2nd June 2021

The Member Secretary,
Expert Appraisal Committee (Industry III)
Ministry of Environment and forests and Climate Change,
Room No. 302, Vayu Wing, 3rd Floor
Indira Paryavaran Bhavan,
Jorbaug Road, New Delhi – 110003

Subject: **Submission of compliance for proposed new project for manufacturing of Active Pharmaceuticals Ingredients by Ipca Laboratories Limited at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra.**

Reference: Minutes of the 9th meeting of the EAC (Industry III) held on 13th April 2021

(Proposal Ref. no. IA/MH/IND2/206120/2021)

Respected Sir,

With reference to the above subject our proposal was discussed in the 9th meeting of EAC (Industry III) held on 13th April 2021 for appraisal of EC application under Category B-2. After detailed discussion the committee suggested to submit the compliance of points raised during meeting.

With reference to the above subject, herewith we are submitting the compliance of following points on next page onwards :

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Sr. No.	Observation	Compliance
1	The project is located very near to ESZ therefore in the long run industry may negatively impact the flora and fauna of the area. It is therefore recommended to carry out alternate site analysis. Detail report needs to be submitted.	For the establishment of the proposed project Ipca has purchased total land admeasuring to approximately 600 Acres from NCLT in the year 2019. However, considering the ESZ area near to site out of 600 Acres only 75 Acres land will be utilized for proposed project. The land other than 75 Acres which is under the possession of Ipca only will be act as a buffer for existing biodiversity of protected forest which is buffer zone of Bor Wildlife sanctuary located at a distance of 7.0 Km from the project site. As per the ESZ Draft notification 5th Feb.2021 which is likely to be enacted within 3-4 months the proposed project of Ipca is more than 500 meters away from the boundary of ESZ. No -go alternative for site selected by Ipca is considered as the project is proposed on the land meant for industrial use only and there was full flaged Industrial activities at same location during 1987 to 2006. **Justification of site selection is attached as Annexure -I.** The Project will be established with proper mitigation measures and after implementation of all mitigation measures there will not be any impact on the surrounding Flora and Fauna due to operation of the Project. 1. Project will be ZLD and hence there will not be any impact due to waste water discharge. 2. 35 % Green Belt will be maintained ang all the minor impact due to Air Pollution will be absorbed by this buffer zone.

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		3. Alternative fuel like Bio- Briquette / husk etc will be used having very low sulfur contain and hence there will not be much impact. 4. Efficient 2 stage Scrubbers will be provided on reaction vessels and storage tanks for capturing emissions. 5. Storage of chemicals will be much below the threshold quantities as mention in MHISC Rules. 6. Only one week inventory will be maintained. 7. No forest and wild life area will be occupied. 8. There will be 12 feet height permanent boundary all around the project area so as to arrest all the affect within project area. Ipca will implement the improve technology to reduce emissions to the Noise, air or water. Moreover, all the unit operations considered by Ipca are of much lower scale / volumes Like storage tanks less than 30 KL, Reactors 10-12 KL and Boilers 8 to 10 TPH where potential for emissions are much lesser.
2	The project involves EC and NBWL clearance and as per Ministry's guidelines PP needs to submit the NBWL clearance and link with EC proposal. However in this case PP has only submitted EC application on Portal. As per Parivesh Portal of this application, no NBWL clearance details	The project involves EC and NBWL clearance and as per Ministry's guidelines Ipca already submitted the application for NBWL clearance. But, both the proposals were not linked earlier. However, NBWL application is now linked with the EC application and Screenshot of the same is attached as Annexure II. **The NBWL application is submitted on Parivesh Portal on April 10, 2021 ref No. FP/MH/IND/5848/2021, the application is under examination of wildlife Warden. and the screen shot of the status of application along with NBWL application is attached as Annexure III**

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	mentioned by the PP/Consultant; it seems that application is being made in hurry without following due procedure.	
3.	Details of Schedule –I species in the study area, anticipated impact of the project and its conservation plan submitted to Chief Wild Life warden.	Detailed list of Schedule I species is collected from Forest department Wardha and its conservation plan species along with anticipated impact of project and suggested mitigation measures is submitted to Chief Wild Life warden. **Copy of conservation plan along with Acknowledgment receipt is attached as Annexure-IV**
4.	Alternate fuel should be explored as the project site is very near to Sanctuary	**Ipca will consider Bio Briquette as an alternate fuel which is cleaner fuel in place of coal.** Ipca will utilized Bio Briquette to the tune of 200 TPD as a fuel for heating equipment's. However, only in case of non-availability of Bio briquette, Imported coal having very less content of ash and sulfure as per enclosed analysis reports as annexure will be utilized in order to avoid shut down of manufacturing facility. All the mitigations will be followed considering worst case scenario. ESP will be provided as Air pollution control equipment. As CNG/PNG is not available in the area this fuel is not mentioned in the application. However, once the Gas is available in the vicinity Ipca will immediately switch over the fuel to CNG/PNG.
5.	Budget allocation for green belt development should be increased and detailed green belt along with species and budget needs to be submitted	In existing developed Green belt of 105276.0 Sq. m. **(35% of total plot area)** at the site and around 15800 Nos. of native and pollution resistant species are planted in the green belt. In addition to this 5300 Nos of trees will be planted in green belt at a distance of 2 m x 2.5 m to achieve 2000 Nos of trees/ Ha. To

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		Explochem. Nobel had been allocated water for industrial use amounting to 5.79 million m3. They were being supplied water from Bor dam from period 1985 – 86 to 2003 -04. Noble Explochem had entered into agreement for 6 years from 1/11/2004 to 31/10/2010. The aforesaid industry was closed since 2004-2005 and hence didn't lift water. So irrigation Dept. cancel the allocation. **Hence, Ipca has applied for restoration of facility for non irrigation water supply to irrigation department on 25.2.2021.** Bases on the application Irrigation department conveyed through letter dated 9.3.2021 that as water permission for Noble Explochem from Bor dam was cancelled by Chief Engineer Irrigation Dept Nagpur due to discontinuation of agreement, hence restoration of water is not possible. **Letter from irrigation department is attached as Annexure –VII (Marathi and English version)** Considering this Ipca is now in process of getting permission for water lifting for non-irrigation purpose from irrigation department. • Irrigation department permission will be obtained within 4-6 months. Consultant already appointed for preparation of detailed DPR the prerequisite of Irrigation department. • CGWA permission will be obtained within 4 months of time. Application already filed. Acknowledgement copy attached as Annexure. **Hereby Ipca will commit that we will not start any work for proposed unit before getting permission from BOR dam/CGWA.**

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		strengthen the Green belt the additional plantation will be done around the proposed site of 5 to 10m width, this additional plantation will work as buffer area between Factory site and Forest area. Around 5000 Nos of Tree species will be planted in around the factory. Budget of Rs. 50.00 Lakhs as a capital cost and Rs. 20 Lakhs per Annum as a recurring cost has been allocated for green belt development. **Details on increased Budget allocation for green belt development and revised green belt along with species list and layout plan is attached as Annexure -V**
6.	Details of Boundary wall should be at least 12ft high with wire coils on the walls.	During the submission of application the PP has proposed to construct the boundary wall with height of 9ft with wire coil above it, but during the EAC meeting members suggested us to increase the boundary wall height to 12 ft with wire coil above it. Now as per suggestion of EAC Committee, the total plot area will be protected by erecting 12 feet high boundary wall with wire coil above it so as to protect the area by any wild animal trespassing.
7.	Revised water balance and source of water along with permission from the concerned regulatory authority.	Water Balance is revised for additional water required for additional green belt development and attached as Annexure VI. **The net fresh water requirement for the unit will be 1613 CMD and as the proposed unit will run on complete Zero Liquid Discharge (ZLD) basis, after recycling of 649 CMD of treated effluent the total fresh water consumption will get reduced to 964 CMD.** Source of water supply will be from Bor Dam/CGWA. Ipca has bought sick unit in the year 2019.The land was earlier belongs to Noble

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<table>
<tr>
<td>8.</td>
<td>Details of Forest clearance may be taken, if required</td>
<td>Forest Clearance is not appliable as no forest land is involved in the proposed project.
However, Ipca has submitted application to forest department for NOC. Acknowledgement copy of the same is attached as Annexure –VIII. Furthermore , as per the GR issued by Government of Maharashtra dated 8.8.2013 NOC is not applicable for the project where forest land is not been used for the activity. Copy of the GR is also been attached in Annexure VIII for your ready reference.</td>
</tr>
<tr>
<td>9.</td>
<td>Details of existing project, along with copy of CTE/CTO with production details to verify, any violation.</td>
<td>Ipca purchases land through NCLT in the year 2019 which was earlier belongs to Nobel Explochem Limited (Nobel). Nobel Explochem Limited established the unit for the manufacturing of Nitro glycine base explosives and started operation in February 1987.
<table>
<tr><th>Year of Consent</th><th>Products</th><th>Quantity</th></tr>
<tr><td rowspan="2">Consent to Operate dt. 26.12.2001, Noble Explochem Ltd.</td><td>1. Noble Gel (60,80,90)
2. Noblex (80,60)
3. Noble Coal 1,3,5
4. Noble Blast 1, 3
5. Noble Boost Prime
6. Noble Soismey
7. Noble Smooth</td><td>1250 Mt/month</td></tr>
<tr><td>8. Slurry explosive coloumn chase cap, Boster sensitives</td><td>1000 Mt/month</td></tr>
</table>
However, due to ban on these products from Government of India in the year 2004 the production was discontinued by Nobel and applied for CTO on 14.12.2004 for the manufacturing of new products in same premises.
<table>
<tr><th>Year of Consent</th><th>Products</th><th>Quantity</th></tr>
</table>
</td>
</tr>
</table>

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		Consent to Operate dt. 01.10.2006, Noble Explochem Ltd.	1. 2-Ethyl Hexyl Nitrate (Fuel Additive)	7200 Mt/A
			2. Noble Miracle 1&2 (Class II explosives)	10000 Mt/A
			3. Emulsion/Slurry Explosives	25000 Mt/A
		After that Noble received RCTO for the manufacturing of same products on 8.10.2006. As Noble has not increased the production capacity granted in the consent before 2006 have not violated EIA notification 2006. Though unit had received the RCTO for manufacturing of said products, Nobel stopped the manufacturing of products due to non-favourable conditions at that time and company was not working from year 2006. Copy of declaration of non violation is attached as Annexure IX along with copies of CTE and CTO and also uploaded on Parivesh portal.		
10.	Details of agreement with Dam Authority for supply of water	Water permission from Bor dam/ CGWA is in process. Detailed agreement will be made with Dam Authority for supply of water. Hereby, we will commit that we will not start any work for proposed unit before getting permission from BOR dam/CGWA.		
11.	Details of application and its approval from forest Department for cutting of tree	For proposed construction Ipca will cut 320 number of tress, a compensatory afforestation will be done in around the plot, on land which is under possession of Ipca. Ipca will plant as numbers of trees suggested by Forest department as compensatory afforestation. Copy of application to Forest department for permission for tree cutting and plan of compensatory afforestation submitted to		

		Forest Department and undertaking for Compensatory afforestation is attached as Annexure X.

Hope above mentioned compliance points fulfill your requirement. However, EMP has also been revised as per the suggestion of the committee and attached as Annexure XI of this letter for your reference. Request you to oblige us by considering our proposal for recommendation of EC under category B-2 in upcoming agenda of EAC.

Thanking You,

Yours Faithfully,

For Ipca Laboratories Limited

Authorised Signatory
Manoj Kumar Mittal

Vice President (Corp.) EHS

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Annexure I

Justification for Site Selection

The concept of alternative can be defined as a possible course of action, in place of another that would meet the same purpose. Location alternatives are particularly relevant in change of land use application as well as greenfield developments. Location alternatives are unlikely to be important when a potential project under consideration forms part of an overarching strategic planning initiative such as an industrial development zone or municipal plan.

Key criteria when identifying alternatives are that they should be Practicable, feasible, relevant, reasonable and viable. The proposed site at village Hingni, Tal. Seloo, Wardha, Maharashtra selected by Ipca Laboratories Limited (Ipca)for proposed establishment of API manufacturing is based on said key criteria for selection of site.

Ipca purchases this land through NCLT in the year 2019 which was earlier belongs to Nobel Explochem Limited (Nobel). No change in land use envisaged as earlier there was industry for manufacturing of Explosives. Nobel stopped the manufacturing of products due to non-favourable conditions at that time and company was not working from year 2006.

The existing site is a developed land which does not include agricultural, forestry, water bodies (including CRZ) etc. and Infrastructures like assured electrical power, continuous water supply with purification from water works like disinfection, the internal road network, external approach road, and networking with CHWSTDF (Common Hazardous Waste Storage Treatment and Disposal Facility) at Butibori, in vicinity is readily available. No land from protected area is being compromised for the project. Other than this following points were considered while selecting the site:

- Suitability, adequacy, and comparable cost of the sites to install the plant and to expand it whenever feasible.
- Size of the local market and the cost of transporting to central markets vis-a-vis the extent of demand.
- Recreational facilities are in plenty.
- Relatively better transportation facilities by road, rail, water (and air) are available.
- There is adequate supply of labour, both skilled and unskilled, male and female.

The additional factors that were considered for selecting the site were as under:

- existing site is a developed land which includes land which was under industrial activity since 1987
- site has good infrastructure like electrical power, assured water supply from Bor Dam, good internal road network and external approach road
- CHWSTDF (Common Hazardous Waste Storage Treatment and Disposal Facility) at Butibori, is available nearby
- ample land available for developing the project properly
- No land from protected area or within the draft ESZ boundary is being compromised for the project

Salient mitigation measures to be adopted include:

- Project will be ZLD and there will not be any impact due to effluent discharge.
- 35 % Green Belt will be maintained and all the minor impact due to Air Pollution will be absorbed by this buffer zone
- Alternative fuel like Bio- Briquette / husk etc will be used to reduce air pollution impact.
- Efficient 2 stage Scrubbers will be provided on reaction vessels
- Two stage condensers will be provided to reduce VOC emissions
- Storage of chemicals will be much below the threshold quantities as mentioned in MSIHC Rules 1989/2000
- Only one week storage inventory will be maintained.

- There will be 12 feet height permanent boundary all around the project area

No -go alternative for site selected by Ipca as the project is proposed on the land meant for industrial use only and Ipca will implement the improve technology to reduce emissions to the air or water.

As the land was for industrial purpose only and not in use, Ipca wants to utilize this land for proposed manufacturing facility. Study of the existing biodiversity near to project site is done as the protected forest is located at a distance of 2.4 KM from the project site After assessing and evaluating the existing environment it is observed that after implementation of proposed Environment management plan there will not be any negative impact on the surrounding environment and hence no alternate site is considered for proposed project.

Hence consideration of alternate site is not done

Annexure II

PARIVESH
परिवेश

Ministry of Environment, Forest and Climate Change
Government of India

"Pro Active and Responsive facilitation by Interactive, Virtuous and Environmental Singlewindow Hub"

Only CRZ - Project attracts CRZ notification, 2011

S.No.	Proposal No.	Type of Approval	Type of Application	Current Status	Edit	Delete
1	SW/206119/2021	EPA WPA	EC(Category A)	Awaiting for EC(T)		

Annexure III

Wild Life Report

Form for seeking recommendation of Standing Committee of NBWL/SBWL.

PART - I & II

(To be filled up by User Agency)

A. General Details

A-1. Project Details

(i). Forest Clearance Required?: No

(ii). Proposal No. : FP/MH/IND/5848/2021

(iii). Name of Project: Proposed New project for manufacturing of API by Ipca Laboratories Limited at Vil. Hingni, Tal. Seloo, Dist. Wardha, Maharashtra.

(iv). Short narrative of the Project : Ipca is one of the world's largest manufacturers of APIs - Atenolol (anti-hypertensive), Chloroquine Phosphate (anti-malarial), Furosemide (diuretic), Hydroxychloroquine Sulphate (NSAID), Metoprolol Succinate (anti-hypertensive), Metoprolol Tartrate (anti-hypertensive) and Pyrantel Salts (anthelmint

(v). State : Maharashtra

(vi). Category of the Project : Industry

(vii). Shape of project land : Non Linear

(viii). Distance of the project from the boundary of the Protected Area (in km.): 2.7

(ix). Estimated cost of the Project(Rupees in lacs) : 0

(x). Total period for which clearance is required (in year): 100

(xi). Total Project Area(in ha.): 30.07878

(xii). Project Area under Protected Area (in ha.): 0

(xiii). Project Area under Non-Protected Area (in ha.): 30.079

(xviii). Project Area inside Wildlife Sanctuaries(in ha.): 0

(xiv). Project Area outside Wildlife Sanctuaries(in ha.): 30.079

(xv). Project Area inside Conservation Reserve(in ha.): 0

(xvi). Project Area outside Conservation Reserve(in ha.): 0

(xvii). Project Area inside National Park(in ha.): 0

(xviii). Project Area outside National Park(in ha.): 0

(xix). Project Area inside Ecologically Sensitive Zone(in ha.): 0

(xx). Project Area outside Ecologically Sensitive Zone(in ha.): 0

A-2. Details of User Agency

(i). Name : M/s Ipca Laboratries Ltd.

