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**COMPREHENSIVE ENVIRONMENTAL POLLUTION ABATEMENT
ACTION PLAN FOR CRITICALLY POLLUTED INDUSTRIAL CLUSTER –
BHIWADI (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)**

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION	20
2. ACTION PLAN FOR BHIWADI INDUSTRIAL CLUSTER	20
2.1. INTRODUCTION.....	20
2.1.1. Location.....	20
2.1.2. Climate.....	22
2.1.3. Physiography.....	22
2.1.4. Soil & Geology.....	23
2.1.5. Impact Zone.....	23
2.1.6. Industrial Development	27
2.1.7. CEPI Score and Areas.....	29
2.2. WATER ENVIRONMENT.....	30
2.2.1. Water Resources.....	30
2.2.2. Water Quality	32
2.2.3. Sources of Water Pollution	33
2.2.4. Disposal of Effluents.....	33
2.2.5. Existing Infrastructure Facilities	34
2.2.5.1. Water Quality Monitoring Network.....	34
2.2.5.2. Common Effluent Treatment Plant.....	34
2.2.5.3. Surface Drainage and Effluent Conveyance.....	35
2.2.6. Action Plan for Control of Pollution	35
2.2.6.1. Pollution Control Measures by Industries	35
2.2.6.2. Rainwater Harvesting.....	36
2.2.6.3. Infrastructure Renewal	36
2.2.6.4. Impact on CEPI Score.....	37
2.2.6.5. Managerial and Financial Aspects.....	37
2.2.6.6. Monitoring System	38
2.3. AIR ENVIRONMENT.....	38
2.3.1. Present Status	38
2.3.2. Sources of Air Pollution.....	39

2.3.3.	<i>Action Plan for Compliance and Control of Pollution</i>	39
2.3.3.1.	<i>Ambient Air Quality Monitoring Network</i>	39
2.3.3.2.	<i>Pollution Control Measures</i>	40
2.3.3.3.	<i>Impact on CEPI Score</i>	40
2.3.3.4.	<i>Time-frame for Implementation</i>	40
2.3.3.5.	<i>Monitoring System</i>	41
2.4.	LAND ENVIRONMENT	41
2.4.1.	<i>Soil Contamination</i>	41
2.4.2.	<i>Groundwater Contamination</i>	41
2.4.3.	<i>Action Plan for control of pollution</i>	41
2.4.4.	<i>Impact on CEPI score after Abatement of Pollution</i>	42
2.5.	WASTE GENERATION AND MANAGEMENT	42
2.5.1.	<i>Hazardous waste</i>	42
2.5.2.	<i>Biomedical Waste</i>	43
2.5.3.	<i>Municipal Solid Waste</i>	44
2.6.	PUBLIC AWARENESS AND CAPACITY BUILDING	45
2.7.	SUMMARY OF PROPOSED ACTION POINTS.....	46

LIST OF TABLES:

Table 1: Area under Forest – Bhiwadi Region.....	22
Table 2: Status of Development of various Industrial Areas in Bhiwadi Region.....	27
Table 3: Types of Industries in Bhiwadi Industrial Area.....	28
Table 4: Types of Industries in Khushkhera Industrial Area	28
Table 5: Types of Industries in Chopanki Industrial Area.....	29
Table 6: List of Critically Polluted Areas in Bhiwadi Industrial Cluster	29
Table 7: Parameter-wise CEPI Scores of Shortlisted areas in Rajasthan.....	29
Table 8: Depth to Water Level (in meters below ground level) for Bhiwadi Industrial Cluster	30
Table 9: Chemical Analysis Results of Stations in Bhiwadi Industrial Cluster as reported by RSPCB	32
Table 10: Chemical Analysis Results of Groundwater in Bhiwadi Region as reported by CGWB	32
Table 11: Characteristics of Inflow and Outflow at CETP, Bhiwadi.....	35
Table 12: CEPI Score for Water Environment Post Implementation of Action Plan.....	37
Table 13: Ambient Air Quality Monitoring Data in Bhiwadi Region for the period 2009-10	38
Table 15: CEPI Score for Air Environment Post Implementation of Action Plan.....	40
Table 16: CEPI Score Post for Land Environment Implementation of Action plan.....	42
Table 17: Inventory of Hazardous Waste Generated in Bhiwadi Region	43
Table 18: Final Action Plan for Bhiwadi Industrial Cluster: Short Term and Long Term Action Points - (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)	47

LIST OF FIGURES:

Figure 1 Bhiwadi industrial Cluster Location Map	21
Figure 2: Location of Protected Forests in Bhiwadi Region	23
Figure 3 Location of the sensitive receptors in Bhiwadi Industrial area.....	24
Figure 4 Location of the sensitive receptors in Chopanki Industrial area.....	25
Figure 5 Location of the sensitive receptors in Khushkhera Industrial area	26
Figure 6: Groundwater Potential in Alwar District.....	31
Figure 7: Groundwater Status of Alwar District, 2009.....	31

ABBREVIATIONS

APCS	Air Pollution Control System
BGL	Below Ground Level
BIS	Bureau of Indian Standards
BMW	Bio medical Waste
BOD	Biological Oxygen Demand
CBOs	Community Based Organisations
CBWTF	Common Biomedical Waste Treatment and Disposal Facility
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CGWB	Central Ground Water Board
CHWTSDF	Common Hazardous Waste Treatment, Storage and Disposal Facility
Cl ₂	Chlorine
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CPCB	Central Pollution Control Board
DBOOT	Design Built Own Operate Transfer
DG	Diesel Generator
DO	Dissolved Oxygen
Ecosmart	IL&FS Ecosmart Ltd
EP Act	Environment (Protection) Act, 1986.
ETP	Effluent Treatment Plant
FC	Faecal Coliform
GHGs	Green House Gases
GoI	Government of India
Ha	Hectare
HCs	Hydro carbons
HDPE	High density Polyethylene
IIT	Indian Institute of Technology
IMD	Indian Meteorological Department
IS	Indian standard
kg	kilogram
km	kilometer
Leq	Linear equivalent
lpcd	Litres per capita per day
LPG	Liquified Petroleum Gas
LSI	Large Scale Industries
m.	Meter
M.S.	Mild Steel
MLD	Million Liters per Day
MNES	Ministry of Non conventional Energy Resources
MoEF	Ministry of Environment & Forests
MSI	Medium Scale Industries
MSW	Municipal Solid waste
MTA	Metric Tonnes per Annum

NAAQS	National Ambient Air Quality Standards
NAMP	National Air Quality Monitoring Programme
NGOs	Non Governmental Organisations
NH ₃	Ammonia
NIO	National Institute of Oceanography
NO	Nitrogen Oxide
NO ₂	Nitrogen Dioxide
NOC	No Objection Certificate
NO _x	Nitrogen Oxide
NWMP	National Water Quality Monitoring Programme
PDCOR	Project Development Company of Rajasthan Ltd
PHED	Public Health and Engineering Department
PM ₁₀	Particulate Matter with a diameter of less than 10 microns
PM _{2.5}	Particulate Matter with a diameter of less than 2.5 microns
ppm	Parts per million
ppt	Parts per trillion
PWD	Public Works Department
RH	Relative Humidity
RIICO	Rajasthan State Industrial Development & Investment Corporation Ltd
RO	Reverse Osmosis
RSPCB	Rajasthan State Pollution Control Board
RSPM	Respirable Suspended Particulate Matter
SEZ	Special Economic Zone
SO ₂	Sulphur di Oxide
SPM	Suspended Particulate Matter
SPV	Special Purpose Vehicle
sq.km	Square Kilometer
SSI	Small Scale Industries
SWM	Solid Waste Management
TC	Total Coliforms
TDS	Total Dissolved Solids
ToR	Terms of Reference
TPA	Tonnes per Annum
TPD	Tonnes per Day
TSDF	Treatment Storage and Disposal Facility
TSS	Total Suspended Solids

EXECUTIVE SUMMARY

Background

The Central Pollution Control Board (CPCB) in association with Indian Institute of Technology (IIT) New Delhi carried out an environmental assessment of industrial clusters across the country. Based on this, Comprehensive Environmental Pollution Index (CEPI) was calculated to identify polluted industrial clusters in the country.

The main objective of the study to establish CEPI is to identify polluted industrial clusters or areas in order to take concerted action towards pollution abatement and to centrally monitor them at the National level. A total of 88 industrial areas or clusters have been identified by the CPCB in consultation with the Ministry of Environment & Forests (MoEF), Government of India (GoI) for the study to be conducted across the country.

Preparation of Comprehensive Environmental Pollution Abatement Action Plan

This report is for the Bhiwadi Industrial Cluster selected under the CEPI study of Critical Industrial Clusters in the State of Rajasthan. The cluster needs a long term comprehensive environmental pollution abatement plan to improve its environmental performance. Presented below is the CEPI score assigned to the Bhiwadi Industrial Cluster by CPCB.

Parameter-wise CEPI Scores for Bhiwadi Industrial cluster

S. No	Parameter	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index		Existing CEPI
1	Air	6	5	30	6	0	0	6	5	5	0	25	10	Air	71	82.91
2	Water	3	5	15	8	3	3	14	5	5	0	25	15	Water	69	
3	Land	3	5	15	7	3	4.5	14.5	5	3	0	15	15	Land	59.5	

Industrial Development in Bhiwadi Region

Bhiwadi is a growing Industrial Town in Rajasthan situated in the North of the State in Alwar District bordering Haryana State. The identified industrial areas in Bhiwadi Cluster include Bhiwadi, Chopanki and Khushkhera. In order to have complete coverage of the industrial area, an impact zone of 3 kms around each industrial area is considered for the purpose of this study instead of the suggestion given by CPCB to depict an impact zone of 2 kms area around each of the industrial area. It should be noted that exact demarcation of impact zone would require robust studies with long term monitoring. The major receptor in this area is the Bhiwadi town having population of 33,000 which lies within 1km of the Bhiwadi Industrial Area.

RIICO is the main agency involved in Industrial Development. At present a total of about 5000 acres is under Industrial Development within the Bhiwadi Region. Industries in Bhiwadi Region are of varied nature. Major industries in this Region include Forging, Galvanizing, Lead Recycling, Chemical and Pharmaceutical units.

Water Environment

The seasonal river, Sabi, is the only surface water source in this Region which is about 23kms from the Bhiwadi Cluster. Groundwater is the major source of water in Bhiwadi Region for all purposes. Water pollution in this Region is mainly due to engineering, galvanizing, electroplating, chemical and pharmaceutical industries.

Each phase in Bhiwadi has a network of open drains to collect wastewater from individual industries as well as serve as storm water drain. These drains collect the wastewater ending up in the low-lying areas, creating unhealthy and unsanitary conditions in the vicinity. The collecting drains are breached at a few locations. There is thus a need for proper wastewater and storm water disposal. Most of the major industries in the region have their own effluent treatment plants, and some of them claim to reuse most of their treated effluent for gardening and other purposes in their factory premises.

Under the National Water Monitoring Program, RSPCB has set up 5 stations in the Bhiwadi Region for regular monitoring. As per RSPCB records, nearly 90% of the units in Bhiwadi Industrial Area have full-fledged effluent treatment plants (ETP) within their individual premises.

Air Environment

Ambient Air quality monitoring is not carried out on a regular basis in Bhiwadi. Major contributors to air pollution in this Region are the industries. At present, Bhiwadi does not have any functional continuous air monitoring stations. At present, about 30 industries have installed appropriate air pollution control devices.

Land Environment

. Major source of soil contamination observed in Bhiwadi is indiscriminate disposal of wastewater into open low lying areas and dumping of municipal as well as industrial solid waste into open lands. There is a need for a proper solid waste management system, for which a landfill site has been identified. .

Solid Waste Generation and Management

Waste includes hazardous waste, biomedical waste, and municipal solid waste. The RSPCB is regularly conducting survey and inventorization of various waste sources and generation.

Bhiwadi lies in Alwar District and the hazardous waste generated in this District amounts to 6.21% of the total waste generated in the State. Hazardous waste generated in Bhiwadi region amounts to nearly 50% of the total hazardous waste generated in Alwar District. At present, all industries dispose off their hazardous waste at the Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) at Gudli in Udaipur.

Bhiwadi has very few and small scale health care establishments. Hence, biomedical waste generated in this Region is very low. However, there is a biomedical waste collection facility at all these establishments. There is a common incinerator for biomedical waste disposal at Alwar. All the Health Care Establishments in Bhiwadi are registered with this common facility.

Proposed Action Plan for Pollution Abatement

The proposed Action Plan for abatement of pollution is based on the secondary data collected from RSPCB and other concerned agencies. The action points mentioned have been categorized into Short Term and Long Term Measures based on the timeframe required for their implementation. The Short Term Action Points include measures that require one year or less for implementation i.e., December 2012, while the Long Term Action Points include measures that require time beyond one year for implementation. The effective implementation of the remedial action plan will help in abatement of pollution and to restore the environmental quality of these industrial clusters. Below is a tabulated summary of the proposed Action Plan for Bhiwadi industrial Cluster.

