	
Narrative description of Project: Analytical report indicated that groundwater quality at the site was either impacted or significantly impacted with various Chemicals of Concerns (COCs) and concentrations of the reported COCs exceed the respective guideline values as mentioned in DWS 10500:2012/Dutch Guideline Values. These results were presented in the meeting with the representatives from the client and the Gujarat Pollution Control Board (GPCB).	
Description of actual services provided within the assignment: The Gujarat Pollution Control Board (GPCB) has sanctioned a Pilot Project. The project is implemented by a consortium of Witteveen+Bos and Kadam Environmental Consultants.	
Scope of services provided: <ul style="list-style-type: none"> - Design and planning of the pilot test. - Preparation of the specifications of the required equipment and wells - Drilling services and interconnecting pipe works to container. - Installation of Abstraction & Monitoring Wells. - Sampling & Analysis of various parameters for Groundwater. - In situ remediation techniques & pump & treat. - Cable detector for detecting utilities below ground so as to avoid obstruction during drilling. - Top of Casing Survey for ascertaining groundwater flow direction at site. 	

(5) Firm's Name: Kadam Environmental Consultants & Witteveen+Bos

Assignment name: Consultancy Services for Assessment of Contamination, Design of Remediation Plan, Bid Preparation and Supervision of Remedial Activities for the Dhapa Municipal Dumpsite in Kolkata, West Bengal	
Country: India Location within country: Kolkata, West Bengal, India	Duration of assignment (months): 6
Name of Client: West Bengal Pollution Control Board (WBPCB)	Total No. of staff-months of the assignment: 13 experts & supporting staff
Address: West Bengal Pollution Control Board (WBPCB), "Paribesh Bhawan", 10 A, Block – LA, Sector – III Bidhannagar, Kolkata – 700 098	

Start date: April 2012 Completion date: October 2013	No. of professional staff-months provided by associated Consultants: 4 months
Name of associated Consultants, if any:	
Narrative description of Project: Project of Assessment of Site Contamination, Design of Remediation Plan, Bid Preparation and Supervision over execution of Remediation Plan for Dhapa Closed MSW Dump Site (site area of 11.6 Ha), Kolkata, West Bengal, India. Capacity Building for Industrial Pollution Management (CBIPM), Ministry of Environment and Forests (MOEF & West Bengal Pollution Control Board WBPCB), World Bank Funded under National Programme for Rehabilitation of Polluted Sites (NPRPS).	
Description of actual services provided within the assignment: Scope of Services includes: <ul style="list-style-type: none"> • Reconnaissance and Preliminary Site Assessment • Inception Report • Sampling Protocol and Sample analysis of Waste, Surface and Ground Water for baseline monitoring - Field Borehole drilling work and other investigations • Baseline Monitoring by taking ground water, surface water, soil etc. from new Boreholes drilled / existing tube wells / surface water ponds / drains nearby the site etc. & Municipal Solid Waste Characterization and chemical analysis from different areas of the dump site • Development of Concept Site Model – Source, Pathways and Receptors - Study of Impacts • Impact Identification by comparing the results of analysis of sampling with standards. • Preparation of an Environmental & Social Impact Assessment report due to the existing dump site as per World Bank guidelines. • Identification of Impacts due to the dump site and its mitigation measures • Environmental Risk Assessment due to closed dump site. • Preparation of Environmental and Social Management Plan based on the identified impacts and mitigation measures. • Detailed designs & Development of Remediation Plans – Scientific Containment and Closure of MSW Landfill site of 4.2 Ha. • Preparation of Bid Documents for execution of works for landfill closure as per National / International Competitive Bidding Procedure of World Bank. • Execution Supervision of the entire Project. • Remediation validation and Long Term Monitoring Plan 	



Kadam

Environmental Consultants
www.kadamenviro.com

Environment for Development

CONTACT DETAILS

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E-mail: delhi@kadamenviro.com; **T:0124-4242430 to 436 (7 lines)**



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

BY R.P.A.D.

NOTICE UNDER SECTION 33-A OF THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT -1974 (HERE AFTER REFERRED TO AS THE WATER ACT) AS AMENDED FROM TIME TO TIME.

WHEREAS you are having industrial plant at Survey No:167, Village: Ler, Near Bhujodi, Ta. Bhuj, Dist. Kutch.

AND WHEREAS, the board issued closure direction under section u/s 33-A Water Act -1974 with immediate effect on 11/6/2019 for the reasons stated therein.

AND WHEREAS considering your submissions and monitoring report of Regional office revocations was issued on 25/7/2019 and subsequently extended further on vide order dated 28/8/2019 and 27/9/2019 with conditions stipulated therein.

AND WHEREAS a Study was undertaken upon directions by Gujarat Pollution Control Board by Pollucon Laboratories Pvt Ltd, Surat on "*Study on ground water as well as soil from peripheral of M/s AshapuraPerfoclay Limited*" which showed the presence of Ammonical Nitrogen in the borewells peripheral to your industrial plant.

AND WHEREAS with reference to closure direction issued by the Board you have submitted ground water remediation action plan to be done by M/s AshapuraPerfoclay limited which has been prepared by Kadam Environmental Consultants, Vadodara.

Now, therefore I Smt. U.K.Upadhyay, Environmental Engineer, Gujarat Pollution Control Board propose to issue Notice under section 33(A) of the Water (Prevention and Control of Pollution) Act-1974 as under:

1. To execute the action plan submitted, for restoration/remediation of contaminated ground water within a period of three (3) months from the date of issuance of this notice.
2. To immediately remove gypsum dumped at various sites outside the premises & clear all the sites as per consented conditions within a period of (3) three months from the date of issuance of this notice.

Clean Gujarat Green Gujarat

ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

Outward No: 3755/18/11/2019

You are hereby directed to submit progress report to above mentioned points by the 18th of December 2019, 18th January 2020 and final report by 18th February 2020 failing which direction of closure will be issued without further notice to you.

**For and on behalf of
GUJARAT POLLUTION CONTROL BOARD**

U.K. Upadhyay
18/11/2019
**(Smt. U.K. Upadhyay)
Environmental Engineer**

NO: PC/CCA-KUTCH-27(17)/GPCB ID--17774 Date:

**ISSUED TO:
M/s Ashapuraperfoclay Ltd.,
Survey No:167,
Village: Ler, Near Bhujodi,
Ta. Bhuj-37110, Dist. Kutch.**

Outward No:527158,18/11/2019