(ii). Address1 : C-89 to C-95 MIDC Area, MIDC Mahad, Dist. Raigad (Maharastra)

(iii). Address2 : C-89 to C-95 MIDC Area, MIDC Mahad, Dist. Raigad (Maharastra)

(iv). State : Madhya Pradesh

(v). District : Ratlam

(vi). Pin : 457002

(vii). Landmark : Post Box No. 33

(viii). Email address : manojkumarmittal@ipca.com

(ix). Landline Telephone No. : 278000

(x). Fax No. : 232055

(xi). Mobile No. : 9300036263

(xii). Website (if any) : NIL

(xiii). Legal status of User Agency : Private

A-3. Details of Person Making Application

(i). First Name: Manoj Kumar Mittal

(ii). Middle Name: NIL

(iii). Last Name: NIL

(iv). Gender: NIL

(v). Designation: Vice President - EHS (Corporate)

(vi). Address 1: C-89 to C-95 MIDC Area, MIDC Mahad, Dist. Raigad (Maharastra)

(vii). Address 2: C-89 to C-95 MIDC Area, MIDC Mahad, Dist. Raigad (Maharastra)

(viii). State: Madhya Pradesh

(ix). District: Ratlam

(x). Pin: 457002

(xi). Landmark: Post Box No. 33

(xii). Email Address: manojkumar.mittal@ipca.com

(xiii). Landline Telephone No.: 279083

(xiv). Fax No.: 279083

(xv). Mobile No.: 9300036263

(xvi). Upload a copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency: Annexure copy of documents in support of the competence

B. Details of Land required for the Project

B-1. Details of Protected Area

B-1.1 No. of Divisions involved in Protected Area

Division wise details of land			
S.no	**Division Name**	**Protected Area Name**	**Project Area under Protected Area**

1.	Wardha	Bor Wildlife Sanctuary	0

B-1.2 Details of Districts involved

District wise breakup			
S.no	**District Name**	**Project Area under Protected Area(ha.)**	**Project Area under Non-Protected Area(ha.)**
1.	Wardha	0	30.079

B-1.3 Component wise breakup

Component wise breakup			
S.no	**Component**	**Project Area under Protected Area(ha.)**	**Project Area under Non-Protected Area(ha.)**
1	Nil	0	30.079

C. Maps of protected area

Division 1. : Wardha

(i). Project Area under Protected Area (in ha.) : NIL

(ii). Nature of the Project : Non Linear

(a). No. of patches : One

Patch wise details		
Patch No.	**Area of Patch(in ha.)**	**Kml File of Patches**
1.	0	View File

(iv). copy of Survey of India Toposheet indicating boundary of protected area: Annexure Survey of India Toposheet

(v). scanned copy of the Geo-referenced map of the protected area prepared by using DGPS or Total Station: Annexure scanned copy of the Geo-referenced map

D. Justification for locating the Project in protected area and details of alternates examined :

(i). copy of note containing justification for locating the Project in protected area: Annexure Justification

E. Employment likely to be generated

(i). Whether project is likely to generate employment ?: Yes

(a). Permanent/Regular Employment(Number of persons): 400

(b). Temporary Employment(Number of person-days): 400

F. Displacement of People due to the project, if any

(i). Whether project involve displacement?: No

G. Status of Environmental clearance

(i). Whether the Project requires Clearance under the Environment (Protection) Act 1986 ? : Yes

(a). Status of the Environmental Clearance to the Project : EC under process

(ii).Environmental Clearance File No.: J- 11011/141/2021-IA.II(I)

H. Whether proposal is for investigation/survey

(H-1). Whether proposal is for investigation/survey? : No

(H-2). Details of the Bio diversity Impact Assessment report in case the proposal involves use of more than 50 ha. NP/WLS.

(a).Copy of the Bio diversity Impact Assessment report: Annexure Copy of Bio diversity Impact Assessment report

(H-3). Information on the projects undertaken by the proponent agency in the past in Protected Areas

(a).Upload file: Annexure Information on the projects undertaken by the proponent agency in the past in Protected Areas

(H-4). Details regarding compliance of the conditions on each proposal

(a).Upload file: Annexure Details regarding compliance of the conditions on each proposal

(H-5).Whether any matter related to the project is sub judice in any court of law?: No

Documents		
S.No	**Uploaded Additional Info. Files**	**Remarks**
1	Additional Info.	

Print page

TimeLine Details

Proposal received date at each stage of flow.

A. General Details

(i). Proposal No. : FP/MH/IND/5848/2021

(ii). Name of Project for which Forest Land is required : Proposed New project for manufacturing of API by Ipca Laboratories Limited at Vil. Hingni, Tal. Seloo, Dist. Wardha, Maharashtra.

(iii). Short narrative of the proposal and Project/scheme for which the forest land is required : Ipca is one of the world's largest manufacturers of APIs - Atenolol (anti-hypertensive), Chloroquine Phosphate (anti-malarial), Furosemide (diuretic), Hydroxychloroquine Sulphate (NSAID), Metoprolol Succinate (anti-hypertensive), Metoprolol Tartrate (anti-hypertensive) and Pyrantel Salts (anthelmint

(iv). State : Maharashtra

(v). Category of the Project : Industry

(vi). Shape of forest land proposed to be diverted : Non Linear

(vii). Area of forest land proposed for diversion(in ha.): NIL

B. Time Line

Submitted by User Agency	Query for Shortcoming(if any) by Wildlife Warden	Resubmission of Proposal by User Agency	Query by Wildlife Warden for submitting Hard Copies	Uploading(by U.A.) of copies of receipt received from Wildlife Warden	Wildlife Warden	Chief Wildlife Warden	State Government/SBWL	NBWL/MoEFCC(WL)
10/04/2021					**Wardha**			

C Essential Details Sought History

Communication between MoEFCC(WL),New Delhi & State Government	Communication between State Government & Chief Wildlife Warden	Communication between Chief Wildlife Warden & Wildlife Warden	Communication between Wildlife Warden & User Agency

NOTE:- Proposal is pending at : **Wildlife Warden**.

Annexure IV

ipca
A dose of life

26th May 2021

Chief.Wildlife Warden
Govt. of Maharashtra
Van Bhawan Police Gym Khana,
Ramgiri Road Nagpur-440001

Dear Sir,

Subject : Submission of Conservation Plan for Schedule I and II species for our proposed new project for manufacturing of active pharmaceuticals ingredients by Ipca Laboratories Limited at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra for obtaining Environmental Clearance

We, Ipca Laboratories Limited (Ipca) proposes new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra. The proposed production capacity of the unit will be 4470 TPA.

As per the EIA Notification S.O. 1533 dated 14th September 2006, proposed activity is covered under Synthetic Organic Chemicals Industry 5(f) and needs prior environmental clearance for establishment. Keeping in view the MoEF&CC's notification S. O. 1233 (E) dated 27th March 2020 proposals related to Active Pharmaceutical Ingredients will be categorized as B2 category in the light of the COVID-19 crisis. Considering this Ipca submitted application for prior environmental clearance to MoEFCC Delhi under B2 category.

As the proposed project is located within 5 km of protected forest (at distance of 2.4 km from protected forest (buffer area) of Notified Bor Wildlife Sanctuary) and there are evidences of Schedule I fauna from surrounding area and approval for Conservation plan will be required.

Ipca herewith commit that there will not be any negative impact due to operation of the project on the surrounding environment. Ipca will take care of all the aspects of the environment viz. water, soil and air. Ipca will run the plant on complete Zero Liquid Discharge basis and all wastewater generated due to operation will be treated in full-fledged effluent treatment plan, Multiple Effect Evaporator and RO. Treated water will be recycled and reused in utilities and there will not be any discharge on the land or water bodies hence, there will not be any negative impact on water bodies.

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All the hazardous waste will be sent to coprocessor or CHWTSDF for disposal and will not be dump anywhere and hence will not be any impact on soil. All hazardous waste will be stored separately category wise in rain protected shed having impervious flooring .

To control the emissions from processes , suitable scrubbers will be provided and to control the emissions from heating unit's adequate stack height and ESP/multicyclone or Bag Filters will be provided. Regular monitoring will be carried out to confirm the emissions level whether they are within stipulated standards of MPCB.

Further Ipca will spent Rs:1.5 Cr. towards conservation of Bor wildlife sanctuary, Bor dam and surrounding area. Detailed conservation plan is prepared and attached herewith for your record as Annexure. We certainly state that these species may not face any adverse impact due to proposed activity as we have proposed conservation plan as well as greenbelt development to maintain ecological conditions of surrounding environ of the project area.

Hence, we request you to kindly approve the submitted Conservation plan and oblige us.

Thanking you,

Yours Faithfully

For Ipca Laboratories Limited

Authorised Signatory
Manoj Kumar Mittal
Vice President (Corp.) EHS

Encl : as above

Details of Schedule –I species in the study area, anticipated impact of the project and its Conservation Plan

for

Proposed New Project for Manufacturing of Active Pharmaceutical Ingredients (API) by Ipca Laboratories Limited, at Village Hingni, Tal Seloo, Wardha, Maharashtra

Contents

1.0 INTRODUCTION

1.1 Background

According to Global Market Estimates, the **Indian API Market** will grow rapidly at a CAGR of 8.57% during the 2020-2026 phase. The Indian drug industry is the world's third-biggest and as far as volume is concerned then it's the thirteenth biggest industry. The rapidly increasing rate of persistent infections, along with the rising importance of conventional drugs, are major reasons for the Indian API market to grow positively.

Ipca Laboratories limited one of the world's largest manufacturers and suppliers of over a dozen APIs. For more than 60 years, Ipca has been a crucial healthcare partner in over 120 countries across the 6 continents. Ipca a fully-integrated pharmaceutical company that manufactures over 350 formulations and 80 APIs for various therapeutic segments. Now, Ipca Laboratories limited (Hereafter being referred as Ipca for brevity in this text) proposes establishment of new API unit at Village Hingni, Tal. Seloo, Wardha, Maharashtra to manufacture Active Pharmaceutical Ingredients (API). The survey nos. of Ipca are included in Dongargaon & Dhamangaon. The land where the proposed manufacturing unit is proposed previously belongs to Noble explochem, which was an operational explosive factory during the year 1987 to 2006. Ipca purchased this land through NCLT in year 2019 (Allotment order received from NCLT is attached as Annexure in other documents). The land belongs to Noble was meant for Industrial activity and Ipca purchased this land for manufacturing of API, so there will be no change in the land use of the proposed land. The production capacity of the unit will be 4470 MT/A. The proposed products of Ipca will be used in preparation of Active Pharmaceutical Ingredients which are used as Anti-Malarial, Anti-gout, Anti-Hypertensive, Diuretic, etc. as approved by FDA.

As per the EIA Notification S.O. 1533 dated 14th September 2006, proposed activity is covered under Synthetic Organic Chemicals Industry 5(f) and needs prior environmental clearance for establishment. Ipca proposes to establish new facility for manufacturing of APIs and submitted application for prior environmental clearance under B2 category in the light of the MoEF & CC's office memorandum S. O. 1233 (E) dated 27th March 2020 and 30th March 2020.

As the project is located within 5km from the buffer area of Bor Tiger Reserve which is under the provisions of section 38(V) of Wildlife (Protection), Act, 1972, shall be consider as A category due to applicability of general conditions as per EIA notification 2006 and its amendments thereof.

Bor Wildlife Sanctuary is located at a distance of 7 km from the Project site and buffer zone is at a distance of 2.4 km from the project site as per the letter received from Range Forest Officer, Hingani.Dist. Wardha.The State Government of Maharashtra vide its Gazette Notification No. WLP-0815/C.R.261/F-1 dated 04th December, 2015 declared 678.14 square kilometer as the buffer area of Bor Tiger Reserve (Bor Wildlife Sanctuary, New Bor Wildlife Sanctuary& Extended New Bor Wildlife Sanctuary) under the provisions of section 38(V) of Wildlife (Protection), Act, 1972. As per the draft notification Bor Tiger Reserve dated 5th February, 2021, the Central Government hereby notifies an area to an extent of 0.5 km to 26.50 km around the boundary of Bor Tiger Reserve as Eco-sensitive Zone.As per the List of geo-coordinates of the boundary of Bor Tiger Reserve and its Eco-sensitive zone appended as Table A and B of Annexure-III of said Draft notification. And also as per latest letter from MoEF& CC (ESZ Division) to PCCF and Chief Wildlife Warden dt. 07th April 2021, the survey nos. of our factory location are included in Dongargaon & Dhamangaon has not mentioned in the list of villages mentioned in Tal. Hingani. From this it is confirmed that proposed project is not located within the Eco sensitive zone. The proposed project site is at a distance of 500m from the nearest boundary of Eco-sensitive zone.

With reference to this context, proposal by Ipca was discussed in the 9th meeting of EAC (Industry III) on 13th April 2021 for appraisal of EC application under Category B-2. After detailed discussion the committee suggested to submit the details of Schedule –I species in the study area, anticipated impact of the project and its conservation plan need to be submitted to Chief Wild Life warden. Therefore, the present study is conducted to comply the requirement of EAC Delhi. Present study was carried out with following objectives.

1.2 Objectives of the Study

a) Carryout baseline ecological study of the study area with respect to Schedule-I fauna and flora.

b) To evaluate the impacts of project activities on Schedule-I fauna, flora and wildlife in the region and predict the potential impacts in future.

c) To suggest any mitigation measures in order to minimize the impact of project activities on surrounding environment especially on Schedule-I fauna, flora and wildlife there in.

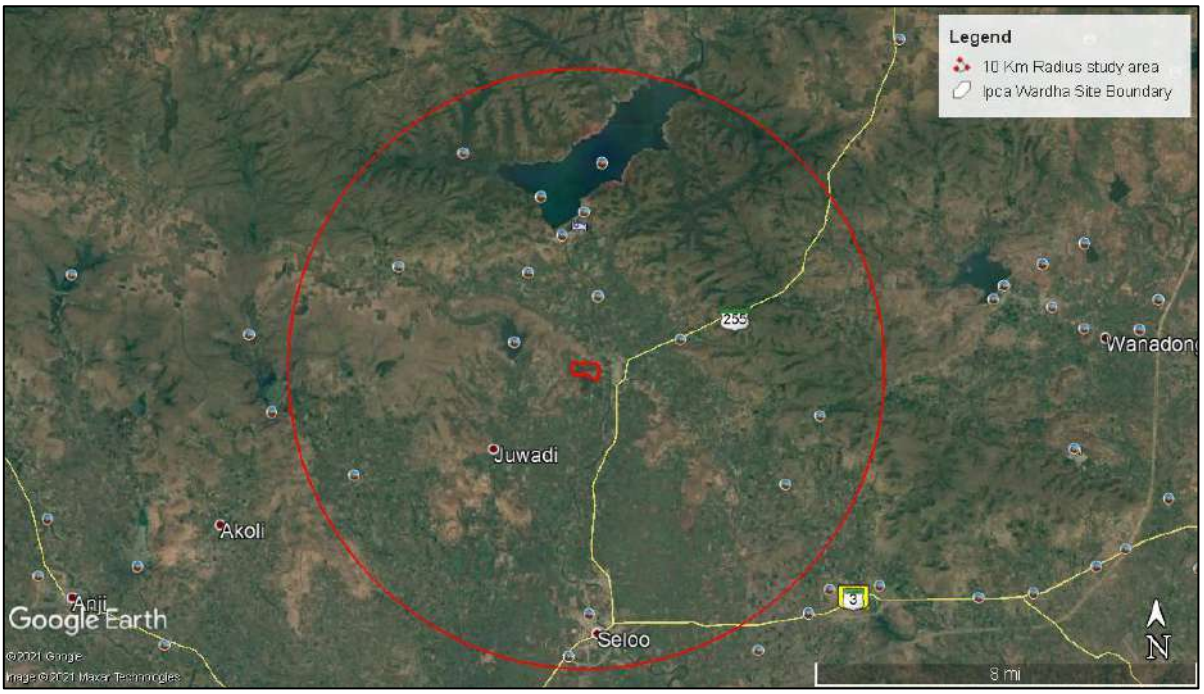
2.0 SALIENT FEATURES OF THE PROJECT

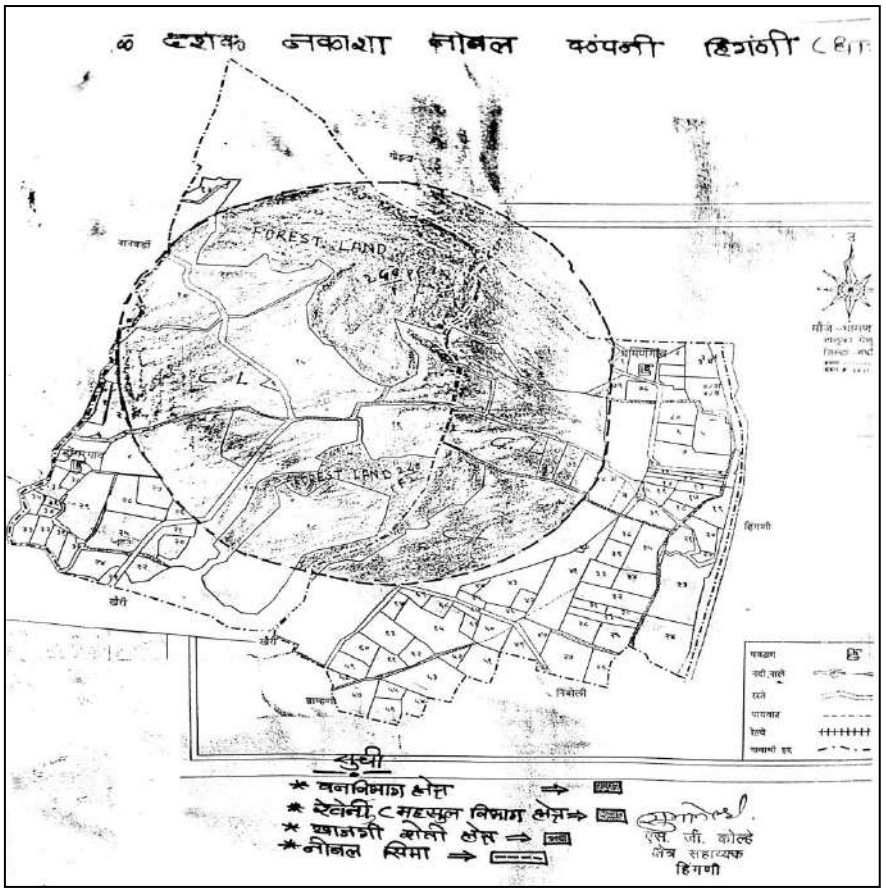
2.1 Project Location

The proposed site of Ipca Laboratories Limited is located at village Dongargaon, Hingni, Tal. Seloo, Dist. Wardha (Maharashtra). It is situated approximately 24 Km from Wardha. The proposed site located at geographical coordinates 20°54'53.47"N latitude and 78°42'20.23"E longitude. The general topography of the area is gradually undulating to flat. It is sloping towards south. The average elevation of land surface is 300 m above the MSL. The area shows moderate vegetation and represents a dry-deciduous forest. It is represented by some reserved forest, protected forest patches and Wildlife Sanctuaries. Geologically Wardha area is composed of basaltic rocks. The basalts are extrusive naturally mined igneous rock. They are dense fine-grained rocks that are of very dark color- green or black and form when molten lava from deep in the earth's crust rises up and solidifies. The area under present investigation was limited to 10 km radius from the proposed site of Ipca Laboratories Limited.

The forests are widely spread and mainly situated on hilly slopes surrounded by cultivated fields. Bor Wildlife Sanctuary is located at a distance of 7 km from the Project site and buffer zone is at a distance of 2.4 km from the project site as per the letter received from Range Forest Officer The majority of forest areas are undulating, and hilly. Google Map of study area (10 km) and map from forest Department presented in the below figures.