The Action Plan was presented on July 20, 2010 before the Steering Committee appointed by the CPCB. Consequent to their suggestions/observations, the Action Plan was modified and resubmitted to CPCB in August 2010. This revised Action Plan was further reviewed by the In-house Committee of CPCB and certain observations/suggestions were made on the Plan and clarifications/additional information, pertaining to those observations were sought vide CPCB's letter number B-29012/ESS(CPA)/2010/4619 dated October 7, 2010. This Action Plan addresses all those issues.

A tabulated summary of the Final Action Plan (**Revised Post CPCB In-House Committee Review**) for Bhiwadi Industrial Cluster is presented in the following page.

Impact on CEPI Score

For the purpose of this study, the CEPI score post implementation of the suggested pollution abatement measures is calculated and presented below:

Parameter-wise CEPI score Post Implementation of Action Plan

S. No.	Parameter	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index	Post Action Plan CEPI
1	Air	3	5	15	6	0	0	6	5	3.5	0	17.5	10	48.5	60.1
2	Water	3	5	15	4.5	3	3	10.5	5	3.5	0	17.5	5	48	
3	Land	3	5	15	4.5	3	4.5	12	5	3	0	15	5	47	

It is expected that, post implementation of the pollution abatement measures, the CEPI Score for Bhiwadi Industrial Cluster will be lowered by nearly twenty points to **60.1**.

Final Action Plan for Bhiwadi Industrial Cluster: Short Term and Long Term Action Points - (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
Short Term Action Plan- Air					
1.	Development of ambient air quality and stack emission monitoring facilities by the State board	RSPCB, Industries, Industries Association	June 2012	Approx. Rs. 25 -30 lakhs	To strengthen the monitoring of major air polluting industries. The State Board should develop its facilities along with required man power.
2.	Performance monitoring of major air polluting industries for assessment of compliance of the notified air emission standards.	RSPCB, RIICO Industrial Association, CTEP Trust	June 2012	Approx. Rs. 25-40 lakhs	The work of stack emission monitoring of the identified major air polluting industries in the industrial cluster would be taken up by the State Board in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the emission standards notified under EP Rules '86.
3.	Improvement and up gradation of APCM in induction furnaces & lead recycling industrial sectors	RSPCB, Industries, Industries Association	December 2012	The cost may vary from industry to industry	The State Board has directed the industries for improvement in operation & maintenance of APCM & their up-gradation. Air monitoring of units is being carried out as per prescribed frequency by the RSPCB to evaluate the performance of APCM.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
4.	Installation and operation of air monitoring stations at the periphery of each industrial area	RSPCB/RIICO	June 2012	Approx. Rs. 75 Lakhs	RSPCB has identified 3 sites for ambient air quality stations in Bhiwadi industrial area. In addition 2 AAQM stations are being considered for the residential areas in Bhiwadi by RSPCB. Alongside this RSPCB is also considering establishment of 2 AAQM stations in Khushkhera industrial area and 2 AAQM stations in Chaupanki industrial area.
5.	To check the illegal use of wastes substances as fuels by the industries	RSPCB, Industries, Industrial Association, Department of factory and boilers	June 2012	Not Available	The inspector of factory and boiler is to take up general survey of the industrial units which are using various types of wastes as a fuel and waste without permission of competent authority.
6.	Rapid study on Epidemiological to assess the impacts of the ambient lead pollution in various target groups	RSPCB, RIICO, State Health Department, Industrial association, Association of The Waste Lead Batteries Processing Units	December 2012	Approx. Rs. 30 -50 lakhs	Rapid study shall be carried out by Association of The Waste Lead Batteries Processing Units.
Long Term Action Plan-Air					
1.	Shift to cleaner fuels	RSPCB, Industry and Industrial Association, RIICO	December 2013	The cost may vary from industry to industry	Work to carry the CNG up to Bhiwadi is already completed. The major fossil fuel (coal or agricultural waste) consuming industries shall be

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
					advised to adopt cleaner fuel for prevention of environment. RSPCB and RIICO shall advise and encourage the major air polluting industries to adopt clean fuel, depending upon the availability of clean fuel.
2.	Installation of continuous real time ambient air quality monitoring station at Bhiwadi	RSPCB, RIICO	December 2013	Approx. Rs. 1.50 to 1.75 crores	RSPCB may take up the issue with CPCB for financing the installation of continuous real time ambient air quality monitoring station at Bhiwadi.
Short Term Action Plan- Water					
1.	Augmentation of capacity existing CETP (6 MLD to 9 MLD)	Industrial Association/ RIICO/BJPNT	December 2011	Approx. Rs. 2.17 crores	The work of capacity augmentation is under progress. The work is done by BJPNT through Bivija Infrastructure Pvt. Ltd.
2.	The disposal of treated waste water of CETP, Bhiwadi -Completion of work related to laying down closed conduit pipe line up to river Sabi	RIICO / RSPCB/ BJPNT Trust	March 2012	Approx. Rs. 7.72 crores	About 95% work on laying the closed conduit pipeline from Bhiwadi to river Sabi is completed. The work of approx. 2km is yet to be completed due to land allocation/land dispute problems.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
3.	Segregation of trade & Domestic effluent	RIICO/RSPCB	March 2012	Approx. Rs. 2 Crores (for Stage I)	<p>The job of segregation of trade and domestic effluent has been taken up by RIICO.</p> <p>In first phase of this job related to laying of closed conduit pipe lines, RIICO has started laying down of 3.8 KM pipe line from Parshvanth mall to CETP and from Samtel Mode to CETP. The job of Phase-I is in progress and pipe lines of about 600 meter length have been laid down.</p>
4.	Development of Recycling and reuse of treated effluent	RSPCB/RIICO/Industrial Association	Ongoing Activity	The cost will vary from industry to industry	About 12 industries in Bhiwadi have already taken steps to recycle and reuse the treated waste water. The State Board is pursuing the remaining major water polluting industries to adopt water conservation techniques by way of recycling and reuse of treated waste water.
5.	Installation of flow meter by the member units of CETP for monitoring the flow entering into closed conduit line from each of the member industry	Industries' Association/RSPCB/Industries	December 2012	Not Available	Flow meters are to be installed by the member units to monitor the discharge through the conveyance system to CETP <i>viz.</i> the quantity permitted by CETP trust for the treatment.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
6.	Development of sewerage system including STP (4 MLD)	UIT/RSPCB	March 2012	Approx. Rs. 17.24 Crores	<p>The Work of development of sewerage system including STP is almost completed by 90%.</p> <p>The RSPCB is regularly pursuing the UIT for early completion of Sewer lines and house connections.</p>
7.	Regulation on groundwater abstraction by the industries	RIICO/RSPCB/CGWA	Ongoing activity	--	<p>The RSPCB is insisting for CGWA NOC for groundwater withdrawal of more than 25 KLD.</p> <p>For compliance of CGWA guidelines RIICO and RSPCB to insist and ensure the Installation of water meter by the industries which extracts groundwater.</p>
8.	Monitoring of groundwater quality	RSPCB, CETP Trust, RIICO	March 2012	Approx. Rs.1- 2 lakhs	<p>The State Board has increased ground water quality monitoring points from earlier 5 points to 10 points around Bhiwadi and other industrial under NWMP having frequency of one sample in six month. The frequency of the sampling of all the six points shall be increased to once in three months for upgrading the monitoring of ground water quality.</p>

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
9.	Development of recharging structures for groundwater recharge	RIICO, RSPCB, RUIDP and BMC	Ongoing Activity	The cost may vary from industry to industry	The RSPCB and RIICO are pursuing the existing industries to setup RWH structures.
10.	Assessment of the quality of the treated effluent of major highly polluting industries	RSPCB	June 2012	---	RSPCB is monitoring the quality of treated effluent allowed to be discharge on the land /gardening
Long Term Action Plan- Water					
1.	Capacity enhancement of CETP for Bhiwadi <ul style="list-style-type: none"> • By enhancing the capacity of 9 MLD to 15 MLD or • Development separate CETP of 10 MLD 	RSPCB/Industrial Association/RIICO/BJPNT	2012 – 2015	Approx. Rs. 13.5 Crores	The issue regarding the enhancement of existing CETP or installation of separate CETP is under consideration with BJPNT. For setting up of new CETP, RIICO shall allocate a land on concessional basis.
2.	Development of CETP for Khushkhera (capacity Approx. 5-7 MLD)	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
3.	Development of CETP for Chopanki (approx. 5-7 MLD)	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.
4.	Development of CETP (approx. 5-7 MLD) for Kaharani, Pathredi and Tapukada	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.
5.	Closed Conduit Conveyance system to carry wastewater from industries to CETP in Bhiwadi	RIICO, CETP Trust, Industries' Association	2012-2015	Approx. Rs. 18 crores (for Stage II)	In Stage-II of the project, RIICO is in process to call revised tenders for closed conduit work in whole industrial area Bhiwadi. The length of stage I & stage II lines shall be 3.8 KM & 72 KM respectively. Connections of all effluent generating industries to the closed conduit system shall be done after completion of Stage-II work.
Action Plan Land					
1.	Identification & development of a Site for MSW Treatment & Disposal	Bhiwadi Municipal Council & UIT in consultation with State Urban Development Dept.	2013-2015	Not Available	The Municipality Bhiwadi has requested the district administration for allotment of the land so that necessary DPR etc may be prepared.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
2.	Augmentation of treatment and disposal facility for Bio-medical Waste	Medical and Health Department, RSPCB and Municipal Corporation	2013-2015	Not Available	The biomedical waste from the health care facilities of Bhiwadi is being collected, transported and disposed with the authorized Common Bio Medical Waste Treatment and Disposal Facility located in Alwar i.e., at distance of approx. 85 km. The RSPCB is monitoring the disposal of biomedical waste in accordance with the provision of Bio Medical Waste (Handling & Management) Rules 1998. The disposal facility requires augmentation for the compliance of CPCB guidelines for treatment and disposal facility of BMW.
Action Point-Others					
1.	Tree Plantation for Greening the Area	Forest Dept., UIT, RIICO, RSPCB	December 2011	Approx. Rs. 25 Lakhs	UIT Bhiwadi, RIICO, BMA and industrial association have planted trees in various areas. Moreover, the large scale industrial units have achieved plantation in more than 33% area of their premises. The same has been verified during routine inspections.
2.	Capacity Building for prevention & control of Pollution	RIICO , CETP Trust & RSPCB	March 2013	Not Available	1. Following actions shall be taken up by the RSPCB: a. Strengthening of technical and scientific manpower of Regional Office, Bhiwadi (RO , Bhiwadi)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
					<ul style="list-style-type: none"> b. RSPCB must establish full fledged Regional Office at Bhiwadi to monitor the implementation of action Plan and enforcement of regulatory region. c. The technical side of staff should have 1 Environmental Engineer, 2 nos. Assistant Environmental Engineer, 3 nos. Junior Environmental Engineer, supporting staff, computer facility, laboratory facility and transportation facility. d. The scientific side of staff should have 1 nos. Scientific Officer, 2 nos. Junior Scientific Officer, 2 nos. Senior Scientific Assistant. e. Strengthening of regional laboratory of RO , Bhiwadi for regular assessment of PCM with the industries, CETP, water quality and air quality of the area f. Education and training of technical and scientific staff of familiarization with the latest technology for pollution control and analytical techniques g. Strengthening of online connectivity

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
					<p>of RO, Bhiwadi with HO-Jaipur and CPCB Delhi for upgrading the data transfer mechanism</p> <p>h. Seminar and workshop for education and awareness of the project proponents for adoption of cleaner fuel and advanced process techniques for reduction of air emission and effluent discharge</p> <p>2 Following action shall be taken up by RIICO Limited & CETP Trust:</p> <p>i. To encourage use of cleaner fuel by providing soft loan for replacement / conversion of the existing boiler / thermo pack to cleaner fuel.</p> <p>ii. To encourage & provide soft loan to industrial unit which intends to install RO plant at their own for recycling of their effluent.</p> <p>iii. RIICO shall develop industrial areas for non polluting industries</p>

Note: While recommending the interventions to reduce CEPI, various studies, reports, Master Plans, RSPCB and RIICO data was referred to and wherever the information was available, the costs of interventions have already been included in the Action Plans. These interventions will be implemented by different agencies, including RIICO as identified in the Report.