Figure 1: Study area of 10 Km





2.2 Total Area

For the establishment of the proposed project Ipca has purchased total land admeasuring to approximately 600 Acres from NCLT. However, considering the ESZ area near to site out of 600 Acres only 75 Acres land will be utilized for proposed project. The land other than 75 Acres which is under the possession of Ipca only will be act as a buffer for existing biodiversity of protected forest which is buffer zone of Bor Wildlife sanctuary located at a distance of 7.0 Km from the project site.

2.3 Land Status

Ipca purchases land through NCLT in the year 2019 which was earlier belongs to Nobel Explochem Limited (Nobel). Nobel Explochem Limited established the unit for the manufacturing of Nitro glycine base explosives and started operation in February 1987. Nobel stopped the manufacturing of products due to non-favourable conditions at that time and company was not working from year 2006.

As the land was for industrial purpose only and not in use, Ipca wants to utilize this land for proposed manufacturing facility and not utilizing any forest land for the purpose.

3.0 METHODOLOGY

Understanding of the nature and extent of various ecological conditions in the project area and its surrounding is essential to predict the potential impacts of industrial activities. It would also help in devising the methods and advance planning to mitigate the impacts if any. The methodology used in order to achieve the objectives of the study include following.

3.1 Basic framework of data collection

The prediction of impacts industries on flora and fauna depends on understanding of the proposed activities, its magnitude/extent, scale and ecological conditions in the surrounding area. Collection of comprehensive baseline information on flora and fauna is therefore a prerequisite for assessment of impacts of development activities. It would also help in advance planning and mitigate the impacts and ultimately managing the natural habitats and resources. The approach to achieve the stated objectives within defined scope of work, include field surveys, interviews, and reviews of literature. Following was the basic fame work of the data collection and analysis for the present study. The baseline ecological assessment involved information gathering on following.

- Develop understanding on general ecological scenario
- Study of flora
- Study of fauna

3.2 Field surveys

Field visits were carried out in the month of December 2020 and February 2021 to understand and assess the impacts of proposed project activities on flora and fauna and natural habitats. We evaluated the distribution and abundance of flora and fauna in project area and in buffer area separately. However, survey was not carried out in the parts of Core Zone of Bor Wildlife Sanctuary. Secondary data was collected from Forest Department for Core area of Bor WLS.

3.3 General ecological assessment

The observations and assessment of overall ecological scenario involves details such as classification of Biogeographic zone, eco-region, habitat types and land cover, distances from natural habitats, vegetation/forest types, sensitive ecological habitats such as Wetlands sites, Important Bird Areas, migration corridors of important wildlife etc. present in the study area. Such baseline information provides better understanding of the situation and overall ecological

importance of the area.

The important ecological habitats and features were identified based on our field visits and also mapping of landuse types in the study area. We identified ecologically important habitats through primary survey, literature survey and consulting local people etc. These important ecological habitats and features were then identified on landuse map that is prepared for the study area. Land use map of 10 km radius of the proposed project site is prepared by EIA agency is used for the present study. Prominent landuse features such as, roads, rivers/waterbody/drainages, agriculture, and built-up areas, forest area, scrubland etc. were digitized using open source software such as QGIS and their areas were calculated. There may be acceptable margin of errors in the final map however, locations and important features are identified and shown on map.

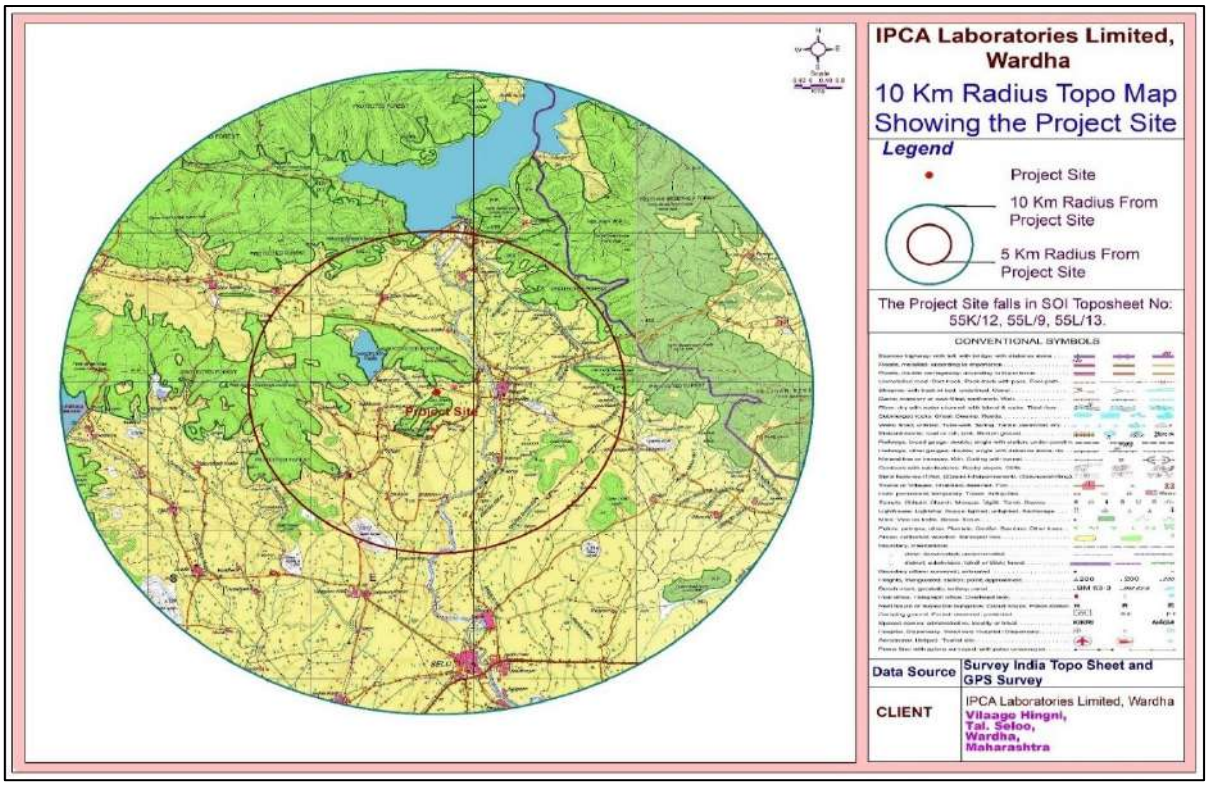


Figure 2: 10Km area Topomap

As evident from above figures that the proposed plot is surrounded by Reserve forests, protected forest and Wildlife Sanctuaries on North, East and west side. Land use report of 10 km radius shows majority of the area is covered by Vegetation/Forest & Irrigated crop land, Major water body is Bor Dam, Bor river is at distance of 0.5 Km on east side and Dongargaon Dam is at 1.7 Km on NW direction.

3.4 Landuse mapping of the study area

Land cover is a fundamental parameter describing the Earth's surface. This parameter is a considerable variable that impacts on and links many parts of the human and physical environments. Remote sensing technique has ability to represent of land cover categories by means of classification process. With the availability of multispectral remotely sensed data in digital form and the developments in digital processing, remote sensing supplies a new prospective for land-cover/land-use analysis. Geographical Information Systems have already been used for assessing environmental problems, since they provide a flexible environment and a powerful tool for the manipulation and analysis of spatial information for land cover feature identification and the maps of all variables were combined to extract information to better understand analyzing. Satellite remote sensing, in conjunction with geographic information systems, has been widely applied and been recognized as a powerful and effective tool in analysing land cover/use categories This study made use of remotely sensed data and GIS technologies; to evaluate qualitatively and quantitatively outcome of part of Wardha district land cover/use distribution. Obtained results were compared, visualized and analyzed, in Geographic Information System.

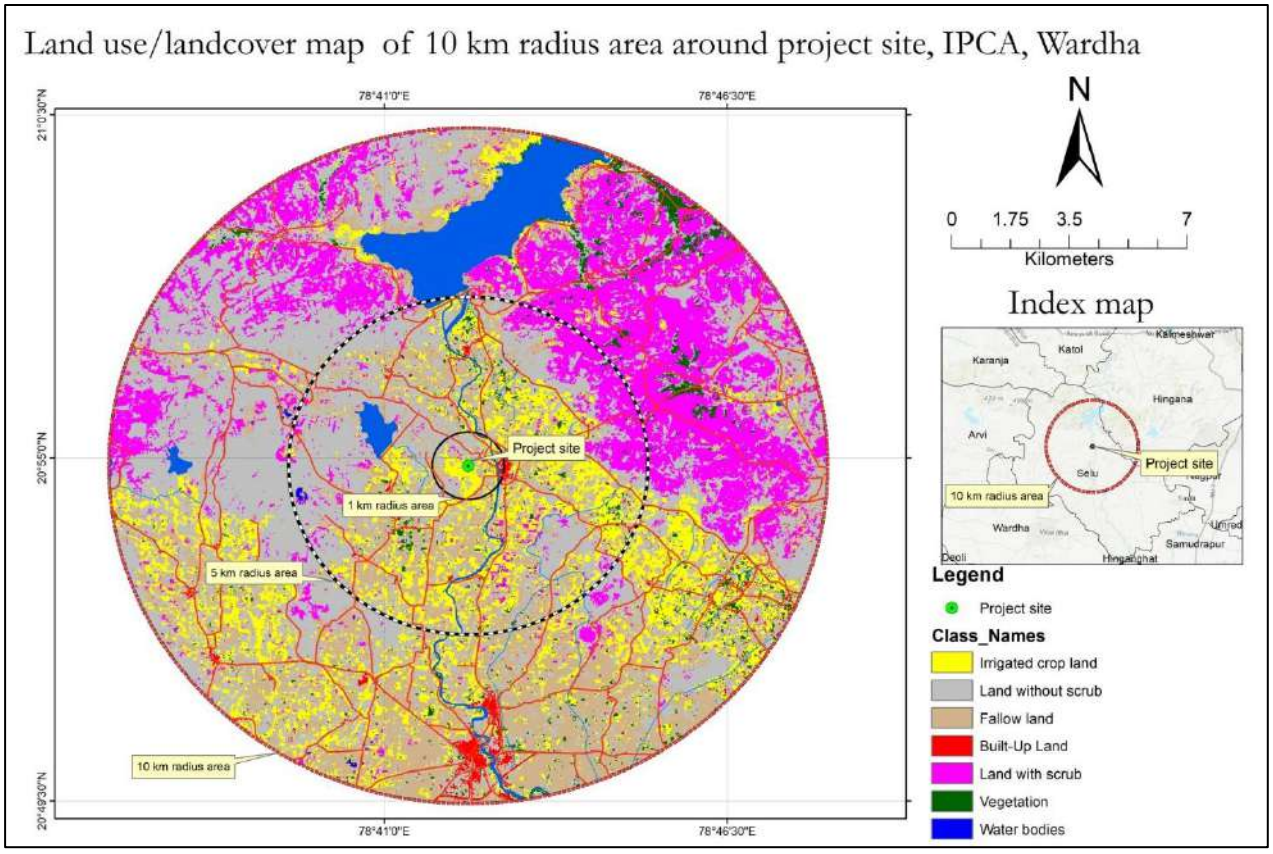


Figure 3: 10Km area Landuse Pattern

Table: Landuse/ Landcover Statistics of the 10 km radius area around project site.

Sr. No.	LAND USE/LAND COVER	AREA (Hectare)	AREA (%)
1	**Built-Up Land**		
	Settlements, Road etc.	363.06	1.15
2	**Water Bodies**		
	River/tank	978.39	3.11
3	**Reserved Forest / Vegetation**		
	Vegetation	962.31	3.05
4	**Waste land**		
	Land with scrub	5960.34	18.92
	Land without scrub	12426.12	39.44
5	**Agriculture land**		
	Irrigated crop land	4565.34	14.49
	Fallow Land	6248.34	19.83
	Total	**31503.9**	**100**

3.5 Study of flora

Assessment of flora was carried out in the study area in the month of December 2020 and February 2021. Study of flora involved simple, systematic and standard techniques. Due to clustered distributions of project component in predefined areas (limited to 10 km periphery only), we carried out qualitative assessment of flora in the study areas through sampling. During surveys, team continuously searched for plant species and identified them to prepare a checklist of plants in the respective study area. Part of buffer area and the project site, were surveyed and a qualitative checklist of plants for core and buffer areas were made.

3.6 Study of fauna

We mainly studied the fauna of higher trophic levels which acts as indicator of the type and health of the eco-systems. We mainly studied the faunal classes such as amphibians & reptiles (herpetofauna), birds and mammals which occupy higher trophic levels which act as indicator of the type and health of the eco-systems in the project area.

3.7 Study of birds

Birds, occupying higher trophic levels in the ecosystems, respond quickly to the changes in the habitats and therefore serve as one of the best indicators for evaluating the ecological status and

functioning of ecosystems of the area. Therefore, we created baseline data on birds by systematically collected data on occurrence in the core and buffer areas separately. For creating baseline data on birds, we carried out bird surveys in different habitats as differential habitat preferences are seen in birds. In order to study species richness of birds in core and buffer areas, we employed, Area Search Method" or extensive search within core and buffer areas. We carried out observations on bird species in small ponds, open areas, scrubland, dense bushes, isolated trees, village peripheries, surrounding agriculture areas etc.

A comprehensive checklist of birds was prepared with information on their habitats (i.e. Aquatic and Terrestrial), migratory non-migratory status, IUCN Red list Categories, Wildlife Protection Act (1972) Schedules, checklist of birds is prepared.

3.8 Study of mammals

Like birds, mammals are also occupying higher trophic levels in many ecosystems and respond quickly to the changes in their habitats therefore, serves as best indicators of the ecosystem health. We therefore, chose to create baseline information on distribution and presence and absences of mammal species. Since the presence of mammalian species is low affecting probability of their sightings, in the study area, it was difficult to estimate their population using line transect method. More importantly, it was difficult to accommodate the sightings of nocturnal and diurnal animals in the study. Therefore, we prepared a qualitative check list of mammals based on their presences and absence using indirect evidences and signs such as footprints, droppings, diggings, scrap marks, etc. in the study area area.

3.9 Important wildlife habitats & protected areas

We assessed the presence and distances of important wildlife habitats and hotspots such as protected areas, breeding and nesting habitats and grassland area from core area. These important areas include areas such as Protected areas (National Park, Wildlife Sanctuaries, Conservation Reserves etc.)

3.10 Rare, threatened & endemic wildlife species

We also assessed the presence of rare, endangered, endemic wildlife species in the project area/core area and buffer area. Two major standards were used for assessing the status of species of flora and fauna of the project area 1) Indian Wildlife (Protection) Act 1972 and IUCN Red List Categories to know the global status of the species. Apart from their status of migratory or resident etc. were also assessed. Special search efforts were made during the field visits to identify any

such sensitive species or their corridors etc. in the project area and the buffer area

3.11 Literature review

Considering the time limitation to undertake statistically rigorous data gathering system, study also relied on existing knowledge about the ecology and biodiversity of the region. Importantly, there are quite a few studies undertaken in the past dealing with the impacts of projects on flora and fauna and other concerns of biodiversity conservation. Various relevant literatures were surveyed during the study for collection of baseline information. Maps, reports and documents collected from the project proponent & forest department were also reviewed and used in the present study. Books on flora, fauna and wildlife were also studied in order to understand the biology of several species. Other than the above, for the purpose of this study, relevant information was also collected and reviewed from following sources:

- Research papers and other secondary reference on flora and fauna around Bor Wildlife Sanctuary
- Report on Critically endangered species of India.
- Important Bird Area book
- Google imageries/Google Maps
- Project related Maps provided by the proponent

3.12 Consultations

During the study, series of consultations were made with both technical and non-technical stakeholders to get better picture on the project area/core area and buffer zone habitats. In order to know more about the seasonal presence of several faunal species and their movement, study team informally consulted and discussed with local people, from the villages, herders and farmers who inhabit close to the proposed project area.

3.13 Analysis to evaluate the potential impacts

The information collected on status of flora and fauna and, their distributions and potential impacts of proposed project development were logically analyzed and conclusions were extracted for preparation of conservation plan for the project proponent to implement.

3.14 Preparation of wildlife conservation action plan

After identification of key impacts of the project, on flora, fauna or any key habitats of any important species or their corridors, a comprehensive wildlife conservation action plan was prepared for 5 years with monitoring mechanism and financial projections.

3.15 Limitations of the study

The study undertaken is structured around the project information as provided by the project proponent, any change in the proposed activities may result in variation of outcome. The study is based on field visits, literature survey, consultation with local people etc. All information's and inferences presented herein are based on the specifics currently available within the limits of the scope of work, information provided by the client or its representative, existing secondary data and schedule data.

4.0 BASELINE ECOLOGICAL SCENARIO

The observations and assessment of overall ecological scenario presented in this chapter include details of flora, fauna, natural habitats, protected areas, wildlife species and their migration corridors etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, wildlife species etc., were analyzed and results are presented as follow.

4.1 Biogeographic zone

Biological environment of any area constitute all living beings of that area, it is an integral part of the environment. According to revised forest types (Champion and Seth, 1968) the study area has been classified as Southern Tropical Dry Deciduous Forests (Group 5 subgroup 5A/C3). According to Rodgers & Panwar (1988) biogeographic classification the regions falls in Deccan biogeographic zone (6) and Deccan Plateau South (6A) biotic province. The vegetation are characterized by *Teak, Butea, Chloroxylon, Lagerstroemia, Terminalia, Diospyros, Nyctanthus*, and *Acacia* species.