1. INTRODUCTION

The Action Plan was presented on July 20, 2010 before the Steering Committee appointed by the CPCB. Consequent to their suggestions/observations, the Action Plan was modified and resubmitted to CPCB in August 2010. This revised Action Plan was further reviewed by the In-house Committee of CPCB and certain observations/suggestions were made on the Plan and clarifications/additional information, pertaining to those observations were sought vide CPCB's letter number B-29012/ESS(CPA)/2010/4619 dated October 7, 2010. This Action Plan addresses all those issues.

This report¹ is the Final Action Plan for Bhiwadi Industrial Cluster based on the data collected from RSPCB and other Agencies/responsible key stakeholders. The Plan has been prepared with due field verifications and consequent implementation of various actions included therein.

2. ACTION PLAN FOR BHIWADI INDUSTRIAL CLUSTER

2.1. Introduction

2.1.1. Location

Bhiwadi is a growing Industrial Town in Rajasthan situated in the North of the State in Alwar District bordering Haryana State. It is around 70 Km by road from New Delhi near NH-8 and 200 km by road from Jaipur. Bhiwadi is a Regional Centre/Priority Town of the National Capital Region (NCR) and forms part of the Regional Plan 2021 for NCR.

As of Census of India, 2001, Bhiwadi had a population of 33,830. Bhiwadi Industrial area includes Bhiwadi Phase I to V, Chopanki, Pathredi, Khushkhera and Tapukara. Land available in Bhiwadi is about 2000 acres in Bhiwadi, 977 acres in Khushkhera and 820 acres in Chopanki. Refer *Figure 1* for location of the Industrial Cluster in Bhiwadi Region.

¹ This report has been structured based on the document titled "Framework of Model Action Plan for Critically Polluted Industrial Areas/Clusters" which was circulated by the CPCB on July 20, 2010 after going through all the presentations made by various State Pollution Control Boards.

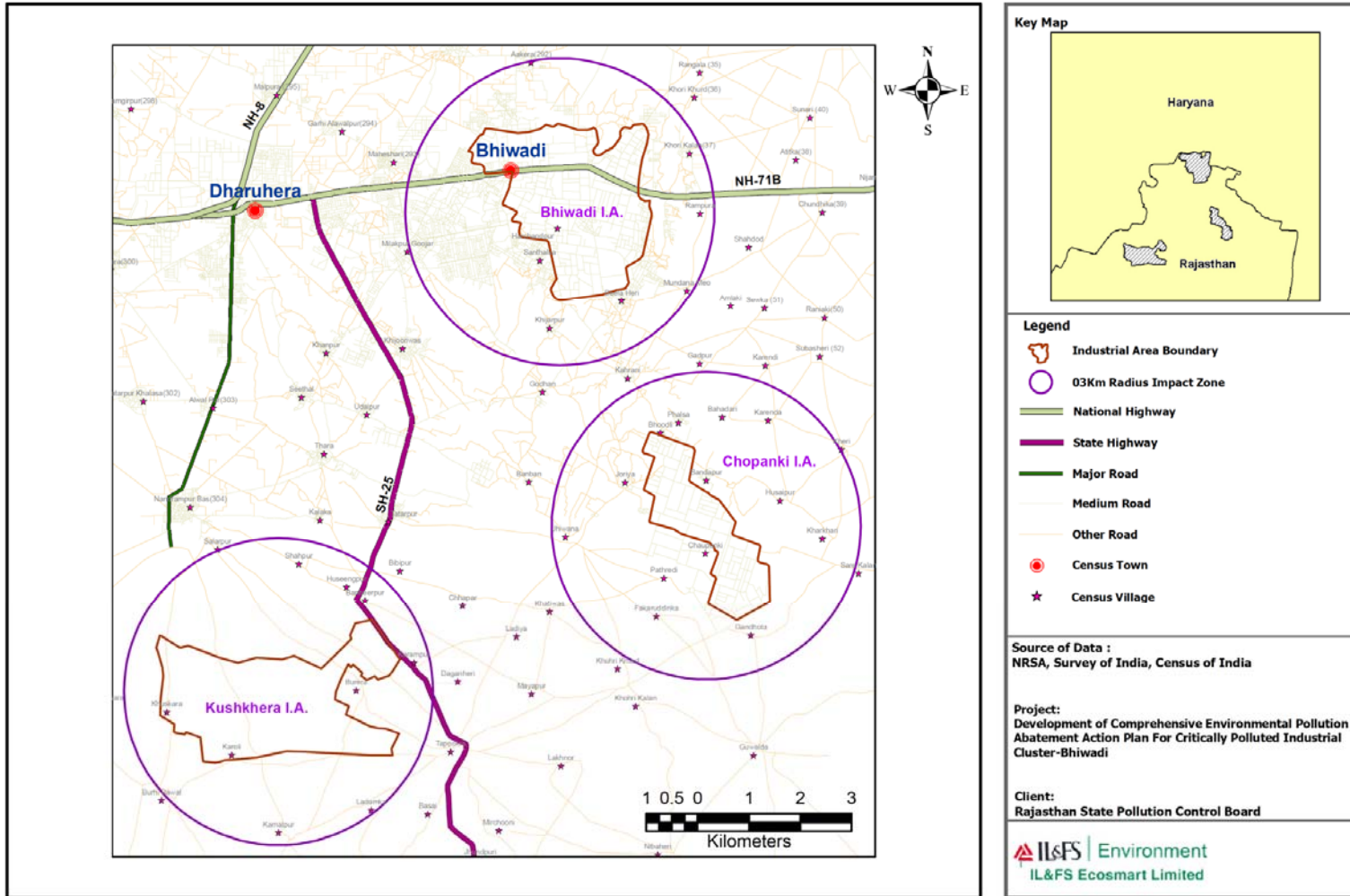


Figure 1 Bhiwadi industrial Cluster Location Map

2.1.2. Climate

Climate is generally hot and dry. The maximum temperature in this region touches 47° C and the minimum goes to freezing point. Average temperature is 26° C. The winds are strongest (13.1 km/hr) in June and lightest (5.6 km/hr) in November. Humidity level is about 70%. The average rainfall in Bhiwadi Region is 500-700mm. Bhiwadi receives rainfall only for two months – July and August. Bhiwadi falls in the Flood Prone Eastern Plain of the State².

2.1.3. Physiography

The topography of Bhiwadi region consists of few hillocks of Aravali series and the altitude varies from 150m to 300m above mean sea level³.

There are a number of hills and protected forests in Bhiwadi region namely Gondhan forest, Chopanki forest, Kohri Kalan forest, Sarekalan forest and Banvan forest. Areas under various forest blocks of Bhiwadi Region are presented in **Table-1**. There are no reserved forests in this area however, around 1485 hectares are under protected forest. Dhonk, Ronj, Hingot, Dacer, Ber and Kareel are the major species of trees are present in this area. Refer **Figure-2** on the following page.

Table 1: Area under Forest – Bhiwadi Region

Sr.No.	Forest Block	Protected Forest	Unclassified Forest	Total Area
		Area in Hectares		
1	Banvan	45.94	0	45.94
2	Chopanki	218.75	0.18	218.93
3	Guwalda	58.82	1.91	60.73
4	Khori Kalan	214.97	0.14	215.11
5	Udhanwas	289.75	0	289.75
6	Sarekalan	211.66	0.25	211.91
7	Ghatal	184.92	0	184.92
8	Khijarpur	78.42	0	78.42
9	Godhan	182.02	0.29	182.31
	Total Area	1485.25	2.77	1488.02

(Source: Forest Department, Alwar)

Further, a sizable amount of land (about 798 ha) is ravenous which is in urgent need of protection to improve the land quality.

²As per the Agro-climatic Zone classified by the State Water Resources Planning Department.

³ Source: Master Plan for Bhiwadi-Tapukara-Khushkhera Complex - 2031, Draft Report prepared by Town Planning Department, Government of Rajasthan.

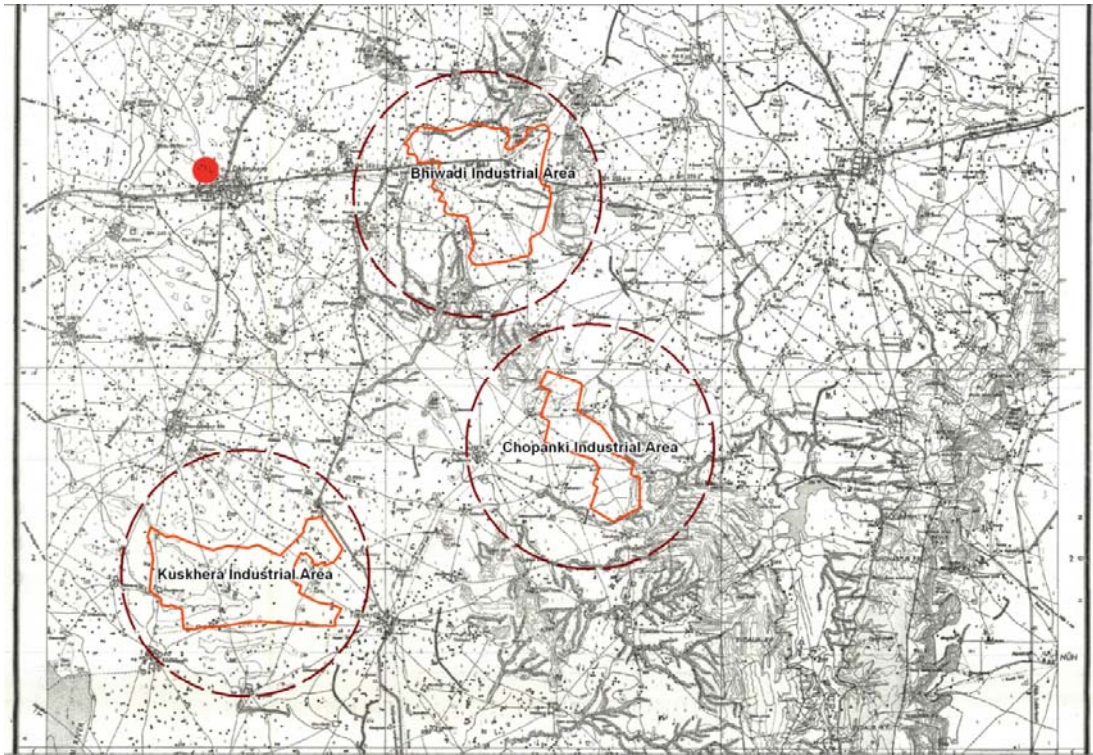


Figure 2: Location of Protected Forests in Bhiwadi Region

2.1.4. Soil & Geology

In Bhiwadi region the soil is Alluvial Sandy soil⁴ with strength of SBC 8-10 tonne/m². The major group of rocks is pre-Aravalli comprising of schist, quartzite and granite. Alwar group consists of quartzite and schist. Major mineral found in district are Baryte, Building stones and Copper. District leads in the production of these minerals.

2.1.5. Impact Zone

Based on the suggestion in the *Framework of Model Action Plan for Critically Polluted Industrial Areas / Cluster* by CPCB, the geographical area of the industrial cluster and its impact zone has been considered here. A radius of 3 kms has been considered to fully cover the Industrial Clusters as well as the sensitive receptors in the area. Refer **figure 3, 4 and 5** for the maps of Bhiwadi, Khushkhera and Chopanki Industrial Areas, respectively, showing the sensitive receptors. The impact zone for the Bhiwadi Industrial Cluster does not have any ecologically sensitive features such as reserved forests, heritage sites, etc. The major receptor is the Bhiwadi town having population of 33,000 which lies within 1km of the Bhiwadi Industrial Area.

⁴ Source: Master Plan for Bhiwadi-Tapookara-Khushkhera Complex - 2031, Draft Report prepared by Town Planning Department, Government of Rajasthan.