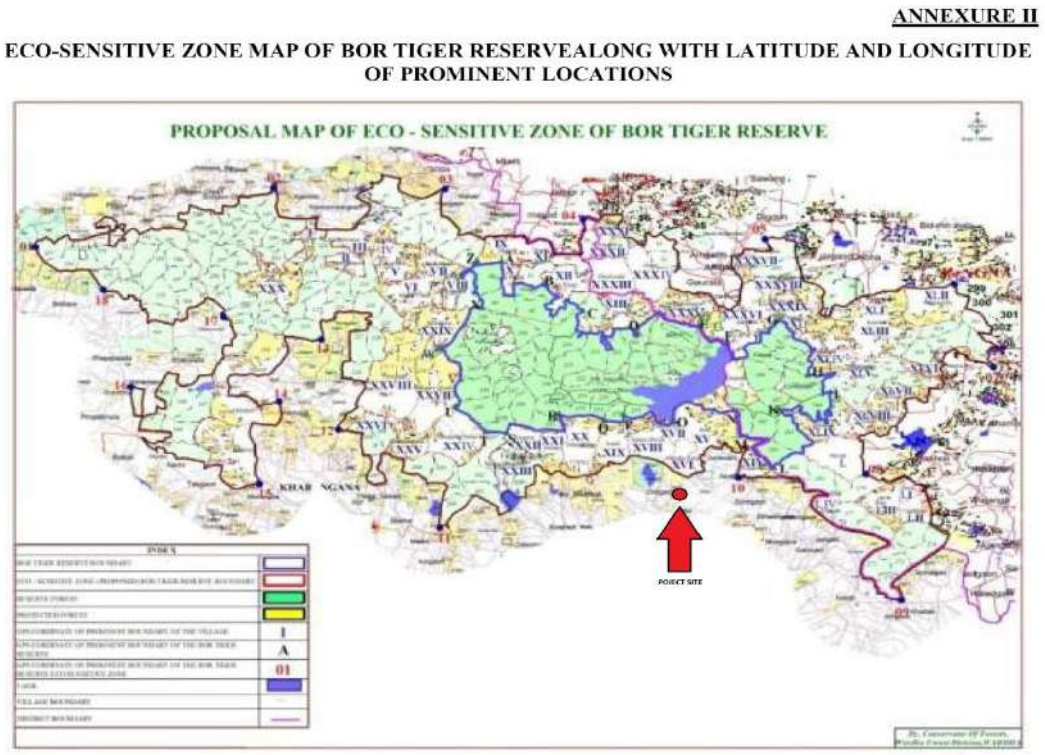
4.2 Protected areas

However Bor Wildlife Sanctuary is located at within 10 km radius from the boundary of the proposed project site. Bor Wildlife Sanctuary is located at a distance of 7 km from the Project site and **buffer zone** is at a distance of 2.4 km from the project site as per the letter received from Range Forest Officer, Hingani, Dist. Wardha. The State Government of Maharashtra vide its Gazette Notification No. WLP-0815/C.R.261/F-1 dated 04th December, 2015 declared 678.14 square kilometer as the **buffer area of Bor Tiger Reserve** (Bor Wildlife Sanctuary, New Bor Wildlife Sanctuary& Extended New Bor Wildlife Sanctuary) under the provisions of section 38(V) of Wildlife (Protection), Act, 1972.

As per the draft notification Bor Tiger Reserve dated 5th February, 2021, the Central Government hereby notifies an area to an extent of 0.5 km to 26.50 km around the boundary of Bor Tiger Reserve as Eco-sensitive Zone. As per the List of geo-coordinates of the boundary of Bor Tiger Reserve and its Eco-sensitive zone appended as Table A and B of Annexure-III of said Draft notification. And also as per latest letter from MoEF& CC (ESZ Division) to PCCF and Chief Wildlife Warden dt. 07th April 2021, the survey nos. of our factory location are included in

Dongargaon & Dhamangaon has not mentioned in the list of villages mentioned in Tal. Hingani. From this it is confirmed that proposed project is not located within the Eco sensitive zone. The proposed project site is at a distance of 500m from the nearest boundary of Eco-sensitive zone. Google image of the site along with geo-coordinates of the boundary of Bor Tiger Reserve and its Eco-sensitive zone is given below.

Map showing Eco Sensitive Zone of Bor Tiger Reserve and proposed project area



4.3 Assessment of flora

The data for flora is collected as per Actual site visit and Secondary data collected from Forest Department, local consultation and available literature for the same area. The vegetation is moderately dense consisting mainly *Teak, Butea, Chloroxylon, Lagerstroemia, Diospyros, Nyctanthus* and *Acacia* species.

The climbers were few. The common climbers were *Wattakaka volubilis, Rivea hypocrateriformis, Cryprostegia, Cryptolepis, Ipoemia, Tinospora,* and *Pergularia daemia.* The Pteridophytes were *Nephrolepis, Adiantum,* and *Pteris*. The Bryophytes were not reported, as they are very much sensitive to humidity and moisture. The herbaceous vegetation was surveyed by random walk through the agriculture and pasturelands. The abundant herb species includes *Hyptis, Parthenium, Achyranthus, Alternanthera sessilis, Lepidagathis cristata, Oldenlandia sp., Acalypha indica,* Spermacoce stricta, *Leucas aspera, Digera arvensis,*

Tribulus terrestris, Indigofera linifolia, Justicia procumbens, Gomphrena sp., Striga densiflora, Polygala chinensis, Lepidagathis cristata, Acanthospermum hispidum, Corchorus sp., Xanthium indicum, Tridax procumbens, Pupalia, Cassia uniflora, Heliotropium, Peristrophe, Ageratum sp., Commelina sp., Blainvellea sp., Bidens sp., Euphorbia sp., etc.

Exotic flora:

The people cultivate many ornamentals, horticultural plants, important vegetables, trees, shrubs and climbers for aesthetic purpose. These represent fairly high number of exotic species. It has further enriched the flora. Among the exotic flora most common species were *Samania saman, Muntingia calabura, Delonix regia, Jacaranda mimosaefolia, Roystonia regia, Eucalyptus sp., Pithecelobium dulce, Polyalthia longifolia, Thuja compacta, Plumeria alba, Casuarina equisetifolia, Nerium odorum, Bougainvillea spectabilis, Canna indica, etc.* Some of the species are now naturalized in the area though they are exotic in nature. Some species shows invasiveness that includes *Lantana camara, Parthenium hysteriphorus,* etc.

Agriculture Pattern:

The chief land use around the proposed area is farming. Depending on rains, there are three cropping seasons, namely (1) Kharif (early monsoon from June to September) (2) Rabi (late monsoon from September to December) and (3) Zaid (from January to May) in a year. Kharif crops include cotton, jowar, bajra, tur, kulthi, mung, udid, chawali, groundnut, till, sugarcane, chillies. Rabi crops include wheat, jowar, grain and sunflower. Groundnut and mung are generally Zaid crops. Vegetables are grown throughout the year. Most of the cultivated land is un-irrigated area dependent on monsoon rainfall. As observed, the major crops grown in this area are rice, jowar, cotton and wheat. Pulses and oilseeds like Red gram (*Cajanus cajan*), Groundnut (*Arachis hypogea*), Soya bean (*Glycine max*), and Sunflower (*Helianthus annuus*), and *Guizotia abyssinica*. The leafy vegetable crops are *Brassica oleracea* var *capitata*, *Spinacia oleracea, Coriandrum sativum,* and *Amaranthus sp.* The *Peucedanum graveolens* (Shepu) and Coriander is found cultivated occasionally. The fruit vegetables are Tomato (*Lycopersicon esculenta*), Brinjal (*Solanum melongea*) and *Capsicum annum.* The important fruit plants were Oranges, Lemons, Mango, Papita, Guava, and Jamun. Occasionally, *Achrus sapota* (Chiku) was found grown. The wild fruit species are *Ziziphus mauritiana*, and *Cordia dichotoma*.

Main grass species found are Kusal, Bhurbhushi, Ghonad, Sheda, Marvel etc. The common grasses were *Heteropogon contortus, Brachiaria reptans, Digitaria adscendens, Eragrostis ciliaris, Melanocenchris jacquemontii, Aristida adscensionis, Chloris barbata,*

Chrysopogon fulvus, Apluda mutica Aristida sp, Heteropogon sp., Cenchrus barbatus, Setaria sp, Lasiurus hirsutus, and *Cymbopogon.*

The forests are mixed in nature and contain trees of all age classes. The forest predominantly consists of Teak and its associates. Proportion of Teak is about 28 percent (The Working Plan of Nagpur Forest Division, 2015-16 to 2024-25). The major mixed species are Saja, Bija, Kalam, Haldu, Tiwas, Dhaoda, Garadi, Mowai, Rohan, Bhirra, Garadi, Lendia, Palas, Salai etc. In the fruit bearing species, Tendu, Moha, Char, Aonla, Bel, Harra and Beheda are the main species. Natural Bamboo is limited to few compartments. Kuda, Garadi, Decamali are the main species in the understorey. The vegetation is predominantly young to middle aged with occasional mature trees.

Forest Type:

Teak bearing forest is predominantly confined to the hilly and undulated region of Protected forest & Reserve Forest. Teak in high proportion in some patches of the reserved forest. Common associates of Teak were Salai (*Boswellia serrata*), Dhaora (*Anogeissus latiflolia*), Aola (*Emblica officinalis*), Palas (*Butea monosperma*), Bor (*Zizyphus mauritiana*), Ghot (*Zizyphus xylophyra*), Ain (*Terminalia tomentosa*), Ahl (*Morinda pubescence*), Khair (*Acacia catechu*), Achar (*Buchanania lanzan*), Tendu (*Diospyros melanoxylon*), Amaltas (*Cassia fistula*), Kalam (*Mitragyna parviflora*), Moha (*Madhuca latifolia*), Movai (*Lannia grandis*), and Nehada (*Terminalia bellirica*). Undergrowth is not dense, except in moist valleys or along nala bank where Nirgudi (*Vitex negundo*), Murag sheng (*Helicteres isora*), and Bharat (*Gymnosporia montana*), Chilati (*Mimosa hamata*), stunted Khair (*Acacia catechu*) observed and at very few places Lantana (*Lantana camara*), and Parijatak (*Nyctanthes arbor-tristis*) were found. The principal grasses were Sheda (*Sehima nervosum*), Ghonal (*Themada triandra*), Kusal (*Heteropogan contortis*), Rusa (*Cymbopogan martini*), and Bhurbhusi (*Eragrotis tenella*). Climbers were not very common except along nallahs and streams. The common climbers were Chilati (*Mimosa hamata*), Malkangani (*Celastrus paniculata*), Piwarvel (*Combratum ovalifolia*), Mahul (*Bauhinia vahlii*), and Eruni (*Zizyphus oenoplca*).

Open Mixed Forests:

These forests observed intermixed with Teak and Anjan types. Along with the miscellaneous species Teak occurs in strips or patches in area adjoining Teak forests in all large reserves. Dense patches of better quality of mixed species were observed within the moist valleys along the banks and water courses only. The tree species commonly found in the mixed type of

forests were Dhawda (*Anogeissus latifolia*), Salai (*Boswellia serrata*), Khair (*Acacia catechu*), Ghot (*Zizyphus xylophyra*), Palas (*Butea monosperma*), Lendia (*Lagerstromia parviflora*), Amatas (*Cassia fistula*), Jamrasi (*Cassine glauca*), Kulu (*Serculia urens*), Air (*Terminalia tomentosa*), Kalam (*Mitragyna parviflora*), Tendu (*Diospyros melanoxylon*), Charoli (*Buchanania lanzan*), Semal (*Bombax ceiba*), Apta (*Bauhinia recemosa*), Aola (*Emblica officinalis*), Moha (*Madhuka latifolia*), Kala-shirish (*Albizzia lebbeck*) Chichwa (*Albizzia odoratissima*), Kasai (*Bridalia retusa*), Pangara (*Erythina* sp.), Movai (*Lannea grandis*), Rohan (*Soymida febrifuga*), Arjun (*Terminalia arjuna*) The undergrowth species like Bharat (*Maytenus emarginata*), Tarota (*Cassia tora*), Nirgudi (*Vitex negundo*) were observed within the study area. The climbers were Piwarbel (*Combratum ovalifolium*), Malkanguni (*Celestrus paniculata*), and Kanch Khuari (*Mukuna pruriens*).

According to the revised classification of forest types by Champion and Seth (1968), the forest type around the proposed site was Southern Tropical Dry Deciduous Forests (Group 5; sub-group 5A/ci and 5A/c-3) *i.e.* Southern Dry Mixed Deciduous Forests dominated by *Butea* and *Tectona*. However, considerable local variations occur in forest composition depending primarily upon the edaphic factors such as parent rock and consequent soil types; and topography of the tract. The aspect also plays an important role in determining the character of the vegetation in the hilly region.

Among the enumerated flora in the study area, none of them were assigned any threat category, by RED data book of Indian Plants (Nayar and Sastry, 1990) and Red list of threatened Vascular plants (IUCN, 2010; BSI, 2003).

4.4 Assessment of fauna

Mammals:

Presence of mammals was documented by using both direct and indirect evidences. Opportunistic sightings were also included. Transect line were used to search indirect evidence i.e. animal burrows/ holes, scat, pellets, feeding signs, and tracks. Photographic (colored pictorial guide) field guide were used for interviews with local people (Burnham et.al, 1980; Rodgers, 1991; Sale and Berkmuller, 1988; Daniel, 1992).

This region has a fairly good distribution of wildlife. Absence of natural grassland limits the herbivore population. Nilgai, sambhar and cheetal as well as wild boars are found all over the tract. Jackal, jungle cat and civet cat are also common. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. Barking deer, sloth bear, languor and monkeys are also common mammals. Jackal and Foxes are seen frequenting near the inhabited areas. Nilgai, Chital and Sambhar are found all over the surrounding forests.

The study area is a place of good mammalian diversity. As from Secondary data available from Forest Department there are records of Indian Tiger, Leopard, Sloth Bear falls under schedule-I of WPA and Jackal, Wild dog, Jungle cat, Rhesus Macaque, Common languor and Indian Fox falls under schedule -II of WPA. According to local people Cheetal, Sambhar and Wild boar are of common occurrence in this area. The area represents good habitat for these animals. However, these Mammalian wildlife species are not reported from proposed site.

Reptiles and Amphibian fauna:

The entire area of 10 km radius was searched to inventory all terrestrial habitats for reptiles and amphibians. Area searches consisted of turning cover objects like logs, boulders etc. (Welsh, 1987).

The reptiles have a prominent role in the ecological balance and conservation of nature. Due to thoughtless destruction of biotypes by man for his own uses, a large number of reptiles have become endangered today. The reptiles of this area exhibit moderate diversity. The amphibians present were Common frog (*Rana tigrina*) and Toad (*Bufo melanostictus*). The reptiles include lizards, amphibians, and snakes. Some of the reptiles listed in this area were Garden lizard (*Calotes versicolor*), Wall lizard (*Hemidactylus brookii*), Checkered Keel Back (*Xernochrophis piscator*), Cobra (*Naja naja*), and Krait (*Bungarus coeruleus*). Out of these no one falls under threatened category. According to local villagers there are records of Indian rock Python and Monitor Lizard in around area of Bor Tiger Reserve which belongs to Schedule I of WPA.

Indian Cobra (*Naja naja*), Checkered keel back (*Xenochrophis piscator),* Common Rat Snake (*Ptyas mucosus*), and Russell‟s Viper (*Vipera russelli*) were provided protection as per Schedule-II of Wild life protection act, (1972) and Common Krait (*Bungarus caerulus*) were provided as per Schedule – IV of Wildlife protection act.

Avifauna:

Standard methods were followed to survey the avifauna. Opportunistic survey was carried out with respect to avifaunal checklist. Identification by calls was also made for species identification which were not directly encountered or were hidden in the vegetation or canopy (Sridharan, 1989; Bhupathy, 1991; Bibby et al., 1992; and Hutto et al., 1986).

Common wild birds include painted sand grouse, common sand grouse, pea fowl, grey jungle fowl, red jungle fowl, red spur fowl, painted partridge, grey partridge, jungle bush quail, black breasted quail, Indian bustard quail, common or grey quail, pigeon, crane, dove are found in the

tract.

The study area has fairly good avifaunal diversity despite anthropogenic activities. Birds are important to human welfare in various ways including seed dispersal agents. The most commonly spotted bird species of this area were Indian Roller, Green bee eater, Jungle babbler, Cattle Egret, Crow pheasant, Red-wattled Lapwing, Red-vented bulbul, Orienal magpie-robin, black-winged kite, etc. Indian peafowl (*Pavo cristatus*) not sighted but enlisted based on communication with villagers. Some of the sighted birds were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedules. Among the Avifuana in the study area (data collected from Forest Depatment and Local consultation), Pea fowl, white rumped Vulture and Grey Headed Fish Eagle is included in schedule I of Wild life protection Act (1972), while many other birds are included in schedule IV.

Butterflies:

During survey period butterflies were rarely observed in early morning. They are enlisted below based on consultative approach with villagers.

Summary:

Baseline ecology and biodiversity studies were carried out to include the description of the various existing ecological settings within the area surrounded by a circle of 10 km radius around the proposed project site. Detailed list of Flora and Fauna recorded from Actual Site Visit and Secondary Sources is Tabulated in table below.

4.5 Status of Threatened Biodiversity

Baseline ecology and biodiversity was studied by actual field visit, Secondary data and by local consultation to find out various existing ecological settings within the area surrounded by a circle of 10 km radius around the proposed project site. In order to ascertain whether a species belong to any of the IUCN categories of threat or the WPA status, appropriate authentic and latest information from the websites was gathered. From the search, it is evident that none of the plant species found either in the core area nor in the project area belongs to a threatened category. There are some fauna species which belongs to WPA Schedule I. **Conservation Plan for Schedule I species along with budgetary allocation is presented in report**. Anticipated impact of the project on surrounding environment and precautionary measures adopted by the company to mitigate this are presented in section 5 of the report.