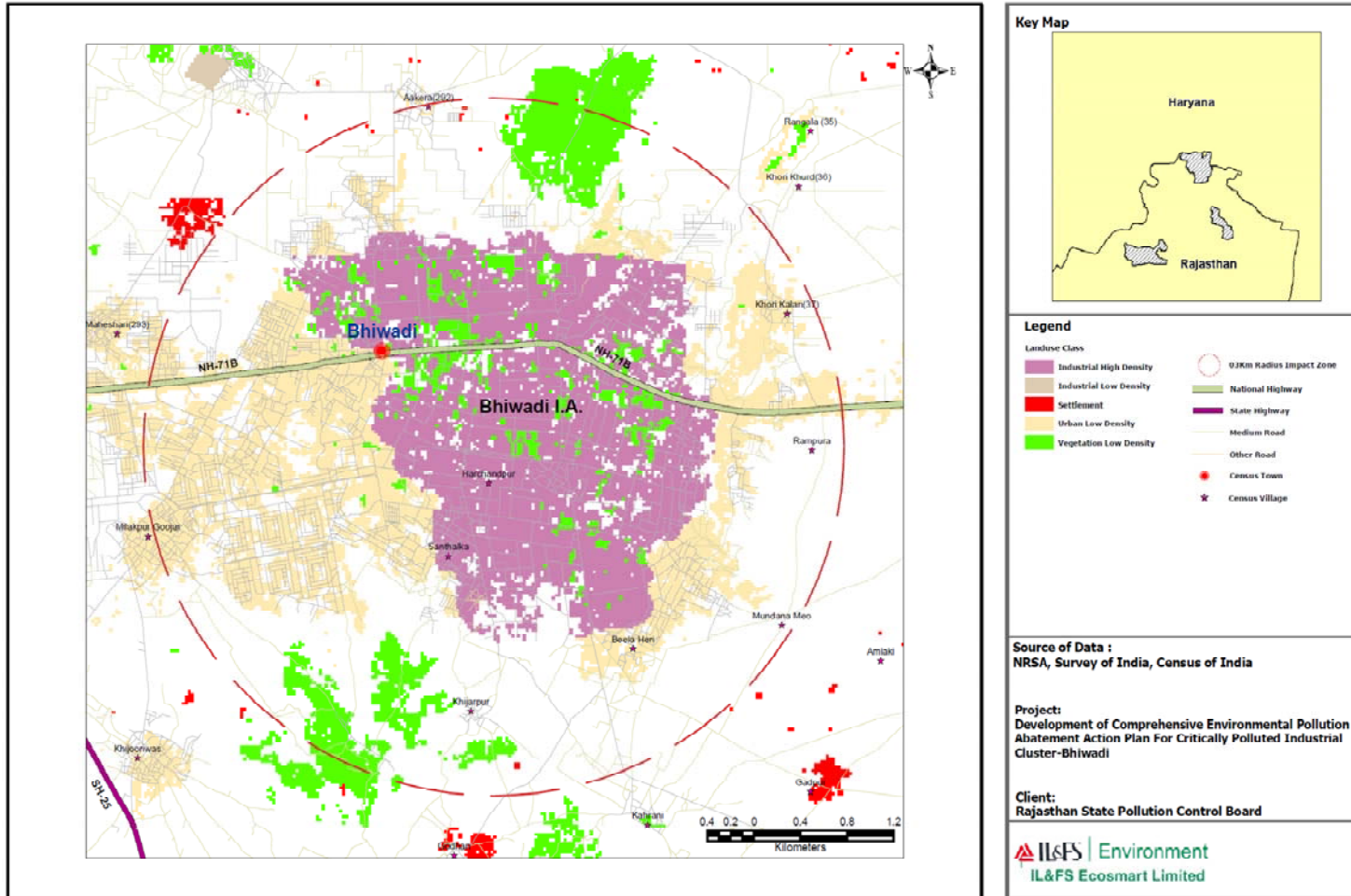


Figure 3 Location of the sensitive receptors in Bhiwadi Industrial area

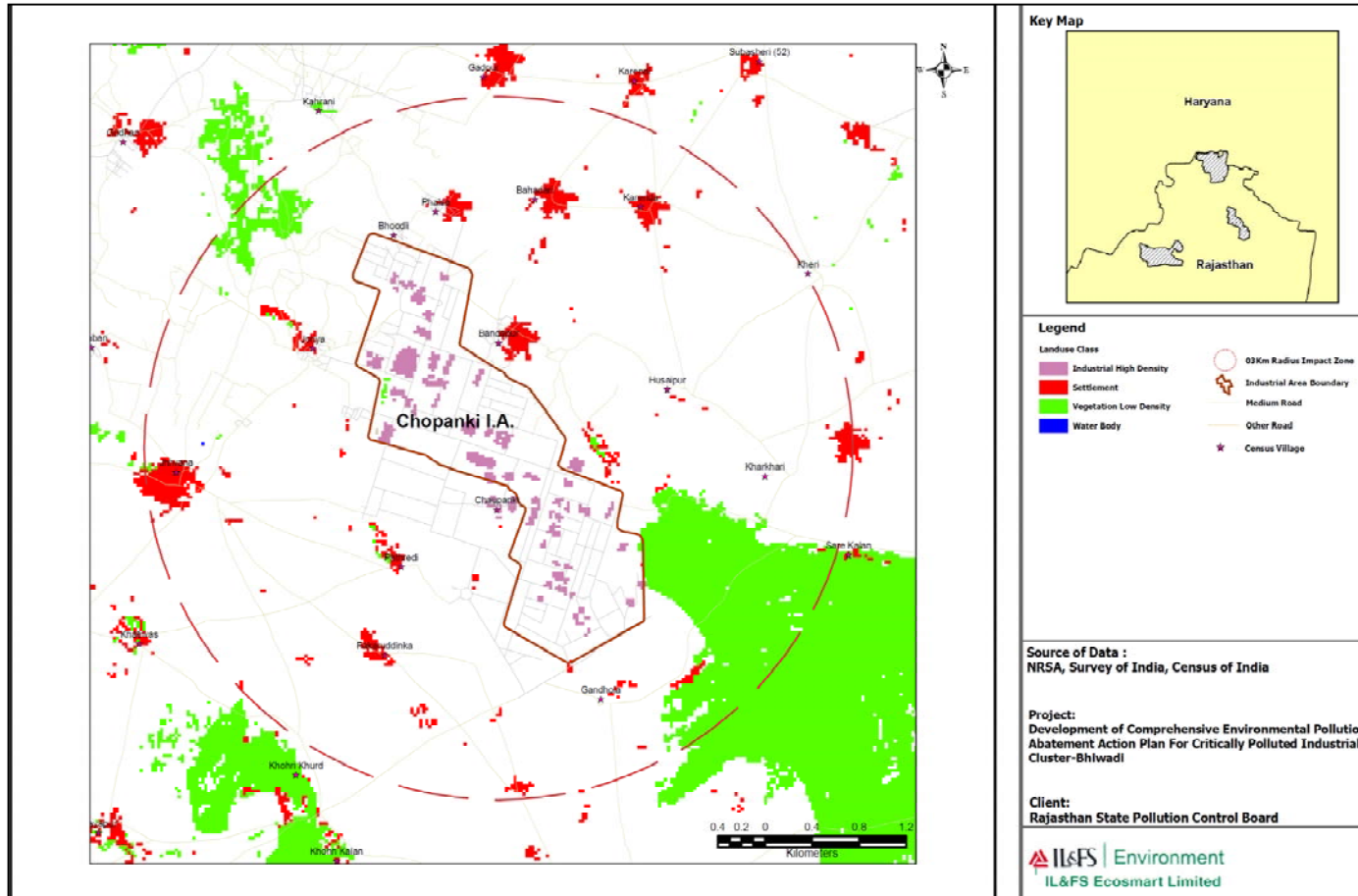


Figure 4 Location of the sensitive receptors in Chopanki Industrial area

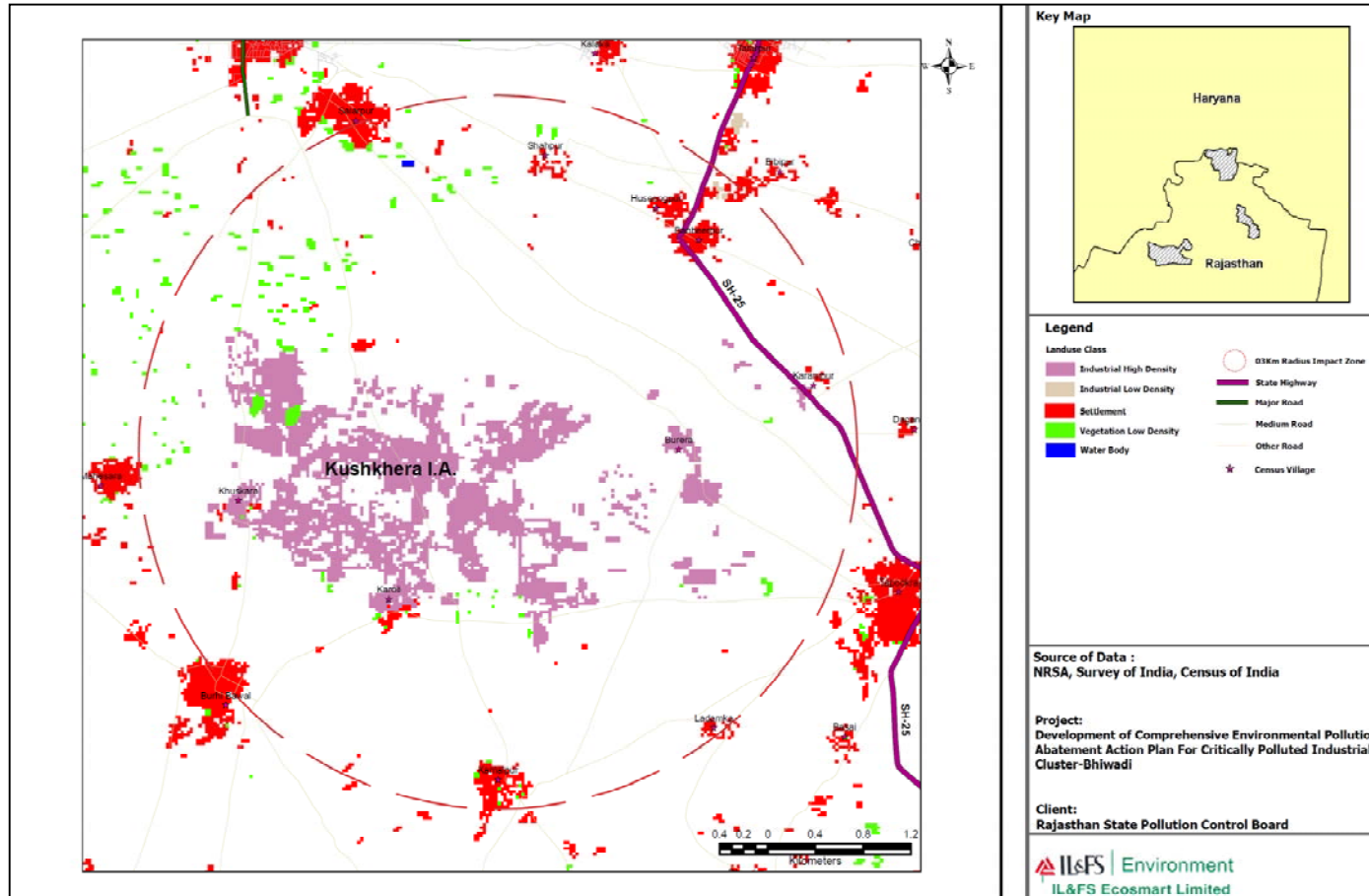


Figure 5 Location of the sensitive receptors in Khushkhera Industrial area

2.1.6. Industrial Development

Industries are playing a key role in employment generation in Bhiwadi Region and have contributed largely to increase the share of secondary sector in the economy. RIICO is the main Agency involved in Industrial Development. The Industries in this Region are distributed in eight RIICO industrial estates. Out of these, three industrial areas form a part of the CEPI study; these include:

- (i) Bhiwadi- RIICO Industrial Area - Phase I to V, Kaharani and Rampur Mundana
- (ii) Chopanki- RIICO Industrial Area - Chopanki and Pathredi
- (iii) Khushkhera- RIICO Industrial Area - Khushkhera & Tapukara

In addition, some independent industries are operating on Bhiwadi-Alwar State Highway-25 (Tijara road); these do not form a part of this study and therefore have not been discussed in this report.

At present a total of about 5000 acres is under Industrial Development within the Bhiwadi Region (refer **Table-2**). Bhiwadi, the oldest industrial area in Bhiwadi Region, is now saturated and there are no vacant plots anymore in Bhiwadi Industrial Area. The industrial areas in Chopanki and Khushkhera were established in 1995-1996. Realizing high potential of industrial development and investors' rising interest in the region two more industrial areas - Tapukara and Pathredi were developed in 2007. In 2009, Kaharani Industrial Area between Bhiwadi and Chopanki was developed. Very few vacant plots in different Industrial Areas testify fast development of industrial units in Bhiwadi Region. Kaharani Industrial Area established in 2009, has already started attracting big industrial houses for setting up their units. It is also pertinent to note that some of the industries in Bhiwadi Industrial Area are those which were directed to shift from Delhi under the Hon'ble Supreme Court orders.

Table 2: Status of Development of various Industrial Areas in Bhiwadi Region

Sr. No	Location	Year of Estab.	Developed Land (acres)	Saleable Land (acres)	No. of Plots Planned (Nos.)	Plots Allotted (Nos.)	Vacant Area (acres)	Vacant Plots (Nos.)
1	Bhiwadi I to V Ph.	1976	2075.35	1468.81	1430	1383	8.15	47
2	Kaharani	2009	1217	761.19	258	130	291.60	128
3	Rampur Mundana		63.28	41.15	271	246	4.48	25
4	Khushkhera, Phase I, II, III	1995	825.83	675.9	1017	958	20.55	59
5	Chopanki	1996	802	495.97	1107	1038	23.76	69
	Total		4983.46	3443.02	4083	3755	348.54	328

(Source: RIICO Unit I & II, Bhiwadi)

Industries in Bhiwadi Region are of varied nature. As per the State Government's Industrial Policy, more of Small Scale Industries are being promoted in the State. Total number of units in the Industrial Areas selected under CEPI study is 1066 (approx.), of which 828 units are in Bhiwadi, 103 in Khushkhera and 146 units in Chopanki Industrial Area. As seen in **Tables 3 to 5**, about 30% of the industries in the Study Area are Metal Fabrication, Non Ferrous Metals and Galvanizing units. Other major industries include Chemical and Pharmaceutical industries. Bhiwadi Industrial Area has the highest number of Red Category Units and Highly Polluting Units.

Table 3: Types of Industries in Bhiwadi Industrial Area

S. No	Type of Product	Units	Orange Category Units	Red Category Units	Highly Polluting Units	Others
1	Metal Fabrication, Non Ferrous Metals, Galvanizing	255	208	25		22
2	Plastic, Polymers, Plasticizers	41	29	0		12
3	Chemical, Pharmaceuticals, Electroplating, Dyes, Pesticides	104	90	5	8	1
4	Paints and Inks	16	15	1		0
5	Rubber, Rubber Products, Foam, Boards	44	37	3		4
6	Food Processing, Mineral water and Beverages	21	10	2		9
7	Ceramic, Marble Processing and Stone grinding	17	16	0		1
8	Textiles, Yarn, Thread Manufacturing	15	10	3		2
9	Miscellaneous	315	184	11		120
	Total	828	599	50	8	171

(Source: Regional Office – Bhiwadi, RSPCB)

Table 4: Types of Industries in Khushkhera Industrial Area

S. No	Type of Product	Units	Orange Category Units	Red Category Units	Highly Polluting Units	Others
1	Metal Fabrication, Non Ferrous Metals, Galvanizing	27	25	1		1
2	Plastic, Polymers, Plasticizers	10	7	0		3
3	Chemical, Pharmaceuticals, Electroplating, Dyes, Pesticides	18	15	2		1
4	Paints and Inks	2	1	1		0
5	Rubber, Rubber Products, Foam, Boards	6	6	0		0
6	Food Processing, Mineral water and Beverages	8	3	1		4
7	Ceramic, Marble Processing and Stone grinding	5	4	1		0
8	Textiles, Yarn, Thread Manufacturing	5	4	1		0
9	Miscellaneous	22	9	1		12
	Total	103	74	8	0	21

(Source: Regional Office – Bhiwadi, RSPCB)

Table 5: Types of Industries in Chopanki Industrial Area

S. No	Type of Product	Units	Orange Category Units	Red Category Units	Highly Polluting Units	Others
1	Metal Fabrication, Non Ferrous Metals, Galvanizing	49	39	8		2
2	Plastic, Polymers, Plasticizers	16	11	0		5
3	Chemical, Pharmaceuticals, Electroplating, Dyes, Pesticides	10	9	0	1	0
4	Paints and Inks	7	5	0		2
5	Rubber, Rubber Products, Foam, Boards	9	7	1		1
6	Food Processing, Mineral water and Beverages	7	2	3		2
7	Ceramic, Marble Processing and Stone grinding	2	2	0		0
8	Textiles, Yarn, Thread Manufacturing	4	1	0		3
9	Miscellaneous	42	21	2		19
	Total	146	97	14	1	34

(Source: Regional Office – Bhiwadi, RSPCB)

2.1.7. CEPI Score and Areas

The MoEF Office Memorandum dated March 15, 2010, lists the areas for CEPI study in the Bhiwadi Industrial Cluster. **Table-2** gives the list of areas to be covered under the Bhiwadi Industrial cluster. The Bhiwadi Cluster is ranked ‘6’ in the list of country-wide critically polluted clusters under CEPI. The environmental parameter-wise CEPI scores of Bhiwadi Industrial Cluster are listed in **Table-6**.

As a sequel to the identification of those clusters and the directions of CPCB, it is required to prepare Comprehensive Environmental Pollution Abatement Action Plan for the selected areas.

Table 6: List of Critically Polluted Areas in Bhiwadi Industrial Cluster

Sl No	Critically Polluted Industrial Area (CPA) and CEPI	Industrial Cluster / Potential Impact Zone
1	Bhiwadi CEPI - 82.91 (Ac_Wc_Ls)	a) RIICO Industrial Areas phase I to IV b) Bhiwadi Town c) Other surrounding industrial areas: Chopanki, Rampura Mundana, Khushkhera Phase I to III

Note: A – Air, W – Water, L – Land, s – severe, c - critical

Table 7: Parameter-wise CEPI Scores of Shortlisted areas in Rajasthan

Rank	Industrial Area / clusters	Air	Water	Land	CEPI	Comment
6	Bhiwadi	71.00	69.00	59.50	82.91	Ac Wc Ls

Note: A/W/L: Air/ Water /Land; c/s: Critical/Severe

The map showing impact zones and geographical boundaries of the polluted clusters in Bhiwadi has been presented in **Figure 1**.

2.2. Water Environment

2.2.1. Water Resources

Surface Water

There is no perennial river in this Region. The only seasonal river which flows through the western part of Bhiwadi Region is Sabi River. Sabi River is about 23kms from the Bhiwadi Cluster. The river originates in the Sewar hills (Jaipur district) and flows in a general North-Eastern direction passing through Bansur, Behror, Mandawar, Kishangarh and Tijara tehsils. It carries away the water of the western slope of the central range of the Aravali hills.

Groundwater

Groundwater is the major source of water in Bhiwadi Region for all practical purposes. Groundwater is mainly found in old alluvium layer of the soil. It is one of the groundwater potential zones (Figure-6, 7) where yielding in old alluvium varies from 50-200 m³/day. Groundwater potential of the alluvial aquifers is good and equal everywhere due to uniform distribution of rainfall, effective porosity and geometry of the aquifers. As per Groundwater Department of Alwar district, groundwater is over exploited in entire Alwar district (Figure 6, 7).

Table 8: Depth to Water Level (in meters below ground level) for Bhiwadi Industrial Cluster

Sr. No	Location	Type of Well	Year	Month			
				Jan	May	Aug	Nov
1	Tijara, Alwar	Tube well	2005	21.27	21.13	21.08	21.06
			2006	21.72	21.47	20.98	21.14
			2007	21.57	21.45	21.05	21.82
			2008	22.13	22.16	21.94	No data
			2009	22.47	22.72	22.80	22.67
2	Tapukara, Alwar	Tube well	2005	19.96	19.9	20.12	19.1
			2006	19.91	20.06	19.19	19.37
			2007	20.72	19.66	19.93	20.67
			2008	20.56	20.6	20.26	No data
			2009	21.57	21.16	20.86	21.46

Source: Central Ground Water Board

Since Bhiwadi Region does not have any perennial surface water resource, industries in this area depend completely on groundwater for their water supply needs. RIICO has 33 tube wells for supplying water in three industrial areas viz. Bhiwadi, Khushkhera, and Chopanki. Other than these, industrial units have their own tube wells within their premises. RIICO has

pumping and storage system to supply 89.5 lakh liters of water per day and has a 133.6 kms long network of water pipeline⁵.

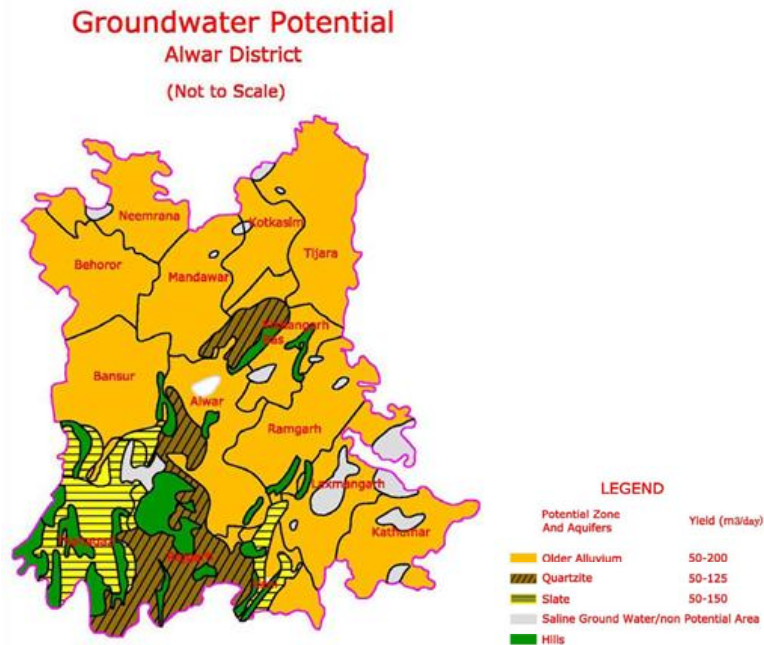


Figure 6: Groundwater Potential in Alwar District

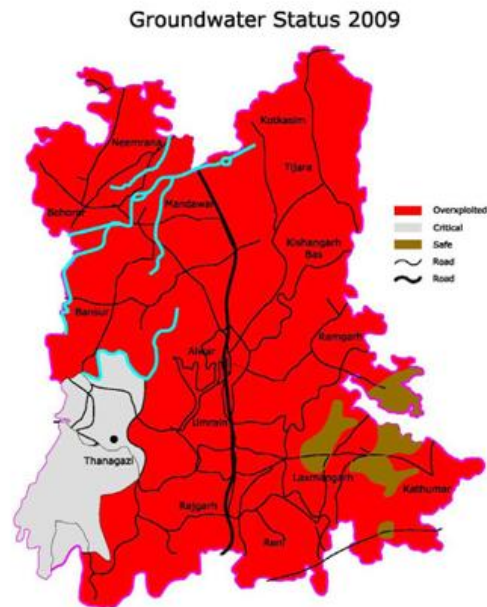


Figure 7: Groundwater Status of Alwar District, 2009

⁵ Source: Master Plan for Bhiwadi-Tapookara-Khushkhera Complex - 2031, Draft Report prepared by Town Planning Department, Government of Rajasthan.

2.2.2. Water Quality

The RSPCB has monitored groundwater at designated stations under the National Water Monitoring Program. Table-9 provides the water monitoring results in the last 3 years.

Table 9: Chemical Analysis Results of Stations in Bhiwadi Industrial Cluster as reported by RSPCB

MONITORING DATE	May-07	Oct-07	Apr-08	Nov-08	Apr-09	Oct-09
Handpump of Shri Ratiram, Village Santhalka (Station Code-1709)						
pH	8.16	7.64	8.36	8.12	7.18	7.36
Dissolved Oxygen, mg/l	4.79	3.2	3.8	6.59	3.07	2.6
B.O.D.3 days at 27 °C	0.66	1.75	0.15	1.57	0.09	0.17
Conductivity , µmho/cm	2000	2400	3200	680	2800	3000
Handpump Near Indraprastha Public School, Bhiwadi (Station Code-1712)						
pH	8.37	7.92	8.45	8.07	7.38	7.47
Dissolved Oxygen, mg/l	4.9	5.3	4.1	7.56	4.74	3.19
B.O.D.3 days at 27C	0.2	1.05	0.4	2.81	0.35	0.38
Conductivity , µmho/cm	1140	1110	1100	680	1240	1540
Hand Pump Of Shri Jagdish Bhati, Village Ghatal Bhiwadi (Station Code-1713)						
pH	8.41	7.98	8.81	8.21	7.64	7.95
Dissolved Oxygen, mg/l	4.59	6.3	4.4	5.94	4.93	3.78
B.O.D.3 days at 27C	0.36	1.15	0.25	3.24	0.54	0.55
Conductivity , µmho/cm	1150	750	1260	560	1620	1640
Handpump Of Shri Dulichand, Village Alupur (Station Code-1710)						
pH	7.99	7.83	8.42	8.01	7.8	7.62
Dissolved Oxygen, mg/l	5.61	1.3	4.3	5.94	5.02	3.78
B.O.D.3 days at 27C	1.07	1.8	0.3	0.81	0.47	0.17
Conductivity , µmho/cm	910	700	1000	680	620	800
Hand Pump Infront Of M/S Kundan Ediable, Kushkhera (Station Code-1711)						
pH	7.89	7.76	8.7	8	7.41	7.42
Dissolved Oxygen, mg/l	4.69	4.2	3.9	7.02	3.52	2.6
B.O.D.3 days at 27C	1.17	0.8	0.1	0.81	0.26	0.08
Conductivity , µmho/cm	290	1350	1400	690	1800	2200

Source: National Water Monitoring Program, RSPCB

Table 10: Chemical Analysis Results of Groundwater in Bhiwadi Region as reported by CGWB

S. N	Paramet ers	Units	IS:10500 Desirable	IS:10500 Permissible	2006-2007		2007-2008		2008-2009
					Tapukara	Tapukara	Tijara	Tapukara	
1	pH	-	6.5-8.5	6.5-8.5	8.12	7.63	7.57	8.78	
2	EC, at 25° c	µmhos /cm	NA	NA	870	920	1225	800	
3	CO ₃	mg/l	NA	NA	0	0	0	60	
4	HCO ₃	mg/l	NA	NA	488	525	671	244	
5	Cl	mg/l	250	1000	28	35	57	43	
6	SO ₄	mg/l	200	400	12	12	35	40	
7	NO ₃	mg/l	45	No Relaxation	30	33	42	40	
8	PO ₄	mg/l	NA	NA	0.65	0.29	0.35	0.14	
9	TH	mg/l	300	600	210	250	320	190	
10	Ca	mg/l	75	200	44	48	36	28	
11	Mg	mg/l	30	100	24	32	56	29	
12	Na	mg/l	NA	NA	125	125	177	112	
13	K	mg/l	NA	NA	0.4	1	0.4	0.1	
14	F	mg/l	1	1.5	1.05	0.92	0.74	1.09	
15	Fe	mg/l	0.3	1	0.96	2.61	2.36	1.66	
16	SiO ₂	mg/l	NA	NA	17	16	15	27	
17	TDS	mg/l	500	2000	566	598	796	520	

Source: Groundwater Year Book, CGWB for 2006-07, 2007-08 and 2008-09

The Central Groundwater Board (CGWB) carries out monthly monitoring at National Hydrograph Network Stations located in this Region. Most of the parameters are higher than the desirable standards but, within the permissible limits (refer **Table-10**).