(List of Flora and Fauna from Site visit & Forest Department)

Floral Observations

Sr. No.	Scientific Name	Family	Common Name	IUCN Status
1.	*Acacia catechu*	Fabaceae	Khair	NE
2.	*Acacia auriculiformis*	Mimosaceae	Australian babhul	LC
3.	*Aegle marmelos*	Rutaceae	Bel	LC
4.	*Albizzia lebbeck*	Mimosaceae	Shirish	LC
5.	*Azadirachta indica*	Meliaceae	Neem	NE
6.	*Bauhinia racemosa*	Caesalpiniaceae	Apta	LC
7.	*Annona squamosa L.*	*Annonaceae*	*Sitafal*	NE
8.	*Butea monosperma*	Fabaceae	Palas	NE
9.	*Ailanthus excelsa* Roxb.	Simaroubaceae	Maharukh	LC
10.	*Leucaena latisiliqua* (L.) Gillis	Mimosaceae	Subabhul	NE
11.	*Moringa oleifera*	Moringaceae	Shevga	NE
12.	*Delonix regia*	Caesalpiniaceae	Gulmohar	LC
13.	*Grewia tiliifolia* Vahl.	Tiliaceae	Dhaman	LC
14.	*Eucalyptus goldulus*	Myrtaceae	Nilagiri	LC
15.	*Syzigium cumini*	Myrtaceae	Jambul	LC
16.	*Ficus bengalensis*	Euphorbiaceae	Vata-vraksha	LC
17.	*Ficus glomerata*	Moraceae	Umber	NE
18.	*Ficus hispida*	Moraceae	Bokeda	NE
19.	*Ficus religiosa*	Moraceae	Peepal	LC
20.	*Cassia fistula* L.	Caesalpiniaceae	Amaltas/Bahawa	LC
21.	*Diospyros malanoxylon*	Ebenaceae	Tendu	NE
22.	*Bombax ceiba*	Malvaceae	Savar	NE
23.	*Helicteres isora*	Malvaceae	Kewan	NE
24.	*Madhuca longifolia*	Sapotaceae	Moha	NE
25.	*Mangifera indica*	Anacardiaceae	Aamba	DD
26.	*Nerium indicum*	Apocynaceae	Kanher	LC
27.	*Polyalthia longifolia*	Annonaceae	Ashoka	NE
28.	*Pongamia pinnata*	Fabaceae	Karanj	LC
29.	*Psidium guajava*	Myrtaceae	Guava	LC
30.	*Pithecellobium dulce*	Mimosaceae	Vilayati Chinch	NE
31.	*Samania saman*	Mimosaceae	Raintree	LC
32.	*Saraca asoka*	Caesalpiniaceae	Ashok	NE
33.	*Sterculia urens*	Flacourtiaceae	Sardol	NE
34.	*Tamarindus indica*	Caesalpiniaceae	Chinch	NE
35.	*Terminalia bellerica*	Combretaceae	Behada	NE
36.	*Terminalia arjuna*	Combretaceae	Arjun / Kahu	LC
37.	*Tectona grandis*	Lamiaceae	Teak	LC
38.	*Terminalia tomentosa*	Combretaceae	Ain	NE
39.	*Zizyphus jujuba*	Rhamnaceae	Ber	LC
40.	*Plumeria obtusa*	Apocynaceae	Chafa	NE
41.	*Justicia adhatoda*	Acanthaceae	Adulsa	LC
42.	*Lantana camara*	Verbenaceae	Ghaneri	LC
43.	*Malachra capitata*	Malvaceae	Ranbhendi	NE
44.	*Sesamum orientale*	Pedaliaceae	Til	NE

45.	*Mimosa pudica*	Fabaceae	Touch me Not	LC
46.	*Bouganvilla spectabillis*	Nyctaginaceae	Bouganvel	NE
47.	*Ricinus communis*	Euphorbiaceae	Castor bean	NE
48.	*Ablemoschus manihot*	Malvaceae	Ran bhendi	NE
49.	*Calotropis gigantea*	Asclepiadaceae	Akra,Ruie	NE
50.	*Datura innoxia*	Solanaceae	Dhotra	NE
51.	*Helicteris isora*	Sterculiaceae	Murad-sheng	NE
52.	*Aloe vera*	Xanthorrhoeaceae	Aloe	NE
53.	*Acacia nilotica* ssp. *Cupressiformis*	Mimosaceae	Ramkathi	NE
54.	*Acacia nilotica* ssp. *indica*	Mimosaceae	Godi-babhul	NE
55.	*Hemidesmus indicus*	Asclepiadaceae	Anantmul	NE
56.	*Jatropha gossypifolia*	Euphorbiaceae	Ratanjaun	LC
57.	*Mimosa pudica*	Fabaceae	Chuimui	LC
58.	*Ocimum Sanctum*	Lamiaceae	Bantulsi	LC
59.	*Solanum virginianum*	Solanaceae	Kanteringani	LC
60.	*Achyranthes aspera*	Amaranthaceae	Aghada	NE
61.	*Ageratum conyzoides*	Asteraceae	Osadi	NE
62.	*Abrus precatorius*	Fabaceae	Gunja	NE
63.	*Acacia pinnata*	Fabaceae	Shemba	NE
64.	*Ipomoea carnea*	Convolvulaceae	Besharam	LC
65.	*Apluda mutica*	Poaceae	Kusali	NE
66.	*Cloris barbata*	Poaceae	Tan	LC
67.	*Coix-lachryma*	Poaceae	Ran-maka	NE
68.	*Andropogon Sp.*	Poaceae	--	NE
69.	*Cynodon dactylon*	Poaceae	Haryali, dhurva	LC
70.	*Dichanthlum annulatum*	Poaceae	Tel gavat	NE
71.	*Nelumbo nucifera*	Nelumbonaceae	Lotus	DD

72.

Birds				
1.	*Accipiter badius*	Shikra	-	LC
2.	*Acridotheres tristis*	Common Myna	-	LC
3.	*Bubulcus ibis*	Cattle egret	IV	LC
4.	*Centropus sinensis*	Crow pheasant	-	LC
5.	*Columba livia*	Rock Pigeon	IV	LC
6.	*Pavo cristatus*	Indian Peafowl	I	LC
7.	*Corvus splendens*	House Crow	-	LC
8.	*Passer domesticus*	House Sparrow	-	LC
9.	*Orthotomus sutorius*	Tailor bird	-	NE
10.	*Spilopelia chinensis*	Spotted dove	-	LC
11.	*Saxicoloides fulicatus*	Indian robin	IV	LC
12.	*Dicrurus adsimilis*	Indian black drongo	IV	LC
13.	*Egretta garzetta*	Little Egret	-	LC
14.	*Corvus macrorhynchus*	Jungle crow	V	LC
15.	*Gyps bengalensis*	Vulture	I	EN
16.	*Milvus migrans*	Black kite	-	NE
17.	*Elanus axillaris*	Black Shouldered Kite	-	LC

18.	*Himantopus himantopus*	Black-winged stilt	IV	LC
19.	*Merops orientalis*	Green bee eater	IV	LC
20.	*Dendrocitta vagabunda*	Rufous treepie	-	LC
21.	Upupa epops	Coomon Hoppoe	-	LC
22	*Ardea cinerea*	Grey Heron	IV	LC
.23.	*Sturnia pagodarum*	Brahminy myna	IV	LC
24.	*Spilornis cheela*	Crested Serpent Eagle	-	LC
25.	*Ploceus philippinus*	Indian baya	IV	LC
26.	*Megalaima haemacephala*	Coppersmith barbet	IV	LC
27.	*Apus affinus*	House swift	IV	LC
28.	*Psilopogon zeylanicus*	brown-headed barbet	IV	LC
29.	*Butastur teesa*	White eyed Buzzard	IV	LC
30.	*Pernis apivorus*	Honey Buzzard	-	LC
31.	*Acridotheres fuscus*	Jungle Myna	IV	LC
32.	*Anas poecilorhyncha*	Spot billed duck	IV	LC
33.	*Pycronotus cafer*	Red vented bulbul	IV	LC
34.	*Anthus rufulus*	Paddy field pipit	-	LC
35.	*Pastor roseus*	Rosy starling	-	LC
36.	*Micropternusbrachyu*	Indian wood pecker	-	LC
37.	*Upupa epops*	Coomon Hoppoe	IV	LC
38.	*Apus affinus*	House swift	IV	LC
39.	*Pitta brachyura*	Indian Pitta	IV	LC
40.	*Icthyophaga ichthyaetus*	Grey Headed Fish Eagle	I	NT
41.	*Terpsiphone paradisi*	Asian Paradise Flycatcher	IV	LC
42.	*Treron phoenicoptera*	Yellow Footed Green Pegion	IV	LC

Mammals

Zoological Name	**Common Name**	**Local Name**	**Schedule**
Panthera tigris tigris	Tiger	Wagh	I
Axis axis	Cheetal	Harin	III
Bandicota bengalensis	Field rat	Undir	V
Boselaphus tragocamelus	Blue bull	Nilgai	III
Canis aureus	Jackal	Kolha	II
Panther pardus fusca	Leopard	Bibat	I
Cervus unicolor	Sambhar	Sambhar	III
Cuon alpinus	Wild Dog	Jangali Kutra	II
Felis chaus	Jungle cat	Ranmanjar	II
Funambulus palmarum	Palm squirrel	Khar	IV
Funambulus pennati	Five Striped palm squirrel	Khar	IV
Herpestes edwardsi	Common / Indian Mongoose	Mungoose	IV
Melursus ursinus	Sloth Bear	Aswal	I
Bos gaurus	Indian Gaur	Jangli Reda	I

Hystrix indica	Indian Porcupine	Sayal	IV
Lepus nigricollis	Common Indian Hare	Jangli Sasa	IV
Macaca mulatta	Rhesus Macaque	Monkey	II
Muntiacus muntjak	Barking deer	Bhekar	III
Presbytis entellus	Common Languor	Bandar	II
Pteropus vampyrus	Fruit bat	Watwaghul	V
Rattus rattus	Common House rat	Undir	V
Gazella bennettii	Indian Gazelle	Chinkara	I
Suncus murinus	House Shrew	Chichundri	V
Sus cristatus	Wild boar	Ran Dukkar	III
Vulpes bengalensis	Indian Fox	Khokad	II

List of Flora and Fauna from field Visit and other Secondary data for the Wardha- Nagpur region

Scientific Name	Habit	Family	Native/Exotic	Local Name
Abrus precatorius	Climber	Fabaceae	Native	Gunj/Raktvel
Abutilon indicum ssp *indicum*	Shrub	Tiliaceae	Native	Mudra
Acacia auriculiformis	Tree	Mimosaceae	Exotic	Ausrtalian Babhul
Acacia catechu var. *sundra*	Tree	Mimosaceae	Native	Kath
Acacia chundra	Tree	Mimosaceae	Native	Kath
Acacia leucophloea	Tree	Mimosaceae	Native	Hivar
Acacia nilotica ssp. *astringens*	Tree	Mimosaceae	Native	Vedi-babhul
Acacia nilotica ssp. *Cupressiformis*	Tree	Mimosaceae	Native	Ramkathi
Acacia nilotica ssp. *indica*	Tree	Mimosaceae	Native	Godi-babhul
Acalypha indica	Herb	Euphorbiaceae	Native	
Acalypha malabarica	Shrub	Euphorbiaceae	Native	Khokali
Achyranthes aspera	Herb	Amaranthaceae	Native	Aghada/Apamarg
Adina cordifolia	Tree	Rubiaceae	Native	Haldu
Aegle marmelos (L.) Corr.	Tree	Rutaceae	Native	Belphal
Aerva javanica	Herb	Amaranthaceae	Native	Kapuri-Madhuri
Aerva lanata (L.) Juss. ex. Schult.	Herb	Amaranthaceae	Native	Kapuri-Madhuri
Aeschynomene indica L.	Shrub	Fabaceae	Native	Nalabi
Agave americana L. var. *americana*	Shrub	Agavaceae	Native	Ghaypat
Ageratum conyzoides L.	Herb	Asteraceae	Native	Osadi
Ailanthus excelsa Roxb.	Tree	Simaroubaceae	Native	Maharukh
Albizia amara (Roxb.) Boiv.	Tree	Mimosaceae	Native	Kansar
Albizia lebbeck	Tree	Mimosaceae	Native	Shirish (Black)
Albizia procera (Roxb.) Bth.	Tree	Mimosaceae	Native	Siras (White)
Albizzia odoratissima	Tree	Mimosaseae	Native	Chichwa
Alloteropsis cimicina (L.) Stapf.	Grass	Poaceae	Native	Gawat
Aloe vera (L.) Burm.	Shrub	Liliaceae	Native	Korphad
Alstonia scholaris (L.) R.Br.	Tree	Apocynaceae	Native	Satvin
Alternanthera sessilis	Herb	Amaranthaceae	Native	Chubukata
Alysicarpus monilifer (L.) DC	Herb	Fabaceae	Native	Shevra
Alysicarpus pubescens Law.	Herb	Fabaceae	Native	Shevra
Alysicarpus scariosus	Herb	Fabaceae	Native	Shevra
Amaranthus cruentus L.	Herb	Amaranthaceae	Native	Rajgira
Amaranthus roxburghianus Nevski.	Herb	Amaranthaceae	Native	
Amaranthus spinosus L.	Herb	Amaranthaceae	Native	Katemath
Amaranthus tricolor L.	Herb	Amaranthaceae	Native	Tandulja
Amaranthus viridis L.	Herb	Amaranthaceae	Native	Math
Ammannia multiflora Roxb.	Herb	Lythraceae	Native	
Andrographis paniculata	Herb	Acanthaceae	Native	Kal megh
Andropogon pumilus Roxb.	Grass	Poaceae	Native	Diwartan
Annona reticulata L.	Tree	Annonaceae	Native	Ramphal
Annona squamosa L.	Shrub	Annonaceae	Native	Sitaphal
Anogeissus latifolia	Tree	Combretaceae	Native	Dhaora/Dhawada
Apluda mutica	Grass	Poaceae	Native	Phulkia/Ponai
Argemone mexicana L.	Herb	Papavaraceae	Exotic	Pivla-dhotra
Aristida funiculata	Grass	Poaceae	Native	Katanbahari/Kusara
Aristida stocksii (Hook.f.) Domin.	Grass	Poaceae	Native	Pandhare Kusal
Aristolochia indica	Shrub	Aristolochiaceae	Native	Isharmul/saapsan
Arundinella setosa	Grass	Poaceae	Native	Fuler
Asclepias curassavica L.	Shrub	Asclepiadaceae	Native	Halad-kunku
Asparagus racemosus Willd.	Climber	Liliaceae	Native	Shatavari
Atylosia scarabaeoides	Herb	Fabaceae	Native	Rantur
Azadirachta indica A. Juss.	Tree	Meliaceae	Native	Neem

Scientific Name	Habit	Family	Native/Exotic	Local Name
Bacopa monnieri (L.) Penn.	Herb	Scrophulariaceae	Native	Nir-bramhi
Balanites aegyptiaca (L.) Del.	Tree	Balanitaceae	Native	Hinganbet
Bambusa arundinacea	Grass	Poaceae	Native	Katang bamboo
Bambusa ventricosa	Grass	Poaceae	Exotic	Dheri-bamboo
Barleria prionites	Shrub	Acanthaceae	Native	Katekoranti
Bauhinia purpurea L.	Tree	Caesalpiniaceae	Native	Kanchan
Bauhinia racemosa Lam.	Tree	Caesalpiniaceae	Native	Apta / Kachnar
Bauhinia vahlii	Climber	Caesalpiniaceae	Native	Mahulbel
Bauhinia variegata L.	Tree	Caesalpiniaceae	Native	Kanchan
Bidens pilosa	Herb	Asteraceae	Native	Cobblers pegs
Blainvillea acmella	Herb	Asteraceae	Native	
Boerhavia erecta L.	Herb	Nyctaginaceae	Native	Punarnava
Boerhavia repens L. var. *diffusa*	Herb	Nyctaginaceae	Native	Punarnava
Bombax ceiba	Tree	Bombaceae	Native	Katsawar/Semal
Borassus flabelifer	Palm	Arecaceae	Native	Mad
Boswellia serrata	Tree	Burseraceae	Native	Salai
Bougainvillea glabra Choisy	Climber	Nyctaginaceae	Exotic	Boganvel
Bougainvillea spectabilis Willd.	Climber	Nyctaginaceae	Exotic	Boganvel
Bridelia retusa	Tree	Euphorbiaceae	Native	Kateain/Kasai
Buchanania lanzan	Tree	Anacardiaceae	Native	Char/Chironji
Butea monosperma (Lam.) Taub.	Tree	Fabaceae	Native	Palas
Butea superba	Climber	Fabaceae	Native	Palasvel
Caesalpinia bonduc (L.) Roxb.	Shrub	Caesalpiniaceae	Exotic	Sagargota
Caesalpinia pulcherrima (L.) Sw.	Shrub	Caesalpiniaceae	Exotic	Shankasur
Cajanus cajan (L.) Millsp.	Shrub	Fabaceae	Cult.	Tur
Cajanus scarabaeoides	Climber	Fabaceae	Native	Jangli-tur
Callistemon citrinus (Curtis) Skeels	Tree	Myrtaceae	Exotic	Bottlebrush
Calotropis gigantea (L.) Ait.	Shrub	Asclepiadaceae	Native	Mandar
Calotropis procera (Ait.) R.Br.	Shrub	Asclepiadaceae	Native	Rui
Calycopteris floribunda	Climber	Combretaceae	Native	Kukudranji
Canna indica L.	Herb	Cannaceae	Cult.	Kardal
Canscora diffusa	Herb	Gentianaceae	Native	
Capparis decidua (Forssk.) Edgew.	Shrub	Capparaceae	Native	Nepati
Capparis grandis L.f.	Tree	Capparaceae	Native	Pachonda
Capparis spinosa L.	Climber	Capparaceae	Native	Wagati
Capparis zeylanica	Shrub	Capparaceae	Native	Ardanda
Caralluma adsendens	Herb	Asclepiadaceae	Native	Makadshindi
Cardiospermum helicacabum	Climber	Sapindaceae	Native	Phataka
Careya arborea	Tree	Lecythidiaceae	Native	Kumbhi
Carissa congesta	Shrub	Apocynaceae	Native	Karwand
Carthamus tinctorius L.	Herb	Asteraceae	Native	Kardai
Casearia elliptica	Tree	Samydaceae	Native	Kala karai
Casearia tomentosa	Tree	Samydaceae	Native	Tondri
Cassia alata L.	Shrub	Caesalpiniaceae	Native	Dadamardana
Cassia auriculata L.	Shrub	Caesalpiniaceae	Native	Tarvad
Cassia fistula L.	Tree	Caesalpiniaceae	Native	Amaltas/Bahawa
Cassia occidentalis L.	Herb	Caesalpiniaceae	Native	Kadu tarwad
Cassia pumila	Herb	Caesalpiniaceae	Native	
Cassia siamea Lam.	Tree	Caesalpiniaceae	Exotic	Kashid
Cassia sophera L.	Shrub	Caesalpiniaceae	Exotic	Kashawada
Cassia tora L.	Herb	Caesalpiniaceae	Native	Tarota
Cassia uniflora	Herb	Caesalpiniaceae	Exotic	Vilayati-takla
Cassine glauca	Tree	Celastraceae	Native	Aran
Casuarina equisetifolia L.	Tree	Casuarinaceae	Exotic	Suru
Catharanthus roseus	Shrub	Apocynaceae	Native	Sadaphuli
Celastrus paniculata	Shrub	Celastraceae	Native	Dhimarwel/Malkagni
Celosia argentea L.	Herb	Amaranthaceae	Native	Kurdu