2.2.3. Sources of Water Pollution

Industrial

Water pollution in this Region is mainly due to engineering, galvanizing, electroplating, chemical and pharmaceutical industries. Textile industries which are largely water polluting, are very few in number in the Bhiwadi Region. Wastewater from the industries after primary treatment within premises is transported to the CETP through open drains. Treated waste water from the CETP is disposed off in the Sabi River which is 23kms away.⁶

Domestic

There is no piped sewerage system for management of domestic sewage. Many a times the sewage from industrial as well as residential areas had outfall into drains meant for industrial effluent, thus reaching the CETP. This has increased the load on the existing CETP. Domestic sewage in some areas gets accumulated in low lying lands as stagnant water leading to unhygienic conditions.

2.2.4. Disposal of Effluents

Quantity of industrial effluent generated in the Bhiwadi Industrial Cluster is about 6MLD. In addition, domestic effluent from the Bhiwadi town amounts to about 3-4 MLD. Wastewater generated from the industries flows through open storm water drains in most of the industrial areas. Present status, as provided by RSPCB, in Bhiwadi industrial areas is as follows⁷:

- i. Wastewater flows up to CETP through open drains which are not being maintained properly and are in damaged condition. Therefore untreated effluent finds its own way from the damaged drains and gets accumulated in the form of cess pools in open lands near the drains.
- ii. Besides wastewater from CETP has been found to flow occasionally towards residential colonies of Bhiwadi, particularly when untreated effluent is by passed from the CETP either because of shutdown / break down or power failure or in the situation of excess volume of effluent reaching at inlet to CETP.

⁶ As per information given during site visit to CETP, Bhiwadi

⁷ Source: Rajasthan Pollution Control Board

- iii. At present treated and/or partially treated effluent is discharged into *nallah* directly or through pipe line and the same ultimately finds its way into the agriculture fields in the surrounding villages.
- iv. Wastewater disposed off in this manner sometimes flows into agricultural fields across the boundary with Haryana. This has created some interstate disputes.
- v. The domestic effluent generated from Bhiwadi Town and nearby residential colonies have their outfall into the open drains due to absence of any sewerage system. Due to this the volume of effluent reaching the CETP has always been found in excess of the designed capacity, i.e. 6 MLD.

2.2.5. Existing Infrastructure Facilities

2.2.5.1. Water Quality Monitoring Network

Under the National Water Monitoring Program, RSPCB has set up 5 stations in the Bhiwadi Region. These stations include hand pumps located at Ghatal Village, Santhalka Village, Alupur Village, Indraprastha Public School and M/s Kundan Edibles. Pre-monsoon and post-monsoon monitoring is carried out on a regular basis at all these stations. In addition, specific industrial areas should also be considered for establishment of new monitoring stations. This would help in regular and more specific monitoring of water level and quality in this Region.

2.2.5.2. Common Effluent Treatment Plant⁸

In the year 2003-04, Bhiwadi Industrial Development Authority (BIDA) constructed a CETP of 6 MLD capacity to treat the effluent from industries. The project cost of Rs. 122.25 lakhs was met through grant under ASIDE with Rs. 61.12 lakhs grant from GoI and Rs. 61.13 lakhs grant from State Government. A Samiti of entrepreneurs from Bhiwadi I. A. was formed in 2007 in the name of Bhiwadi Jal Pradushan Niwaran Avum Anusandhan Samiti for undertaking the work of up-gradation/modification of existing CETP and its operation and maintenance.

Table-11 gives characteristics of the influent effluent of the CETP. A pipeline is proposed for discharge of treated effluent from CETP in Bhiwadi into the Sabi River. However, the environmental impacts of the proposed project are to be studied.

⁸ Source: Rajasthan State Industrial Development and Investment Corporation Ltd. (RIICO)

Table 11: Characteristics of Inflow and Outflow at CETP, Bhiwadi

Sr. No.	Characteristics	pH	BOD	COD	TSS	Oil & Grease	Lead	Iron	Zinc
	Standards for Final Treated Effluent	5.5-9.5	30 mg/l	250 mg/l	100 mg/l	10 mg/l	0.1 mg/l	3 mg/l	5 mg/l
1	Influent coming to CETP	3.23	79	441	468	8	189.25	5.77	2.55
2	Final Treated Effluent from CETP	6.89	62	304	172	7	0.325	8.78	0.20

Source: RSPCB, 2009

In February 2010, the CETP was upgraded with the addition of Physico-Chemical Treatment. The CETP is still inadequate and inefficient to treat the entire effluent from Bhiwadi Industrial Cluster up to the desired standards. There is no provision for biological treatment and sludge handling at the existing CETP.

This CETP serves only the Bhiwadi Industrial Area and does not cover industries in Chopanki and Khushkhera. Industries in these areas are less effluent generating units, however, in the absence of a treatment facility wastewater is being disposed off in the low lying areas. Chopanki and Khushkhera are at a lower level compared to Bhiwadi hence, one CETP at Bhiwadi cannot serve other industrial areas. Independent CETPs serving industries in Chopanki and Khushkhera are required. A detailed study shall have to be conducted for determining the capacity of the CETPs in these areas and their appropriate locations to better serve the waste water treatment needs.

2.2.5.3. Surface Drainage and Effluent Conveyance

Presently, open drains have been provided for carrying the industrial effluent to the CETP. These open drains are being used for direct discharge of domestic effluent and untreated effluent from industries. Due to this, there is increased load on the CETP.

2.2.6. Action Plan for Control of Pollution

2.2.6.1. Pollution Control Measures by Industries

As per RSPCB records, nearly 90% of the units in Bhiwadi Industrial Area have full-fledged effluent treatment plants (ETP) within their individual premises. While, units in Chopanki, Khushkhera and Kaharani do not have ETPs within their premises as units in these areas are

less effluent generating. Some of the larger industries⁹ in Bhiwadi are investing in installing tertiary treatment facilities within their premises.

2.2.6.2. Rainwater Harvesting

In order to recharge groundwater, measures such as development of groundwater recharging structures are being insisted upon by RSPCB and RIICO in the existing and proposed industries.

2.2.6.3. Infrastructure Renewal

CETP and STP

The existing CETP at Bhiwadi Industrial Area needs to be up-graded further with provisions for de-silting and oil & grease removal. The work of upgrading the existing CETP from 6 MLD to 9 MLD with the above provisions will be completed by BJPNT by March 2012. The work has been awarded to M/s.Bivija Infrastructure Pvt. Ltd, Jaipur.

The existing CETP of 6 MLD is being augmented to 9 MLD to take care of the hydraulic load. This capacity of 9 MLD could either be further enhance to 15 MLD or alternatively, RICCO should consider establishing an all to gather a new CETP of 10 MLD capacity.

Independent CETPs serving industries in Chopanki and Khushkera are required. The proposal of establishing CETPs of approximately 5 to 7 MLD for Chopanki and Khushkera are under consideration of RIICO. Besides, RIICO is also condering establishing a CETP of 5 to 7 MLD capacity for industrial areas of Kaharani, Pathredi and Tapukada. It is necessary to provide closed conduit conveyance system to carry the effluent from the industries in Bhiwadi to the CETP. The work of Stage I of laying of closed conduit from Central Market to CETP and Parshvnath Mall to CETP shall be completed by end of December 2011 and for stage II RIICO is in process to call revised tenders for closed conduit work in the industrial area of Bhiwadi. The length of stage I & stage II lines shall be 3.8 kms & 72 kms, respectively.

Connections of all effluent generating industries to the closed conduit system shall be done after completion of stage II work.

⁹ For example, Nahar Textile Mills in Bhiwadi Industrial Area are in the process of installing a RO Plant of 1000 Cu.M. capacity at a cost of 5 Crores.

For separation of domestic sewage from the industrial effluent, construction of STP with 4 MLD capacities is under progress. This is being implemented through the Urban Improvement Trust (UIT), Bhiwadi. Laying of sewer line is also in progress.

Effluent Conveyance System

For separation of storm water/domestic sewage from the industrial effluent, a dedicated closed conduit conveyance system for industrial effluent is proposed in the Bhiwadi Industrial Area. This would also help the RSPCB in better monitoring and enforcement. The existing open drains shall then be used only for disposal of storm water. A closed conduit system should also be planned for industries in Chopanki and Khushkhera.

2.2.6.4. Impact on CEPI Score

If all the recommendations for improving the water environment are implemented in a timely manner, CEPI score for 'Water' is expected to reduce by nearly twenty points. The CEPI Score post implementation of Action Plan will be 48.

Table 12: CEPI Score for Water Environment Post Implementation of Action Plan

S. No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index, Water
1	Existing	3	5	15	8	3	3	14	5	5	0	25	15	69
2	Post Action Plan	3	5	15	4.5	3	3	10.5	5	3.5	0	17.5	5	48

2.2.6.5. Managerial and Financial Aspects

Estimated Costs

- Estimated cost for up-gradation of the existing CETP is about 2.17 crores.
- Estimated cost for new CETPs at Chopanki, Khushkhera and Kaharani, Pathredi & Tapukada is about 7-8crores each.
- The estimated cost of the 4 MLD STP under progress is about 17.24 crores.

Time-frame for Implementation

- Proposed up-gradation of the existing CETP can be completed by December 2011.
- The proposed effluent conveyance system which is underway at Bhiwadi Industrial Area is expected to be completed by March 2012.
- The proposed STP for Bhiwadi Town is due to be completed by March 2012.
- Proposed new CETP and closed conduit effluent conveyance system for Khushkhera and Chopanki would take about 2-3 years.

2.2.6.6. Monitoring System

A continuous monitoring system should be installed at each of the CETPs to check on the quality of influent and effluent. Once the closed conduit effluent conveyance system is fully functional, monitoring devices could also be installed at the outlet points of the industries and the inlet points of the CETPs. Data from the conveyance system and CETPs in turn should be linked to the database at the RSPCB Regional Office (RO) at Bhiwadi. This would help the Environmental Engineer In-charge at the RO to keep a check and identify defaulters immediately.

2.3. Air Environment

2.3.1. Present Status

Ambient Air quality monitoring is not carried out on a regular basis in Bhiwadi. Bhiwadi is not included under the National Ambient Air Quality Monitoring Program (NAAQM); hence there is no regular monitoring station in this Region. The nearest monitoring station is Alwar.

Table-13 presents ambient air quality data for the period 2009-10 for both industrial and non-industrial areas. It shows that SPM and RSPM levels are higher than the prescribed standards in both industrial as well as non-industrial areas. Practice of using high calorific value waste materials as a source of fuel may lead to adversely affecting the air quality of the industrial region.