Scientific Name	Habit	Family	Native/Exotic	Local Name
Cestrum diurinum L.	Shrub	Solanaceae	Native	Din-ka-raja
Cestrum nocturnum L.	Shrub	Solanaceae	Native	Ratrani
Chenopodium album L.	Herb	Chenopodiaceae	Native	Chakvat
Chloris barbata Swartz.	Grass	Poaceae	Native	Goshya
Chloris virgata Swartz.	Grass	Poaceae	Native	
Chlorophytum tuberosum	Herb	Liliaceae	Native	
Chloroxylon swietenia	Tree	Rutaceae	Native	Bhirra
Chrozophora prostrata	Herb	Euphorbiaceae	Native	
Chrysanthemum indicum L.	Herb	Asteraceae	Native	Shevanti
Chrysopogon fulvus (Spr.) Chiov.	Grass	Poaceae	Native	Gadasheda
Cissus cordifolia	Climber	Vitaceae	Native	Ran-draksh
Citrus limon (L.) Burm. f.	Shrub	Rutaceae	Native	Limbu
Cleistanthus collinus	Tree	Euphorbiaceae	Native	Garari
Cleome gynandra L.	Herb	Capparaceae	Native	Tilvan
Cleome viscosa L.	Herb	Capparaceae	Native	Pivli tilvan
Clerodendrum inerme (L.) Gaertn.	Shrub	Verbenaceae	Native	Koynel
Clerodendrum multiflorum	Shrub	Verbenaceae	Native	Arni
Cocculus hirsutus (L.) Theob.	Climber	Menispermaceae	Native	Vasanvel
Cochlospermum religiosum	Tree	Chochlospermaceae	Native	Gogal/Gongal
Cocos nucifera	Palm	Arecaceae	Native	Naral
Colocasia esculenta (L.) Schott	Herb	Araceae	Native	Alu
Combretum albidum G. Don	Climber	Combretaceae	Native	Piwarvel
Commelina benghalensis	Herb	Commelinaceae	Native	Kena
Commelina forskaolii	Herb	Commelinaceae	Native	Kena
Convolvulus arvensis L.	Climber	Convolvulaceae	Native	Chandvel
Corchorus olitorius	Herb	Tiliaceae	Native	Banpaat
Corchorus trilocularis	Herb	Tiliaceae	Native	Kaaduchunch
Cordia dichotoma Forst.f.	Tree	Bixaceae	Native	Bhokar
Crossandra infundibuliformis	Shrub	Acanthaceae	Native	Aboli
Crotalaria linifolia L.f.	Herb	Fabaceae	Native	
Crotolaria filipes	Herb	Fabaceae	Native	Fatfati
Croton bonplandianus	Herb	Euphorbiaceae	Native	Ban tulsi
Cryptolepis buchanani	Climber	Periplocaceae	Native	Dhudhi/Bokadwel
Cryptostegia grandiflora R.Br.	Climber	Periplocaceae	Native	Kavli
Curculigo orchioides	Herb	Hypoxidaceae	Native	Kali Musli
Curcuma aromatica	Herb	Zingiberaceae	Native	Ranhalad
Cuscuta hyalina Roth.	Climber	Cuscutaceae	Native	Amarvel
Cuscuta reflexa	Climber	Cuscutaceae	Native	Amarvel
Cyanotis axillaris	Herb	Commelinaceae	Native	Ichaka
Cymbopogon citratus (DC) Stapf.	Grass	Poaceae	Native	Gavatichaha
Cymbopogon martini	Grass	Poaceae	Native	Tikhadi
Cynadon dactylon (L.) Pers.	Grass	Poaceae	Native	Hariyalli/Doob
Cyperus compressus L.	Grass	Cyperaceae	Native	Motha
Cyperus difformis L.	Grass	Cyperaceae	Native	Lavala
Cyperus rotundus L. ssp. *rotundus*	Grass	Cyperaceae	Native	Nagarmotha
Dactyloctenium aegyptium	Grass	Poaceae	Native	
Dalbergia lanceolaria L.f.	Tree	Fabaceae	Native	Phanashi
Dalbergia latifolia Roxb.	Tree	Fabaceae	Native	Shisham
Dalbergia paniculata	Tree	Fabaceae	Native	Dhoban
Dalbergia sissoo	Tree	Fabaceae	Native	Sissoo
Datura inoxia Mill.	Herb	Solanaceae	Native	Dhotra
Datura metal L.	Herb	Solanaceae	Native	Kala-dhotra
Datura stramonium L.	Herb	Solanaceae	Native	Dhotra
Delonix elata	Tree	Caesalpiniaceae	Exotic	Pandhra Gulmohor
Delonix regia (Boj. ex Hook.) Raf.	Tree	Caesalpiniaceae	Exotic	Gulmohor
Dendrocalamus strictus	Grass	Poaceae	Native	Bans/Bamboo
Dendrophthoe falcata (L.f.) Etting	Shrub	Loranthaceae	Native	Bandgul

Scientific Name	Habit	Family	Native/Exotic	Local Name
Desmodium triflorum (L.) DC	Herb	Fabaceae	Native	Ran-methi
Dichanthium annulatum	Grass	Poaceae	Native	Marvel (Small)
Dichanthium aristatum	Grass	Poaceae	Native	Marvel (Big)
Dichanthium foveolatum	Grass	Poaceae	Native	Marvel
Dichrostachys cinerea	Shrub	Mimosaceae	Native	Sigam-Kati
Dieffenbachia picta	Shrub	Araceae	Exotic	
Digera muricata (L.) Mart.	Herb	Amaranthaceae	Native	Gitana
Digitaria stricta	Grass	Poaceae	Native	
Diospyros malanoxylon	Tree	Ebenaceae	Native	Tendu
Diospyros montana	Tree	Ebenaceae	Native	Bistendu
Dodonaea viscosa	Shrub	Sapindaceae	Native	Kharata
Dolichandrone falcata	Tree	Bignoniaceae	Native	Medsing
Duranta erecta	Shrub	Verbenaceae	Exotic	Duranta
Echinops echinatus Roxb.	Herb	Asteraceae	Native	Utanti
Eclipta prostrata (L.) L. Mant.	Herb	Asteraceae	Native	Maka
Ehretia laevis Roxb.	Tree	Boraginaceae	Native	Datrangi/Desipapdi
Eichhornia crassipes (Mart.) Solms	Herb	Pontederiaceae	Exotic	Jalparni
Emblica officinalis Gaertn.	Tree	Euphorbiaceae	Native	Avala
Enicostemma littorale	Herb	Gentianaceae	Native	Kadvi-Nayi
Eragrostis tenella	Grass	Poaceae	Native	Bhurbhusi
Erythrina indica	Tree	Fabaceae	Native	Pangara
Erythrina variegata	Tree	Fabaceae	Native	Pangara
Eucalyptus globulus Labill.	Tree	Myrtaceae	Exotic	Nilgiri
Euphorbia cotinifolia	Shrub	Euphorbiaceae	Exotic	Lalpatti
Euphorbia geniculata	Herb	Euphorbiaceae	Native	Dudhi
Euphorbia hirta	Herb	Euphorbiaceae	Native	Dudhivel/Govrrdhan
Euphorbia ligularia Roxb.	Shrub	Euphorbiaceae	Native	Sabar
Euphorbia microphylla	Herb	Euphorbiaceae	Native	Lahan dudhi
Euphorbia milli Desmoul.	Shrub	Euphorbiaceae	Exotic	
Euphorbia nerrifolia	Shrub	Euphorbiaceae	Exotic	Sabar
Euphorbia tirucalli L.	Shrub	Euphorbiaceae	Native	Sher
Evolvulus alsinoides (L.) L.	Herb	Convolvulaceae	Native	Vishnukranta
Ficus amplissima J.E. Sm.	Tree	Moraceae	Native	Pimpri
Ficus benghalensis L.	Tree	Moraceae	Native	Bad/Wad
Ficus elastica Roxb. ex. Horn.	Shrub	Moraceae	Exotic	Rubber
Ficus hispida	Shrub	Moraceae	Native	Katumber/Auadumber
Ficus microcarpa L.f.	Tree	Moraceae	Native	Nandruk
Ficus racemosa L.	Tree	Moraceae	Native	Gular/Umber
Ficus religiosa L.	Tree	Moraceae	Native	Pimpal
Fimbristylis dichotoma (L.) Vahl.	Grass	Cyperaceae	Native	
Flacourtia indica (Burm.f.) Merr.	Shrub	Flacourtiaceae	Native	Kakai
Gardenia gummifera	Shrub	Rubiaceae	Native	Dekamali
Gardenia latifolia	Tree	Rubiaceae	Native	Ghogar
Gardenia turgida	Shrub	Rubiaceae	Native	Phetra (Safed)
Garuga pinnata	Tree	Burseraceae	Native	Kakad
Girardinia diversifolia	Herb	Urticaceae	Native	Khajota
Gliricidia sepium	Tree	Fabaceae	Exotic	Gliricidia
Gloriosa superba	Climber	Liliaceae	Native	Khadyanag/ Langali
Gmelina arborea Roxb.	Tree	Verbenaceae	Native	Shivan
Gomphrena globosa L.	Herb	Amaranthaceae	Native	Jafrigundi
Gossypium herbaceum	Herb	Malvaceae	Native	Kapas
Grangea madraspatana	Herb	Asteraceae	Native	
Grevillea robusta	Tree	Proteaceae	Exotic	Silver Oak
Grewia hirsuta	Tree	Tiliaceae	Native	Gautri/Gaturli
Grewia tenax (Forssk.) Fiori	Shrub	Tiliaceae	Native	Gangeti
Grewia tiliifolia Vahl.	Tree	Tiliaceae	Native	Dhaman
Guizotia abyssinica (L.f.) Cass	Herb	Asteraceae	Cult.	Karale

Scientific Name	Habit	Family	Native/Exotic	Local Name
Gymnosporea senegalensis	Shrub	Celastraceae	Native	Bharati
Hamelia patens Jacq.	Shrub	Rubiaceae	Exotic	
Hedychium coronarium Koen.	Herb	Zingiberaceae	Cult.	Sontakka
Hedyotis corymbosa (L.) Lam.	Herb	Rubiaceae	Native	Pitpapda
Helianthus annuus L.	Herb	Asteraceae	Cult.	Suryaphul
Helicteres isora	Shrub	Sterculiaceae	Native	Murudsheng
Heliotropium indicum L.	Herb	Boraginaceae	Native	Burundi
Hemidesmus indicus (L.) Schult.	Climber	Asclepiadaceae	Native	Khobarvel/Anantmul
Heteropogon contortus	Grass	Poaceae	Native	Kali-kusali
Hibiscus rosa-sinensis	Shrub	Malvaceae	Native	Jasvand
Holarrhena pubescense	Tree	Apocynaceae	Native	White kuda/Satkuda/Kuda
Holoptelea integrifolia	Tree	Ulmaceae	Native	Wavli
Hydrilla verticillata (L.f.) Royle	Herb	Hydrocharitaceae	Native	Sheval
Hygrophilla auriculata	Herb	Acanthaceae	Native	Gokukata/Talimkhana
Hyptis suaveolens (L.) Poit.	Herb	Lamiaceae	Native	Rantulasi/Bantulasi
Imperata cylindrica	Grass	Poaceae	Native	Dab/Dabat/ Phulya
Indigofera cordifolia	Herb	Fabaceae	Native	Bechka
Indigofera linifolia	Herb	Fabaceae	Native	Lal-godhadi
Indigofera tinctoria	Shrub	Fabaceae	Native	Neel
Indoneesiella echioides	Herb	Acanthaceae	Native	
Ipomoea aquatica Rorssk.	Herb	Convolvulaceae	Native	Nalichi bhaji
Ipomoea carnea Jacq.	Shrub	Convolvulaceae	Exotic	Besharam
Ischaemum angustifolium	Grass	Poaceae	Native	Sabai / Sum
Iseilema laxum Hack.	Grass	Poaceae	Native	Mus
Ixora arborea	Tree	Rubiaceae	Native	Lokhandi
Ixora coccinea L.	Shrub	Rubiaceae	Native	
Jacaranda acutifolia Humb. & Bopl.	Tree	Bignoniaceae	Exotic	Nilmohor
Jasminum auriculatum Vahl.	Shrub	Oleaceae	Native	Jai
Jasminum sambac (L.) Ait.	Shrub	Oleaceae	Native	Mogra
Jatropha curcas L.	Shrub	Euphorbiaceae	Native	Chandra-jyoti
Jatropha glandulifera Roxb.	Shrub	Euphorbiaceae	Native	Jangli-erand
Jatropha gossipifolia L.	Shrub	Euphorbiaceae	Native	Mogli-erand
Justicia adhatoda L.	Shrub	Acanthaceae	Native	Adulsa
Justicia procumbens	Herb	Acanthaceae	Native	Kalmashi
Justicia simplex	Herb	Acanthaceae	Native	
Kalanchoe pinnata (Lam.) Pres.	Shrub	Crassulaceae	Native	Panphuti
Kigelia africana (Lam.) Bth.	Tree	Bignoniaceae	Exotic	Brahmdand
Kydia calycina	Tree	Malvaceae	Native	Warang/Baranga
Kyllinga tenuifolia Steud.	Grass	Cyperaceae	Native	Lavali
Lablab purpureus var. *lignosus*	Climber	Fabaceae	Cult.	Waal
Lagascea mollis	Herb	Asteraceae	Native	
Lagerstroemia indica L.	Tree	Lythraceae	Native	Taman
Lagerstroemia parviflora	Tree	Lythraceae	Native	Lendia/Lenda
Lannea coromandelica	Tree	Anacardiaceae	Native	Moyen/Mowai
Lantana camara L.	Shrub	Verbenaceae	Exotic	Ghaneri/Ulta
Lavandula bipinnata	Herb	Lamiaceae	Native	
Lens culinaris Medik.	Herb	Fabaceae	Cult.	Masur
Lepidagathis cristata Willd.	Herb	Acanthaceae	Native	Bhuigend
Lepidagathis trinervis var. *trinervis*	Herb	Acanthaceae	Native	Bhuigend
Leucaena latisiliqua (L.) Gillis	Tree	Mimosaceae	Exotic	Subabhul
Leucas aspera (Willd.) Link.	Herb	Lamiaceae	Native	Dudhani
Limnophila indica (L.) Druce	Herb	Scrophulariaceae	Native	Ambuli
Limonia acidissima L.	Tree	Rutaceae	Native	Kavath
Lobelia nicotianaefolia	Herb	Lobeliaceae	Native	Rantambaku
Ludwigia octavalvis (Jacq.) Raven	Herb	Onagraceae	Native	Panlavang
Luffa acutangula (L.) Roxb.	Climber	Cucurbitaceae	Native	Dodka
Luffa cylindrica (L.) M.J. Roem.	Climber	Cucurbitaceae	Native	Ghosale

Scientific Name	Habit	Family	Native/Exotic	Local Name
Madhuca latifolia	Tree	Sapotaceae	Native	Moha/Mahuwa
Malva parviflora L.	Herb	Malvaceae	Native	
Malvastrum coromandelianum	Herb	Malvaceae	Native	Lokhandi
Mangifera indica L.	Tree	Anacardiaceae	Native	Amba
Manilkara hexandra	Tree	Sapotaceae	Native	Khirni
Manilkara zapota	Tree	Sapotaceae	Native	Chiku
Martynia annua L.	Herb	Martyniaceae	Native	Waghnakhi
Maytenus senegalensis	Shrub	Celastraceae	Native	Henkal
Medicago sativa L.	Herb	Fabaceae	Native	Ghas
Melanocenchris jacquemontii	Grass	Poaceae	Native	Lahan kusal
Melia azedarach L.	Tree	Meliaceae	Exotic	Vilayati neem
Melilotus alba Medik. ex Desr.	Herb	Fabaceae	Native	Pandhari ran-methi
Mentha arvensis L.	Herb	Lamiaceae	Cult.	Pudina
Miliusa velutina	Tree	Annonaceae	Native	Karai
Millettia extensa	Climber	Fabaceae	Native	Nasbel
Millingtonia hortensis L.f.	Tree	Bignoniaceae	Native	Booch
Mimosa hamata Willd.	Shrub	Mimosaceae	Native	Chilati
Mimosa pudica L.	Herb	Mimosaceae	Native	Lajwanti
Mitragyna parvifolia	Tree	Rubiaceae	Native	Kalam/Mundi
Momordica dioica	Climber	Cucurbitaceae	Native	Kartoli
Morinda citrifolia L.	Tree	Rubiaceae	Native	Aal
Moringa oleifera Lam.	Tree	Moringaceae	Native	Shevga
Mucuna pruriens	Climber	Fabaceae	Native	Kanjkuri
Mukia maderaspatana (L.) Roem.	Climber	Cucurbitaceae	Native	Chirati
Muntingia calabura L.	Tree	Elaeocarpaceae	Exotic	Singapore-cheri
Murraya koenigii (L.) Spr.	Shrub	Rutaceae	Native	Kadhi-patta
Nelumbo nucifera	Herb	Nymphaceae	Native	Kamal
Nerium indicum Mill.	Shrub	Apocynaceae	Native	Kanher
Nyctanthes arbor-tristis L.	Shrub	Oleaceae	Native	Prajakta
Ocimum americanum L.	Shrub	Lamiaceae	Native	Ran-tulsi
Ocimum tenuiflorum L.	Shrub	Lamiaceae	Native	Tulas
Olax scandens	Shrub	Olacaceae	Native	Aradphari/harduli
Opuntia elatior Mill.Gard.	Shrub	Cactaceae	Native	Nivdung
Orthosiphon pallidus Royle ex Bth.	Herb	Lamiaceae	Native	Arjaka
Ottelia alismoides (L.) Pers.	Herb	Hydrocharitaceae	Native	Pan-vanaspati
Ougeinia dalbergioides	Tree	Fabaceae	Native	Tiwas/Tinsa
Oxalis corniculata L.	Herb	Oxalidaceae	Native	Ambuti/Tipani
Parthenium hysterophorus L.	Herb	Asteraceae	Exotic	Gajargavat
Passiflora foetida	Climber	Passifloraceae	Native	Ghan-vel
Peltophorum pterocarpum	Tree	Caesalpiniaceae	Exotic	Sonmohor
Pennisetum americanum	Grass	Poaceae	Cult.	Bajari
Peristrophe paniculata	Herb	Acanthaceae	Native	Kakjangha
Persicaria glabra (Willd.) Gomez.	Herb	Polygonaceae	Native	Sheral
Phoenix sylvestris (L.) Roxb.	Palm	Arecaceae	Native	Sindi/Chhindi
Phyla nodiflora (L.) Greene	Herb	Verbenaceae	Native	Gour-mundi
Phyllanthus amarus	Herb	Euphorbiaceae	Native	Bhui-avali
Phyllanthus fraternus Webster	Herb	Euphorbiaceae	Native	Bhui-avali
Phyllanthus maderaspatensis L.	Herb	Euphorbiaceae	Native	Kachora
Phyllanthus niruri	Herb	Euphorbiaceae	Native	Bhui Aonla
Phyllanthus reticulatus Poir.	Shrub	Euphorbiaceae	Native	Panjuli
Physalis minima L.	Herb	Solanaceae	Native	Ran-popti
Piper betle	Climber	Piperaceae	Native	Nagwel/Pan
Pithecellobium dulce (Roxb.) Bth.	Tree	Mimosaceae	Exotic	Vilayati chinch
Pithecelobium saman	Tree	Mimosaceae	Exotic	Rain-tree
Plantago ovata	Herb	Plantaginaceae	Native	Isapghol/Aspghol
Plumbago zeylanica L.	Shrub	Plumbaginaceae	Native	Chitrak
Plumeria alba L.	Tree	Apocynaceae	Native	Pandhra-chapha

Scientific Name	Habit	Family	Native/Exotic	Local Name
Plumeria rubra L.	Tree	Apocynaceae	Native	Lal-Chapha
Polyalthia longifolia (Sonn.) Thw.	Tree	Annonaceae	Exotic	Ashok
Polygala arvensis Willd.	Herb	Polygalaceae	Native	
Polygala erioptera	Herb	Polygalaceae	Native	
Pongamia pinnata (L.) Pierre.	Tree	Fabaceae	Native	Karanj
Portulaca oleracea L.	Herb	Portulacaceae	Native	Ghol
Portulaca quadrifida L.	Herb	Portulacaceae	Native	Chival
Prosopis cineraria (L.) Druce	Tree	Mimosaceae	Native	Saundad
Prosopis juliflora (Swartz) DC	Tree	Mimosaceae	Exotic	Vilayati-babhul
Psidium guajava L.	Shrub	Myrtaceae	Native	Peru
Pterocarpus marsupium	Tree	Fabaceae	Native	Bija
Pulicaria wightiana	Herb	Asteraceae	Native	Son-tikali
Punica granatum L.	Shrub	Punicaceae	Native	Dalimb
Pupalia lappacea	Shrub	Amaranthaceae	Native	
Pycreus pumilus	Grass	Cyperaceae	Native	
Quisqualis indica	Climber	Combretaceae	Exotic	Madhumalti
Randia uliginosa	Tree	Rubiaceae	Native	Kalaphetra
Rauwolfia serpentina	Herb	Apocynaceae	Native	Sarpgandha
Ravenala madagascariensis	Tree	Musaceae	Exotic	Travellers Palm
Rivea hypocrateriformis	Climber	Convolvulaceae	Native	Phangyel
Roystonea regia	Palm	Arecaceae	Exotic	Bottle palm
Rungia pectinata	Herb	Acanthaceae	Native	Sut
Salix tetrasperma	Tree	Salicaceae	Native	Wandra/Bainsa
Salvadora persica	Tree	Salvadoraceae	Native	Miswak
Santalum album L.	Tree	Santalaceae	Native	Chandan
Sapindus laurifolius Vahl.	Tree	Sapindaceae	Native	Ritha
Schleichera oleosa	Tree	Sapindaceae	Native	Kusum
Schrebera swietenioides	Tree	Aristolochiaceae	Native	Mokha
Securinega leucopyrus	Shrub	Euphorbiaceae	Native	Pandharphalli
Sehima nervosum	Grass	Poaceae	Native	Sheda
Sehima sulcatum	Grass	Poaceae	Native	Paunia
Semecarpus anacardium	Tree	Anacardiaceae	Native	Biba/Bhilawa
Sesbania grandiflora (L.) Poir.	Tree	Fabaceae	Native	Hadga
Sesbania sesban (L.) Merr.	Shrub	Fabaceae	Native	Shevri
Setaria italica (L.) P. Beauv.	Grass	Poaceae	Cult.	Rala
Setaria pumila (Poir) R. & S. Syst.	Grass	Poaceae	Native	Barti
Sida acuta Burm.f.	Herb	Malvaceae	Native	Lokhandi
Sida cordifolia L.	Herb	Malvaceae	Native	Lokhandi
Sida rhombifolia	Herb	Malvaceae	Native	Lokhandi
Smilax macrophylla	Climber	Smilacaceae	Native	Ramdaton
Solanum melongena	Herb	Solanaceae	Exotic	Waangi
Solanum nigrum L.	Herb	Solanaceae	Native	Kamuni
Solanum virginianum L.	Herb	Solanaceae	Native	Bhui-ringni
Sonchus asper (L.) Hill.	Herb	Asteraceae	Native	Mhatara
Sorghum miliiforme var. *miliiforme*	Grass	Poaceae	Cult.	Jondhala
Soymida febrifuga	Tree	Meliaceae	Native	Rohan
Spathodea campanulata P. Beauv.	Tree	Bignoniaceae	Exotic	Pichkari
Spermacoce pusilla Wall.	Herb	Rubiaceae	Native	Tarakadal
Spermadictyon suaveolens	Shrub	Rubiaceae	Native	Bain Champa
Sphaeranthus indicus L.	Herb	Asteraceae	Native	Mundi
Spirodela polyrhiza (L.) Schleid.	Herb	Lemnaceae	Native	
Sporobolus indicus (L.) R.Br.	Grass	Poaceae	Native	Chimanchara
Sterculia urens	Tree	Sterculiaceae	Native	Kullu/Kulu
Stereospermum suaveolens	Tree	Bignoniaceae	Native	Padar
Striga densiflora	Herb	Scrophulariaceae	Native	
Stylosanthes hamata	Herb	Fabaceae	Native	Hamata
Stylosanthes scabra	Herb	Fabaceae	Native	Scabra

Scientific Name	Habit	Family	Native/Exotic	Local Name
Swietenia mahagoni	Tree	Meliaceae	Native	Mahogani
Syzygium cumini (L.) Skeels	Tree	Myrtaceae	Native	Jambhul
Tabebuia rosea (Bertol.) DC	Tree	Bignoniaceae	Exotic	Tabebuia
Tabernaemontana divaricata	Shrub	Apocynaceae	Exotic	Chandani
Tagetes erecta L.	Herb	Asteraceae	Native	Zhendu
Tamarindus indica L.	Tree	Caesalpiniaceae	Native	Chinch/Imli
Tecoma stans (Linn.) H.B. & K.	Shrub	Bignoniaceae	Exotic	Tecoma
Tectona grandis L.f.	Tree	Verbenaceae	Native	Sagwan
Tephrosia hamiltonii	Herb	Fabaceae	Native	Divali
Tephrosia purpurea (L.) Pers.	Shrub	Fabaceae	Native	Unhali
Terminalia arjuna	Tree	Combretaceae	Native	Arjun / Kahu
Terminalia bellerica	Tree	Combretaceae	Native	Behada
Terminalia catapa L.	Tree	Combretaceae	Exotic	Jangli-badam
Terminalia chebula	Tree	Combretaceae	Native	Hirda/Harra
Terminalia tomentosa	Tree	Combretaceae	Native	Saja/Ain
Themeda quadrivalvis	Grass	Poaceae	native	Ghonad
Themeda triandra Forssk.	Grass	Poaceae	Native	Bunden
Thespesia populnea	Tree	Malvaceae	Native	Bhend
Thevetia nerrifolia	Shrub	Apocynaceae	Exotic	Pivla-kanher
Thuja compacta	Shrub	Cupressaceae	Exotic	Thuja
Tinospora cordifolia	Climber	Menispermaceae	Native	Gul-vel
Tribulus terrestris L.	Herb	Zygophyllaceae	Native	Sarata/Gokru
Trichodesma indicum (L.) Lehm.	Herb	Boraginaceae	Native	Chota kalpa
Tricholepis amplexicaulis C.B. Cl	Herb	Asteraceae	Native	Dahan
Tridax procumbens L.	Herb	Asteraceae	Native	Kamarmodi
Triumfetta pilosa Roth.	Shrub	Tiliaceae	Native	Zinjurdi
Triumfetta rhomboidea Jacq.	Shrub	Tiliaceae	Native	Zinjurdi
Typha angustifolia L.	Herb	Typhaceae	Native	Pan-kanis
Urena lobata L.	Shrub	Malvaceae	Native	Vanbhendi
Vallisneria spiralis L.	Herb	Hydrocharitaceae	Native	
Vanda tessellata	Herb	Orchidaceae	Native	Bandha/ Bandh
Vantilago denticulata	Climber	Rhamnaceae	Native	Papri Lalbel
Verbascum chinense (L.) Sant.	Herb	Scrophulariaceae	Native	Kutaki
Vernonia cinerea (L.) Less.	Herb	Asteraceae	Native	Sahadevi
Vetiveria zizaniodes	Grass	Poaceae	Native	Khas
Vigna aconitifolia	Herb	Fabaceae	Cult.	Matki
Vigna angularis	Herb	Fabaceae	Cult.	Mung
Vigna mungo (L.) Hepper	Herb	Fabaceae	Cult.	Udid
Vigna radiata (L.) R. Wilczek.	Herb	Fabaceae	Cult.	Sona-mug
Vigna trilobata (L.) Verdc.	Herb	Fabaceae	Native	Jangli-mug
Vigna unguiculata subsp. *cylindrica*	Herb	Fabaceae	Cult.	Chavali
Vigna unguiculata subsp. *unguiculata*	Herb	Fabaceae	Cult.	Kulith
Vitex negundo L. Var. *negundo*	Shrub	Verbenaceae	Native	Nirgudi
Wattakaka volubilis (L.f.) Stapf.	Climber	Asclepiadaceae	Native	Shinkecha vel
Withania somnifera (L.) Dunal	Herb	Solanaceae	Native	Ashwagandha
Wolffia arrhiza	Herb	Lemnaceae	Native	
Woodfordia floribunda	Shrub	Lythraceae	Native	Jilbili/Dhayti
Wrightia tinctoria	Tree	Apocynaceae	Native	Dudhi/Kalakuda
Xanthium indicum Koen.	Herb	Asteraceae	Native	Landga
Xylia xylocarpa	Tree	Mimosaseae	Native	Surya
Ziziphus mauritiana Lam.	Tree	Rhamnaceae	Native	Bor/Ber
Ziziphus oenoplia	Climber	Rhamnaceae	Native	Eruni
Ziziphus xylopyra (Retz.) Willd.	Tree	Rhamnaceae	Native	Ghoti/Ghot
Zornia gibbosa Span.	Herb	Fabaceae	Native	Naala barki

Reptiles and Amphibians

Scientific Name	English Name	Common Name	Schedule as per WPA
Bufo parietalis	Indian Toad	Beduk	IV
Bungarus caeruleus	Common Indian Krait	Karait	IV
Calotes versicolor	Garden Lizard	Sarda	IV
Lycodon aulicus	Kawda	Kawda	--
Naja naja	Indian Cobra	Nag	II
Ptyas mucosus	Common Rat Snake	Dhaman	II
Vipera russelli	Russell's Viper or Ghonas	Viper	II
Xenochrophis piscator	Checkered keel back	Pan-diwad	II
Macropisthodon plumbicolor	Green keel back	Gawatya	--
Calotes versicolor	Common garden lizard	Sarada	--
Lygosoma punctatus	Snake Skink	Sap-surali	--
Python molurus	Indian Rock Python	Ajgar	I
Varanus bengalensis	Monitor Lizard	Ghorpad	I

Sr. No.	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
Butterfly			
1.	Chocolate pansy	*Junonia iphita*	Not enlisted
2.	Common Jezebel	*Delias eucharis*	Not enlisted
3.	Common evening brown	*Melanitis leda*	Not enlisted
4.	Common grass yellow	*Eurema hecabe*	Not enlisted
5.	Common Indian crow	*Euploea core*	Sch – IV
6.	Dark pierrot	*Tarucus ananda*	Not enlisted
7.	Gray pansy	*Junonia atlites*	Not enlisted
8.	Lime butterfly	*Papilio demoleus*	Not enlisted
9.	Plain tiger	*Danaus chrysippus*	Not enlisted
10	Small orange tip	*Colotis etrida*	Not enlisted
11	Tailed jay	*Graphium agamemnon*	Not enlisted
Dragonflies and Damselflies			
1.	Ground skimmer	*Diplocodes trivialis*	Not enlisted
2.	Long legged marsh skimmer	*Trithemis pallidinervis*	Not enlisted
3.	Tricoloured marsh hawk	*Orthetrum luzonicum*	Not enlisted
4.	Senegal golden dartlet	*Ischnura senegalensis*	Not enlisted
5.	blue darner	*Aeshna multicolor*	Not enlisted
6.	Club tail	*Gomphus vulgatissimus*	LC
7.	Blue Tailed Green Darner	*Anax guttatus*	Not enlisted
8.	Ruddy Marsh Skimmer	*Crocothemis servilia*	Not enlisted
9.	Pied Paddy Skimmer	*Neurothemis tullia*	Not enlisted
10	Red Groundling	*Brachythemis lacustris*	Not enlisted
Insect			

11	Honey bee	*Apis cerana*	Not enlisted
12	Rock bee	*Apis dorsata*	Not enlisted
13	Carpenter bee	*Xylocopa violacea*	Not enlisted
14	Cricket	*Gryllides Laicharting*	Not enlisted
15	Common fly	*Musca domestica*	Not enlisted
16	Termite	*Isoptera*	Not enlisted
17	Honey bee	*Apis cerana*	Not enlisted
18	Phasmid	*Phasmatodea*	Not enlisted
19	Silver fish	*Lepisma saccharina*	Not enlisted
20	Flea	*Siphonaptera*	Not enlisted
21	Fly	*Diptera*	Not enlisted
22	Orthoptera	*Orthoptera*	Not enlisted

5.0 Identification of probable impact on Surrounding Habitat, Flora & Fauna

Any development activities are bound to have some adverse impacts on surrounding environment. However, often of the adverse impacts of development are amenable to technological control by providing necessary preventive and control measures and finally through effective environmental management of the operating industries.

Impacts of manufacturing unit of API project, on flora and fauna of surrounding area were identified mainly by using information presented in previous Chapter-4. Due to limitations of the study period, the baseline information was also substantiated through secondary information. Finally, the baseline ecological information was juxtaposed with the project activities and impacts arising due to its construction and operation phases were assessed. Specific impacts were visualized in terms of seasonal issues related with the ecology of important species and their habitats.

Following the above mentioned approach, impacts on various components of biodiversity were assessed. The general ecological impacts during the construction and operation phases may be either short term, temporary or long term and permanent or irreversible in nature. Some of the impacts may be confined to the close boundary of the project site and some may extend to the surrounding areas. Scientific studies revealed that loss of vegetation cover, pollution of water, soil and air, depletion of natural flora and fauna, reduction in biodiversity, erosion of soil, are some of the conspicuous ecological and environmental implications of development activities. Following are general and specific ecological impacts in absence of mitigation measures during construction and operation phases of the proposed project.

5.1 Habitat degradation

As reported in the baseline ecological data in chapter-4, the core and buffer area of the proposed project represents unique flora and fauna of study area. This area has vegetation representative that of typical dry deciduous forests. The fauna of the study area are also typical representatives of Bor Wildlife Sanctuary. The proposed project activities in absence of any mitigation measures could potentially alter the habitat and degrade the eco-system, their functions as following.

- Though, not part of any protected area, this project core area has sparse tree cover surrounded by trees, The total plot area is approximately 600 Acres which is under the possession of Ipca. However, considering the ESZ area near to site out of 600 Acres only 75 Acres land will be utilized for proposed project. The land other than 75 Acres which is under the possession of Ipca only will be act as a buffer for existing biodiversity of protected forest which is buffer zone of Bor Wildlife sanctuary located at a distance of 7.0 Km. Total built up area is 69799.60 Sq. meter including manufacturing blocks, storage area, ETP, roads, admin building, canteen, etc. Therefore, the gross loss of habitats for flora and fauna would not be more than 11% of the area and existing structures will be utilized and additional construction area will be on 35599.60 Sq. meter ground coverage. Rest of the area would remain open, and unaltered with augmentation of green belt.
- Total 320 number of trees will be cut for the proposed manufacturing unit construction and compensatory afforestation will be done in & around the plot.
- The project set up would require excavation and vegetation removal from this area. This would result in removal or displacement of existing vegetation/flora and fauna from the project core area.
- During construction, top soil would be removed from 35599.60 Sq. meter area which is a gross loss of productive soil form the eco- system.
- During the construction work, construction wastes such as oil, grease and debris could pollute the soil in the surrounding area and decrease its productivity.
- The major impact of operational on terrestrial ecology is due to constant noise and

illumination from vehicle and human presence.

- Movement of vehicle and increase in traffic generates airborne dust which will settle on surrounding area soil and on vegetation and it would gradually degrade vegetation cover and degrade the land and decrease biomass productivity of the surrounding area.

5.2 Impacts on surrounding vegegation

Various gases evolved from the manufacturing processes which are harmful to the surrounding biodiversity. If these gases comes out without scrubbing could cause air pollution and leads to loss of diversity. Dust deposited on vegetation can inhibit the normal respiration and photosynthesis mechanisms within the leaf of the plants. High concentration of Nox Contributes to eutrophication, killing fish Damages leaves of plants, retard the photosynthetic activity and causes chlorosis. Nox also reacts with other pollutants in the presence of sunlight to form ozone which can damage vegetation at high concentrations. Industrial effluent and domestic effluent if discharged untreated will have impact on plants survival. If discharged in agricultural field pollute the soil and affect the crop productivity.

5.3 Impacts on forest areas

As per our study, there is a patch of reserve forest areas located near project site. Since there are no forest land is involved for the proposed project and forest land is at 2.4 km from the proposed site, no major direct impacts are envisaged on this forest area. However, during construction phase this area may be subjected to air, light and noise pollution during the construction and operation phases of the proposed project if proper mitigation measures are not followed. Company should take utmost precautions not to degrade these areas by constructing temporary roads, worker camps, dumping construction materials, overburden, solid wastes, garbage or any other form of materials within these forest areas. The fugitive emission from the construction and operation activities shall be strictly controlled so that it does not affect the growth of vegetation in these forest areas. It is also known that workers collect fuel wood from the easily available sources. Since forest areas are located near to the proposed project sites, project proponent shall take utmost care and instruct the workers not to collect fuel wood cut any trees from the surrounding forest areas.

Since the predominant wind directions in this region is from NNW, the pollutants, noise from project site may not travel to this forest patch most of the time of year. Despite this, project proponent shall ensure that there would be no impact of project activities on these forest areas through proper environmental planning and monitoring policy during the construction and operation phases. Detailed recommendations are made to minimize impact of the project activities on the surrounding forest areas in Ecological Management Plan (EMP).