Table 13: Ambient Air Quality Monitoring Data in Bhiwadi Region for the period 2009-10

Sr. No.	Point of Sample Collection	Parameter			
		SPM ($\mu\text{g}/\text{m}^3$)	RSPM ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)
	STANDARDS (24hrs)	100	60	80	50
1	RO, RSPCB	611	210	8.7	17.4
2	Near M/s Medicamen Biotech	1049	316	22.0	18.6
3	H.N. 3/24 HB Colony	779	217	16.9	27.8
4	Near M/s Ocap Chesses Part P. Ltd.	1008	340	12.7	23.1
5	Near United Braveries, Chopanki	765	180	8.7	13.9
6	Near ROCA Bathroom Products Ltd.	629	153	13.1	19.3

Source: Regional Office-Bhiwadi, RSPCB

Note: Monitoring has been done in both industrial and non-industrial areas.

2.3.2. Sources of Air Pollution

Major contributors to air pollution in this Region are the industries. Major industries in Bhiwadi Industrial Area include forging, galvanizing, chemical and pharmaceutical units. Other units contributing majorly to air pollution include lead battery recycling units.

Industries in this Region mainly use husk, coal, pet coke, furnace oil, Light Diesel Oil (LDO), High Speed Diesel (HSD), wood, Low Sulphur Heavy Stock (LSHS), LPG, etc. as fuel. In addition, unauthorized waste material used as fuel by many small scale units is adversely affecting the air quality in this Region. This material is carpet waste/fibers being sourced at a low cost from automobile industries in Rewadi and Manasar in the National Capital Region (NCR).

As per a study conducted by CPCB¹⁰ in 2006, Lead concentration in ambient air was found in the range of 0.99 $\mu\text{g}/\text{m}^3$ to 13.21 $\mu\text{g}/\text{m}^3$. This may be because of inadequate air pollution control system in the recycling industrial units of lead battery scrap. Concerned about the high ambient levels of lead, RSPCB is presently carrying out air quality analysis to quantify the traces of lead in ambient air. Health studies need to be conducted to assess the impact of lead pollution on the local population.

Air pollution due to movement of heavy vehicles was observed during the field visit. Unpaved roads and improper road conditions contribute to ambient air pollution.

2.3.3. Action Plan for Compliance and Control of Pollution

2.3.3.1. Ambient Air Quality Monitoring Network

At present, Bhiwadi does not have any functional continuous air monitoring stations. A proposal for establishing monitoring stations under the NAAQM Program was recently approved by the CPCB.

RSPCB has identified 3 sites for ambient air quality stations in Bhiwadi industrial area. In addition 2 AAQM stations are being considered for the residential areas in Bhiwadi by RSPCB. RSPCB is also considering establishment of 2 AAQM stations in Khushkhara industrial area and 2 AAQM stations in Chaupanki industrial area.

¹⁰ Source: [http://www.cpcb.nic.in/Highlights/2006/ASSESSMENTOFPOLLUTION\[1\].pdf](http://www.cpcb.nic.in/Highlights/2006/ASSESSMENTOFPOLLUTION[1].pdf) as accessed on Aug 1, 2010. The report titled, 'Assessment of Pollution – Case Studies' prepared by CPCB, 2006.

2.3.3.2. Pollution Control Measures

- The highly air polluting industry, the production should be stopped in case of failure of the air pollution control equipment and should not be restarted unless the APC equipment is fully repaired and certified by the RSPCB as fit to prevent and control the air pollution.
- Prohibit illegal burning of wastes substances as fuels in the industrial and residential areas
- Development of proper road infrastructure in all the existing and proposed industrial areas
- Plantation of trees along roads and allocated open spaces within the industrial areas.
- Time bound replacement of Air polluting fuels (firewood, husk, coal, etc) with the cleaner fuels.

At present, nearly 30 medium and large scale units in Bhiwadi Cluster have installed air pollution control devices.

2.3.3.3. Impact on CEPI Score

Impact on the CEPI score after installation and commissioning of air pollution control systems has been calculated as under:

Table 14: CEPI Score for Air Environment Post Implementation of Action Plan

S. No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index, Air
1	Existing	6	5	30	6	0	0	6	5	5	0	25	10	71
2	Post Action	3	5	15	6	0	0	6	5	3.5	0	17.5	10	48.5

The CEPI Score is expected to reduce to 48.5.

2.3.3.4. Time-frame for Implementation

- All industries should be directed to install adequate air pollution control equipment with immediate effect.
- Repair and maintenance works of existing roads should be commissioned with immediate effect.
- Development of new roads would require more than one year; including planning, tendering and commissioning of works.

- Study of Health Impacts due to Lead Pollution (Rapid epidemiological study) will require at least one year for having a comprehensive understanding on the issue.

2.3.3.5. Monitoring System

The work of stack emission monitoring of the identified major air polluting industries in the industrial cluster would be taken up by the State Board in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the emission standards notified under EP Rules '86.

RSPCB has identified 3 sites for ambient air quality stations in Bhiwadi industrial area. In addition 2 AAQM stations are being considered for the residential areas in Bhiwadi by RSPCB. RSPCB is also considering establishment of 2 AAQM stations in Khushkhera industrial area and 2 AAQM stations in Chaupanki industrial area.

2.4. Land Environment

2.4.1. Soil Contamination

Soil contamination studies have not been conducted for Bhiwadi Region.

Industrial wastewater at many pockets in Khushkhera and Chopanki areas drains into open low lying areas. Productive agricultural land is rendered unusable due to stagnation of waste water in these areas. Wastewater from the low lying areas flows further downstream into areas of Haryana State. This has created local agitation and cross-border issues between Rajasthan and Haryana.

Other source of soil contamination is indiscriminate dumping of municipal as well as industrial solid waste into open lands.

2.4.2. Groundwater Contamination

Groundwater contamination studies have not been conducted in the Bhiwadi Region.

2.4.3. Action Plan for control of pollution

- To avoid overflowing of wastewater into open lands, appropriate closed conduit conveyance system should be provided to carry the wastewater from the industries to the CETP.

- Stoppage of open dumping and identification of a site for setting-up of a designated municipal solid waste management facility.
- ETP sludge should not be allowed to be used for land application as well as dumping in the open places in the Industrial area.
- Also, due to the groundwater depletion, rainwater conservation measures and other techniques for recharging groundwater need to be looked at.

2.4.4. Impact on CEPI score after Abatement of Pollution

The present CEPI score for Land Environment is just below 60 indicating severely polluted condition. With the action points as suggested in the previous section, the score would further reduce to 47.

Table 15: CEPI Score Post for Land Environment Implementation of Action plan

S. No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index, Land
1	Existing	3	5	15	7	3	4.5	14.5	5	3	0	15	15	59.5
2	Post Action Plan	3	5	15	4.5	3	4.5	12	5	3	0	15	5	47

2.5. Waste Generation and Management

2.5.1. Hazardous waste¹¹

Present status of Compliance of Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 in Rajasthan

The RSPCB is regularly conducting survey, inspections of hazardous waste generating units for compliance of Hazardous Waste (MH & TM) Rules, 2008 and subsequent amendments. The RSPCB has identified 785 units up to end of June 2010 which is covered under the HW (MH & TM), 2008. Out of identified 785 industries, 115 industries are closed since long or dismantled or closed subsequent to the directions issued by the RSPCB for violation of the provisions of HW (MH & TM) Rules, 2008; 28 industries discontinued their hazardous waste generating process, 62 units are identified under pharmaceutical/pesticides formulation sector which are generating bare minimum quantity of hazardous waste in form of off-specification products during formulation or expiry of products and 97 units generate hazardous waste as spent oil from their D.G. Sets, compressors or system. Thus the number of potential hazardous waste generating units in the State is only 483.

¹¹ Source: Inventory of Hazardous Waste Generation Units in Rajasthan & Action Taken Report (up to 30.06.2010), Rajasthan Pollution Control Board.

Present Status of Hazardous Waste in Bhiwadi Industrial Area

Hazardous waste generated in Alwar District amounts to 6.21% of the total waste generated in the State. Total Hazardous Waste (HW) generation in Alwar District is about 11043.26 MTA (metric tonnes per annum). Hazardous waste generated in Bhiwadi region amounts to nearly 50% of the total hazardous waste generated in Alwar District. Inventory of the types and quantity of hazardous waste generated in Bhiwadi Region is presented in **Table-17**.

Hazardous waste generated through processes listed in Schedule-I of the Hazardous Waste (M, H & T) Rules, 2008 amounts to 5957.62 MTA and there is no waste generated through processes listed in Schedule-II. Out of the total hazardous waste, 3258.16 MTA is land disposable, 430.22 MTA is incinerable and 2269.24 MTA is recyclable. Large numbers of discarded containers which are hazardous are also found in the area.

Table 16: Inventory of Hazardous Waste Generated in Bhiwadi Region

Sr. No	Industrial Area	Hazardous Waste Generated			Hazardous Waste Disposal			
		Schedule - I (MTA)	Schedule - II (MTA)	Total (MTA)	Land Disposable	Incinerable	Reprocessible	Discarded Containers
1	Bhiwadi	5396.578	0	5396.578	3219.818	62.72	2114.04	490
2	Chopanki	538.2	0	538.2	35.6	367.5	135.1	0
3	Khushkhera	22.84	0	22.84	2.74	0	20.1	0
	TOTAL	5957.618	0	5957.618	3258.158	430.22	2269.24	490

Source: Solid Waste Management Cell, RSPCB

Hazardous Waste Disposal

At present, there is no infrastructure availability for disposal of hazardous waste in the Bhiwadi Industrial Clusters. All industries send their hazardous waste to the Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) at Gudli Village in Udaipur, which is currently the only hazardous waste disposal site in the State.

Hazardous waste also includes the sludge from the CETP. The CETP in Bhiwadi is registered with the CHWTSDF at Udaipur. A hazardous waste collection van comes to the CETP premises every alternate day to collect the process waste. Most of the industries in this Region are also registered with the CHWTSDF at Udaipur; collection vehicle visits the industry premises once in 90 days as per regulations.

2.5.2. Biomedical Waste

The Census Town of Bhiwadi was declared a Municipal Council only last year. Not many medical facilities are available in this area. As per the inventorization carried out by the RSPCB Regional Office at Bhiwadi eight Health Care Establishments (120 beds) are

operating in Bhiwadi area. Khushkhera and Chopanki do not have any medical facilities. As per preliminary estimates of the RSPCB Regional Office at Bhiwadi, total Biomedical Waste generated in this Region is approximately 550 kgs per month.

There is a common incinerator for biomedical waste disposal at Alwar. All the Health Care Establishments in Bhiwadi are registered with this common facility. A collection vehicle collects the waste from the establishments within the prescribed 90 days time as per regulations.

The RSPCB is monitoring the disposal of biomedical waste in accordance with the provision of Bio Medical Waste (Handling & Management) Rules'1998. The disposal facility requires augmentation for the compliance of CPCB guidelines for treatment and disposal facility of BMW.

2.5.3. *Municipal Solid Waste*

As per Urban Improvement Trust (UIT), 5 tons of waste is collected and transported daily. Collection of solid waste is being done in limited areas of UIT and Rajasthan Housing Board (RHB) through private contractor. Door-to-door collection, street sweeping and cleaning of drains, cleaning and maintenance of public toilets are being done in UIT and RHB areas. Waste is collected once a day. Collection and transportation of waste is done through a Private Agency. But no segregation of waste is done either at source or at the time of disposal. In areas, not covered under waste collection, waste is dumped on vacant plots and left unattended. In absence of any designated dumping ground/ landfill site, private agency entrusted with the task of waste management is dumping waste indiscriminately in open areas.

RIICO also manages solid waste in its industrial areas through private contractors. This includes cleaning of drains twice in a year, cleaning of area once in a year, cleaning of dustbins twice a month and regular cleaning of roads and dead animals in the industrial areas through another private agency. In addition, individual industries have their own arrangements; they generally employ private contractors for the purpose. There is no designated sanitary landfill site to dispose-off industrial or municipal waste. Thus, silt, construction debris, fly ash etc. are being dumped indiscriminately.

The Municipality Bhiwadi has requested the district administration for allotment of the land so that necessary DPR can be prepared as actions taken for establishing scientific MSW collection, transportation, treated and disposal facility.

2.6. Public awareness and Capacity Building

The RSPCB has recently undergone complete restructuring for better management of the State Board activities. Under this restructuring process following new cells/departments were established at the RSPCB Head Office in Jaipur:

- Planning & Internal Capacity Building Cell
- Technical Cell - 3 Nos, based on various types of industries
- Vigilance Task Force
- Mining Cell
- Solid Waste Management Cell- HW/BMW/MSW/Plastics/e-Waste
- Climate Change Cell
- Miscellaneous Urban Infrastructure Development Cell
- Public Awareness and Assistance Centre
- IT Support and E-governance Cell
- Legal Cell
- Central Laboratory
- Accounts
- Administration and Cess

In addition to monitoring and enforcement, the RSPCB is taking initiatives in the issues and activities related to Public Environmental Education, Awareness and Assistance. Following activities are included in the agenda for public awareness:

- Distribution of promotional literature
- Well established library facility
- Dissemination of information on issues related to brick kilns and lime kilns
- Awareness creation on issues related to Noise Pollution and Noise Pollution (Regulation & Control) Rules, 2000.
- Environmental awareness programs on FM Radio.

RSPCB must establish full set up of the regional office at Bhiwadi to monitor the implementation of action Plan and enforcement of regulatory region.

The technical side of staff should have 1 Environmental Engineer, 2 nos. Assistant Environmental Engineer, 3 nos. Junior Environmental Engineer, supporting staff, computer facility, laboratory facility and transportation facility. The scientific side of staff should have 1 nos. Scientific Officer, 2 nos. Junior Scientific Officer, 2 nos. Senior Scientific Assistant.

Training and capacity building of the RSPCB staff is underway. Regular training programs in various technical as well as administrative spheres are being conducted for strengthening of central and regional laboratories. e-Governance is being introduced for faster and better Consent Management and efficient monitoring of environmental infrastructure facilities such as air and water monitoring stations, CETPs, STPs, etc.

2.7. Summary of Proposed Action Points

The proposed Action Plan for abatement of pollution is based on the secondary data collected from RSPCB and other concerned agencies. The action points mentioned have been categorized into Short Term and Long Term Measures (refer **Table-18**) based on the timeframe required for their implementation. Short Term Action Points include measures that require one year or less for implementation i.e., December 2012, while the Long Term Action Points include measures that require time beyond one year for implementation.

Table 17: Final Action Plan for Bhiwadi Industrial Cluster: Short Term and Long Term Action Points - (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
Short Term Action Plan- Air					
1.	Development of ambient air quality and stack emission monitoring facilities by the State board	RSPCB, Industries, Industries Association	June 2012	Approx. Rs. 25 -30 lakhs	To strengthen the monitoring of major air polluting industries. The State Board should develop its facilities along with required man power.
2.	Performance monitoring of major air polluting industries for assessment of compliance of the notified air emission standards.	RSPCB, RIICO Industrial Association, CTEP Trust	June 2012	Approx. Rs. 25-40 lakhs	The work of stack emission monitoring of the identified major air polluting industries in the industrial cluster would be taken up by the State Board in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the emission standards notified under EP Rules '86.
3.	Improvement and up gradation of APCM in induction furnaces & lead recycling industrial sectors	RSPCB, Industries, Industries Association	December 2012	The cost may vary from industry to industry	The State Board has directed the industries for improvement in operation & maintenance of APCM & their up-gradation. Air monitoring of units is being carried out as per prescribed frequency by the RSPCB to evaluate the performance of APCM.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
4.	Installation and operation of air monitoring stations at the periphery of each industrial area	RSPCB/RIICO	June 2012	Approx. Rs. 75 Lakhs	RSPCB has identified 3 sites for ambient air quality stations in Bhiwadi industrial area. In addition 2 AAQM stations are being considered for the residential areas in Bhiwadi by RSPCB. Alongside this RSPCB is also considering establishment of 2 AAQM stations in Khushkhera industrial area and 2 AAQM stations in Chaupanki industrial area.
5.	To check the illegal use of wastes substances as fuels by the industries	RSPCB, Industries, Industrial Association, Department of factory and boilers	June 2012	Not Available	The inspector of factory and boiler is to take up general survey of the industrial units which are using various types of wastes as a fuel and waste without permission of competent authority.
6.	Rapid study on Epidemiological to assess the impacts of the ambient lead pollution in various target groups	RSPCB, RIICO, State Health Department, Industrial association, Association of The Waste Lead Batteries Processing Units	December 2012	Approx. Rs. 30 -50 lakhs	Rapid study shall be carried out by Association of The Waste Lead Batteries Processing Units.
Long Term Action Plan-Air					
1.	Shift to cleaner fuels	RSPCB, Industry and Industrial Association, RIICO	December 2013	The cost may vary from industry to	Work to carry the CNG up to Bhiwadi is already completed. The major fossil fuel (coal or agricultural

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
				industry	waste) consuming industries shall be advised to adopt cleaner fuel for prevention of environment. RSPCB and RIICO shall advise and encourage the major air polluting industries to adopt clean fuel, depending upon the availability of clean fuel.
2.	Installation of continuous real time ambient air quality monitoring station at Bhiwadi	RSPCB, RIICO	December 2013	Approx. Rs. 1.50 to 1.75 crores	RSPCB may take up the issue with CPCB for financing the installation of continuous real time ambient air quality monitoring station at Bhiwadi.
Short Term Action Plan- Water					
1.	Augmentation of capacity existing CETP (6 MLD to 9 MLD)	Industrial Association/ RIICO/BJPNT	December 2011	Approx. Rs. 2.17 crores	The work of capacity augmentation is under progress. The work is done by BJPNT through Bivija Infrastructure Pvt. Ltd.
2.	The disposal of treated waste water of CETP, Bhiwadi -Completion of work related to laying down closed conduit pipe line up to river Sabi	RIICO / RSPCB/ BJPNT Trust	March 2012	Approx. Rs. 7.72 crores	About 95% work on laying the closed conduit pipeline from Bhiwadi to river Sabi is completed. The work of approx. 2km is yet to be completed due to land allocation/land dispute problems.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
3.	Segregation of trade & Domestic effluent	RIICO/RSPCB	March 2012	Approx. Rs. 2 Crores (for Stage I)	<p>The job of segregation of trade and domestic effluent has been taken up by RIICO.</p> <p>In first phase of this job related to laying of closed conduit pipe lines, RIICO has started laying down of 3.8 KM pipe line from Parshvanth mall to CETP and from Samtel Mode to CETP. The job of Phase-I is in progress and pipe lines of about 600 meter length have been laid down.</p>
4.	Development of Recycling and reuse of treated effluent	RSPCB/RIICO/Industrial Association	Ongoing Activity	The cost will vary from industry to industry	About 12 industries in Bhiwadi have already taken steps to recycle and reuse the treated waste water. The State Board is pursuing the remaining major water polluting industries to adopt water conservation techniques by way of recycling and reuse of treated waste water.
5.	Installation of flow meter by the member units of CETP for monitoring the flow entering into closed conduit line from each of the member industry	Industries' Association/RSPCB/Industries	December 2012	Not Available	Flow meters are to be installed by the member units to monitor the discharge through the conveyance system to CETP <i>viz.</i> the quantity permitted by CETP trust for the treatment.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
6.	Development of sewerage system including STP (4 MLD)	UIT/RSPCB	March 2012	Approx. Rs. 17.24 Crores	<p>The Work of development of sewerage system including STP is almost completed by 90%.</p> <p>The RSPCB is regularly pursuing the UIT for early completion of Sewer lines and house connections.</p>
7.	Regulation on groundwater abstraction by the industries	RIICO/RSPCB/CGWA	Ongoing activity	--	<p>The RSPCB is insisting for CGWA NOC for groundwater withdrawal of more than 25 KLD.</p> <p>For compliance of CGWA guidelines RIICO and RSPCB to insist and ensure the Installation of water meter by the industries which extracts groundwater.</p>
8.	Monitoring of groundwater quality	RSPCB, CETP Trust, RIICO	March 2012	Approx. Rs.1- 2 lakhs	<p>The State Board has increased ground water quality monitoring points from earlier 5 points to 10 points around Bhiwadi and other industrial under NWMP having frequency of one sample in six month. The frequency of the sampling of all the six points shall be increased to once in three months for upgrading the monitoring of ground water quality.</p>

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
9.	Development of recharging structures for groundwater recharge	RIICO, RSPCB, RUIDP and BMC	Ongoing Activity	The cost may vary from industry to industry	The RSPCB and RIICO are pursuing the existing industries to setup RWH structures.
10.	Assessment of the quality of the treated effluent of major highly polluting industries	RSPCB	June 2012	---	RSPCB is monitoring the quality of treated effluent allowed to be discharge on the land /gardening
Long Term Action Plan- Water					
1.	Capacity enhancement of CETP for Bhiwadi <ul style="list-style-type: none"> • By enhancing the capacity of 9 MLD to 15 MLD or • Development separate CETP of 10 MLD 	RSPCB/Industrial Association/RIICO/BJPNT	2012 – 2015	Approx. Rs. 13.5 Crores	The issue regarding the enhancement of existing CETP or installation of separate CETP is under consideration with BJPNT. For setting up of new CETP, RIICO shall allocate a land on concessional basis.
2.	Development of CETP for Khushkhera (capacity Approx. 5-7 MLD)	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
3.	Development of CETP for Chopanki (approx. 5-7 MLD)	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.
4.	Development of CETP (approx. 5-7 MLD) for Kaharani, Pathredi and Tapukada	RSPCB/Industrial Association/RIICO/BJPNT	December 2015	Approx. Rs. 7-8 crores	RIICO has engaged M/s. Ramky Enviro Engineers Ltd, Hyderabad to prepare a feasibility report on possible capacity and locations of CETP in Bhiwadi region and modalities for constructing and operating them on PPP basis.
5.	Closed Conduit Conveyance system to carry wastewater from industries to CETP in Bhiwadi	RIICO, CETP Trust, Industries' Association	2012-2015	Approx. Rs. 18 crores (for Stage II)	In Stage-II of the project, RIICO is in process to call revised tenders for closed conduit work in whole industrial area Bhiwadi. The length of stage I & stage II lines shall be 3.8 KM & 72 KM respectively. Connections of all effluent generating industries to the closed conduit system shall be done after completion of Stage-II work.
Action Plan Land					
1.	Identification & development of a Site for MSW Treatment & Disposal	Bhiwadi Municipal Council & UIT in consultation with State Urban Development Dept.	2013-2015	Not Available	The Municipality Bhiwadi has requested the district administration for allotment of the land so that necessary DPR etc may be prepared.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
2.	Augmentation of treatment and disposal facility for Bio-medical Waste	Medical and Health Department, RSPCB and Municipal Corporation	2013-2015	Not Available	The biomedical waste from the health care facilities of Bhiwadi is being collected, transported and disposed with the authorized Common Bio Medical Waste Treatment and Disposal Facility located in Alwar i.e., at distance of approx. 85 km. The RSPCB is monitoring the disposal of biomedical waste in accordance with the provision of Bio Medical Waste (Handling & Management) Rules 1998. The disposal facility requires augmentation for the compliance of CPCB guidelines for treatment and disposal facility of BMW.
Action Point-Others					
1.	Tree Plantation for Greening the Area	Forest Dept., UIT, RIICO, RSPCB	December 2011	Approx. Rs. 25 Lakhs	UIT Bhiwadi, RIICO, BMA and industrial association have planted trees in various areas. Moreover, the large scale industrial units have achieved plantation in more than 33% area of their premises. The same has been verified during routine inspections.
2.	Capacity Building for prevention & control of Pollution	RIICO , CETP Trust & RSPCB	March 2013	Not Available	1. Following actions shall be taken up by the RSPCB: a. Strengthening of technical and scientific manpower of Regional Office, Bhiwadi (RO , Bhiwadi)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan / Remark
					<ul style="list-style-type: none"> b. RSPCB must establish full fledged Regional Office at Bhiwadi to monitor the implementation of action Plan and enforcement of regulatory region. c. The technical side of staff should have 1 Environmental Engineer, 2 nos. Assistant Environmental Engineer, 3 nos. Junior Environmental Engineer, supporting staff, computer facility, laboratory facility and transportation facility. d. The scientific side of staff should have 1 nos. Scientific Officer, 2 nos. Junior Scientific Officer, 2 nos. Senior Scientific Assistant. e. Strengthening of regional laboratory of RO , Bhiwadi for regular assessment of PCM with the industries, CETP, water quality and air quality of the area f. Education and training of technical and scientific staff of familiarization with the latest technology for pollution control and analytical techniques g. Strengthening of online connectivity

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost	Action Plan /Remark
					<p>of RO, Bhiwadi with HO-Jaipur and CPCB Delhi for upgrading the data transfer mechanism</p> <p>h. Seminar and workshop for education and awareness of the project proponents for adoption of cleaner fuel and advanced process techniques for reduction of air emission and effluent discharge</p> <p>2 Following action shall be taken up by RIICO Limited & CETP Trust:</p> <p>i. To encourage use of cleaner fuel by providing soft loan for replacement / conversion of the existing boiler / thermo pack to cleaner fuel.</p> <p>ii. To encourage & provide soft loan to industrial unit which intends to install RO plant at their own for recycling of their effluent.</p> <p>iii. RIICO shall develop industrial areas for non polluting industries</p>

Note: While recommending the interventions to reduce CEPI, various studies, reports, Master Plans, RSPCB and RIICO data was referred to and wherever the information was available, the costs of interventions have already been included in the Action Plans. These interventions will be implemented by different agencies, including RIICO as identified in the Report.

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