5.4 Impacts on wildlife sanctuary

As per our study, the Bor Wildlife Sanctuary is located 7km from project site, no impact is envisaged due to proposed activity.

Ipca will implement regular monitoring policy during the construction and operation phases. Detailed recommendations are made to minimize impact of the project activities on the surrounding wildlife sanctuary areas in Ecological Management Plan (EMP).

5.5 Impacts on fauna

Though, the impacts of proposed project construction and operation activities may be on several faunal taxa, but for the present study we focused mainly on vertebrate classes i.e. herpetofauna, birds and mammals for identification of impacts and future monitoring purpose. Therefore, in the present study we identified impacts on the reptile, birds and mammals particularly on important and Schedule-I species of the landscape.

5.6 Impacts on birds

Impact on Indian Peafowl: The species was observed in the buffer area of 10 km radius particularly near human habitations, villages and agriculture fields. As the secondary data shows presence of Indian Peafowl in the buffer area, its possibility of nesting in buffer area could not be ruled out. Since Indian Peafowl is a ground nester, several project activities can have adverse impacts on their nesting grounds such as pollution, degradation of soil and vegetation from surrounding area and in the forest areas. Direct disturbance by presence of people, destruction of habitat, vehicle, noise, vibrations, lights, emissions etc. can potentially disturb most of the bird species.

Impact on raptor Species: Species of terrestrial raptors are predators and occupies tertiary consumers positions in the food chain and ecological pyramids. Therefore, any change in primary productivity would affect their distribution, density and population in the region. Therefore,

project activities resulting in air, water and noise pollution, degradation of vegetation would potentially affect the habitat of these bird species and their population in the study area. Moreover, direct disturbance by presence of people, destruction of habitat, vehicle movement, noise, vibrations, lights, emissions etc. can potentially displace most of the raptors species from the project area and its immediate surroundings.

5.7 Impacts on mammals

The above-mentioned mammals population belong to WPA- Schedule 1 are reported from Bor Wildlife Sanctuary area which is 7 km away from the project site. Therefore, no direct impacts envisaged on these species due to the proposed project activities. However, in view of vicinity of buffer area, their presence cannot be ruled out in the proximity of the proposed project site.

Movement of vehicle, human movement, machinery noise, air emissions, Water discharge and lighting arrangements in factory could cause disturbance to these species and affect their movements if any in the proximity of the project site. Therefore, the Ipca needs to take several precautions during construction and operation phases so that the movement of mammals if any are not disturbed. Moreover, the presence of these violent carnivores in the vicinity of human presence shall not be taken lightly and therefore, the safety of the workers shall also be considered along with disturbance to these carnivore species. Following recommendations are made to decrease human wildlife interactions and safeguarding both these species and humans in the project area and its surroundings.

5.8 Impact on reptiles

Since the reptile species are cold blooded & burrowing, it may be subjected to impacts related to water pollution, increase in temperature, impact on Soil, habitat degradation and human movement arising due to proposed project. These species is otherwise hunted or eaten by the people. Therefore, changes of degradation of overall aquatic habitat qualities in the buffer area are likely to affect these species and their distribution. As these species are slow and mostly terrestrial there are more chances of road kills of these species due to increase in traffic.

6.0 Wildlife Conservation Plan for Schedule I fauna of the Study Area

6.1 About Wildlife Protection Act 1972

The Wildlife Protection Act, 1972 is an Act of the Parliament of India enacted for protection of plants and animal species. Before 1972, India only had five designated national parks. Among other reforms, The Act established schedules of protected plant and animal species; hunting or harvesting these species was largely outlawed. The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India, except the State of Jammu and Kashmir which has its own wildlife act. It has six schedules which give varying degrees of protection. As per guidelines issued by MoEF&CC, New Delhi for projects/ Activities requiring environmental clearance should provide Wildlife Conservation Plan for conservation of Schedule I fauna, If exist in the study area.

Schedule I Fauna of region

(Data collected from Forest Department, Actual visit, Local consultation & other secondary sources)

Sr. No	Zoological Name	Common Name	Local Name	WPA Schedule	IUCN Status
	Mammals				
1	*Panthera tigris tigris*	Tiger	Wagh	I	EN
2	*Bos gaurus*	Indian Bison	Jangli Reda	I	VU
3	*Melursus ursinus*	Sloth Bear	Aswal	I	VU
4	*Panther pardus fusca*	Indian Leopard	Bibat	I	VU
5	*Gazella bennettii*	Indian Gazelle	Haran	I	LC
	Birds				
6	*Icthyophaga ichthyaetus*	Grey Headed Fish Eagle	Garud	I	NT
7	*Pavo cristatus*	Indian Peafowl	Mor	I	LC
8	*Gyps bengalensis*	Vulture	Gidhad	I	CR
	Reptiles				
9	*Python molurus*	Indian Rock Python	Ajgar	I	NT
10	*Lissemys punctata*	Flapshell Turtle	Kasav	I	LC
11	*Varanus bengalensis*	Monitor Lizard	Ghorpad	I	LC

EN- Endangered, VU- Vulnerable, LC- Least Concerned, NT- Near Threatened, CR- Critically Endangered

6.2 Mammals

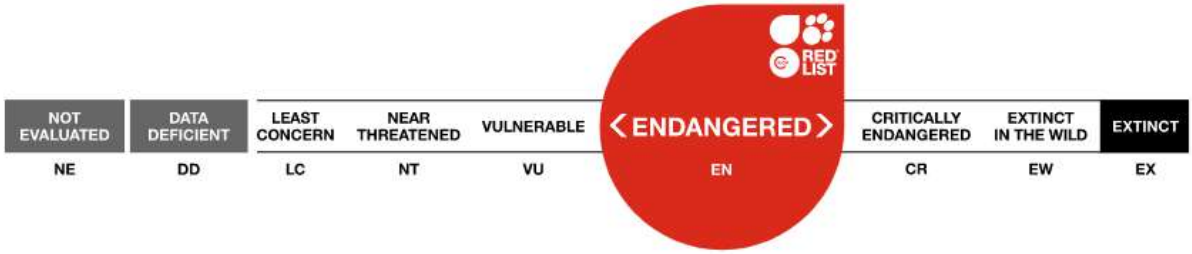
6.2.1 Tiger (*Panthera tigris tigris*)

The Bengal tiger is a tiger from a specific population of the *Panthera tigris tigris* subspecies that is native to the Indian subcontinent. It is threatened by poaching, loss, and fragmentation of habitat, and was estimated at comprising fewer than 2,500 wild individuals by 2011. None of the Tiger Conservation Landscapes within its range is considered large enough to support an effective population of more than 250 adult individuals. India's tiger population was estimated at 1,706–1,909 individuals in 2010. By 2018, the population had increased to an estimated 2,603–3,346 individuals. Around 300–500 tigers are estimated in Bangladesh, 220–274 tigers in Nepal and 103 tigers in Bhutan.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Suborder: Feliformia
Family: Felidae
Subfamily: Pantherinae
Genus: Panthera
Species: P. tigris
Subspecies: P. t. tigris

Conservation Status



IUCN: Endangered (EN) ver. 3.1

IWPA: Schedule I.

6.2.2 Indian Bison (*Bos gaurus*)

The gaur (Bos gaurus; /gaʊər/), also known as the Indian bison, is a bovine native to South and Southeast Asia, and has been listed as Vulnerable on the IUCN Red List since 1986. The global population was estimated at a maximum of 21,000 mature individuals in 2016. It has declined by more than 70% during the last three generations, and is extirpated from Sri Lanka and most likely Bangladesh. Populations in well-protected areas are stable and increasing. It is the largest species among the wild cattle and the Bovidae. In Malaysia, it is called seladang, and pyaung in Myanmar. The domesticated form of the gaur is called gayal (Bos frontalis) or mithun.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Artiodactyla
Family: Bovidae
Subfamily: Bovinae
Genus: Bos
Species: B. gaurus

Conservation Status

IUCN: Vulnerable (VU) ver. 3.1

IWPA: Schedule I.

6.2.3 Sloth Bear (*Melursus ursinus*)

The sloth bear (*Melursus ursinus*) is a myrmecophagous bear species native to the Indian subcontinent. It feeds on fruits, ants and termites. It is listed as Vulnerable on the IUCN Red List, mainly because of habitat loss and degradation. It has also been called "labiated bear" because of its long lower lip and palate used for sucking up insects. It has a long, shaggy fur, a mane around the face, and long, sickle-shaped claws. It is lankier than brown and Asian black bears. It shares features of insectivorous mammals and evolved during the Pleistocene from the ancestral brown bear through divergent evolution. Sloth bears breed during spring and early summer and give birth near the beginning of winter. When their territories are encroached upon by humans, they sometimes attack them. Historically, humans have drastically reduced these bears' habitat and diminished their population by hunting them for food and products such as their bacula and claws. Sloth bears have been tamed and used as performing animals and as pets.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Ursidae
Subfamily: Ursinae
Genus: Melursus
Meyer, 1793
Species: M. ursinus

Conservation Status

IUCN: Vulnerable (VU) ver. 3.1

IWPA: Schedule I.

6.2.4 Indian Leopard (*Panther pardus fusca*)

The Indian leopard (*Panthera pardus fusca*) is a leopard subspecies widely distributed on the Indian subcontinent. The species Panthera pardus is listed as Vulnerable on the IUCN Red List because populations have declined following habitat loss and fragmentation, poaching for the illegal trade of skins and body parts, and persecution due to conflict situations. The Indian leopard is one of the big cats occurring on the Indian subcontinent, apart from the Asiatic lion, Bengal tiger, snow leopard and clouded leopard. In 2014, a national census of leopards around tiger habitats was carried out in India except the northeast. 7,910 individuals were estimated in surveyed areas and a national total of 12,000-14,000 speculated.

CLASSIFICATION:

Kingdom: Animalia
Phylum: Chordata
Subphylum: Vertebrata
Class: Mammalia
Order: Carnivora
Suborder: Fliformia
Family: Felidae
Genus: Panthera
Species: *Panthera pardus fusca*

Conservation Status

IUCN: Vulnerable (VU) ver. 3.1

IWPA: Schedule I.

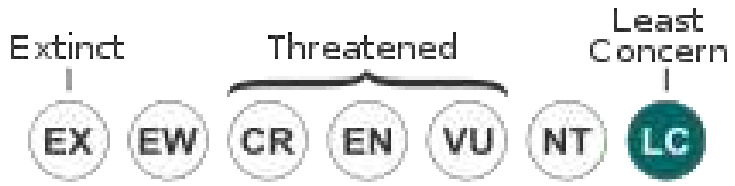
6.2.5 Indian Gazelle (*Gazella bennettii*)

The chinkara (*Gazella bennettii*), also known as the Indian gazelle, is a gazelle species native to Iran, Afghanistan, Pakistan and India. It stands at 65 cm (26 in) tall and weighs about 23 kg (51 lb). It has a reddish-buff summer coat with smooth, glossy fur. In winter, the white belly and throat fur is in greater contrast. The sides of the face have dark chestnut stripes from the corner of the eye to the muzzle, bordered by white stripes. Its horns reach over 39 cm (15 in).

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Artiodactyla
Family: Bovidae
Subfamily: Antilopinae
Genus: Gazella
Species: G. bennettii

Conservation Status



IUCN: Least Concern (LC) ver. 3.1

IWPA: Schedule I.

6.2.6 Recommendations:

As the proposed project will be developed in vicinity of the protected area the following mitigation measures are suggested

- **Total plot area will be fenced with RCC barrier sheets or by woven wires so as to protect the area by any wild animal trespassing, height of the fence will be min. 12 feet to avoid conflict with wild animals.** (No open barb wire fencing will be used as it can harm the animal passing close to it)
- Watch towers will be placed in different areas for surveillance. **Main gate of the site will be located at the opposite site of the Forest area.**
- It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases.
- The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies
- Night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr.
- **Agricultural Canal passing through site will be sufficiently fenced/enclosed** so as to avoid Human Wildlife Conflict.
- **Noise barrier will be installed around the noise making equipment's**. also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise.
- **Awareness generation campaigns will include preparation of brochures in local language**, film show and display of posters, etc.
- All mitigations measures will be strictly followed to reduce the pollution at source, **ESP/Multicyclone along with bag filter will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height** will be provided for effective dispersion of pollutant into the atmosphere.
- **Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan.**
- **No blasting shall be carried out during construction phase of the project**.

- Lightings within factory area shall be adjusted to ensure minimum illuminations spreading outside the project area.
- Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on **Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises.**
- Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments.

6.3 Birds

6.3.1 Grey Headed Fish Eagle (*Haliaeetus ichthyaetus*)

The grey-headed fish eagle (*Haliaeetus ichthyaetus*) is a fish-eating bird of prey from South East Asia. It is a large stocky raptor with adults having dark brown upper body, grey head and lighter underbelly and white legs. Juveniles are paler with darker streaking. It is often confused with the lesser fish eagle (Haliaeetus humilis) and the Pallas's fish eagle. The lesser fish eagle is similar in plumage but smaller and the Pallas's fish eagle shares the same habitat and feeding behaviour but is larger with longer wings and darker underparts. Is often called tank eagle in Sri Lanka due to its fondness for irrigation tanks.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Accipitriformes
Family: Accipitridae
Genus: Haliaeetus
Species: H. ichthyaetus

Conservation Status

IUCN: Near Threatened (NT) ver. 3.1

IWPA: Schedule I.

6.3.2 Indian Peafowl (*Pavo cristatus*)

Peacock or Indian peafowl (*Pavo cristatus*) is a very familiar bird and also recognized as National Bird of India Asiatic peafowl like the Indian Blue Peafowl and especially the Green Peafowl occupy a similar niche as the roadrunners, secretary bird and seriema. All of these birds hunt for small animals including arthropods on the ground and tall grass and minnows in shallow streams. Because of human encroachment into their natural territories, peafowl and humans have come into increasing contact. Because of their natural beauty some are reluctant to classify the birds as pests, but their presence can be disturbing.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Galliformes
Family: Phasianidae
Genus: Pavo
Species: *Pavo cristatus*
Vernacular name: Mor or Peacock

Conservation Status

IUCN: Others (LC) ver. 3.1

IWPA: Schedule I.

6.3.3 White Rumped Vulture (*Gyps bengalensis*)

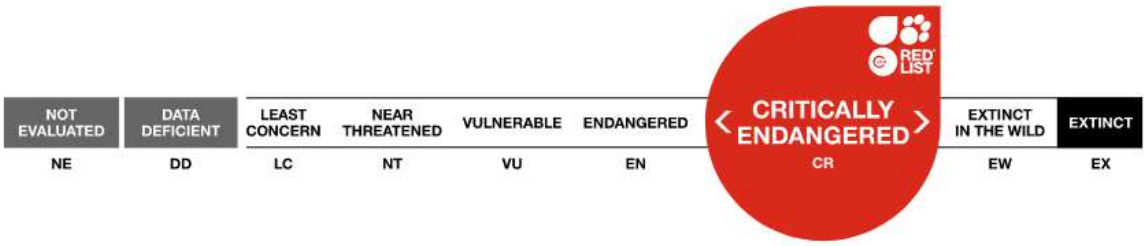
The white-rumped vulture is a typical, medium-sized vulture, with an unfeathered head and neck, very broad wings, and short tail feathers. It is much smaller than the Eurasian Griffon. It has a white neck ruff. The adult's whitish back, rump, and underwing coverts contrast with the otherwise dark plumage. The body is black and the secondaries are silvery grey. The head is tinged in pink and bill is silvery with dark ceres. The nostril openings are slit-like. Juveniles are largely dark and take about four or five years to acquire the adult plumage. In flight, the adults show a dark leading edge of the wing and has a white wing-lining on the underside. The undertail coverts are black. It is the smallest of the Gyps vultures, but is still a very large bird. It weighs 3.5–7.5 kg (7.7–16.5 lb), measures 75–93 cm (30–37 in) in length, and has a wingspan of 1.92–2.6 m (6.3–8.5 ft).

Within the well-supported clade of the genus Gyps which includes Asian, African, and European populations, it has been determined that this species is basal with the other species being more recent in their species divergence.

CLASSIFICATION:

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Accipitriformes
Family: Accipitridae
Genus: Gyps
Species: G. bengalensis

Conservation Status



IUCN: Critically Endangered (CR) ver. 3.1

IWPA: Schedule I.

6.3.4 Reccomendations

The record of these WPA Schedule 1 species in the surrounding area suggest pristine and undisturbed forest area. Following conservation and mitigation measures are suggested to the project. Direct and indirect approach is required to provide effective conservation, which is recommended as under:

- It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using **best pollution control methods during construction and operation phases.**
- The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies
- Night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr.
- Noise barrier will be installed around the noise making equipment's. Also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise.
- All mitigations measures will be strictly followed to reduce the pollution at source, ESP/Multicyclone along with bag filter will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere.
- No blasting shall be carried out during construction phase of the project.
- Lightings within factory area shall be adjusted to ensure minimum illuminations spreading outside the project area
- Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises.

- Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments.
- Increasing the tree cover in the surrounding area for shelter and roosting. This will be achieved by planting of tree groves (a group of trees that grow close together, generally without many bushes or other plants) in the area. Some local species such as Neem, Siris, Amaltash, Ardu, Shesham, Dhak, Peepal tree etc. will be plant. Planting of tree groves in school compounds in the villages of surrounding area will be plant as per the plantation program.
- By conducting awareness programs (community and school level) for conservation in the area and also through organizing competitions during Wildlife Week and Van Mahotsav celebrations.
- Some provision of rewards to informers for the control of poaching and illegal trade in wildlife.
- Carrying out census and research projects to know the potential threats and population status of the species.
- Provision of veterinary care and cages for injured or sick or deformed birds.
- Suggest strategies to minimize negative impacts of changing environment in nearby area and to promote conservation of habitats.

Conservation through Habitat Improvement and Awareness: Habitat improvement programme will be undertaken through plantation of suitable tree species in the surrounding villages. While selecting the tree/ shrub species care shall be provided for beery plants which attract these birds. During summer period, villagers will be encouraged to use the old earthen pots to fill with water for drinking these birds.

Feeding and Watering Arrangement: Artificial water holes will be created along the natural drained nallahs which can sufficient drinking water up to summer of the region. An anicut and open wall will be created by the company as their community development programme involving the local panchayats in this work. Proposition for the suitable place to increase population of birds near plant nursery and office plantation will help. Provision for artificial nests, feeding trays and water troughs is under consideration. To support 54rugivorous birds, artificial feed like wild fruits and vegetables will be provided.

6.4 Reptiles

6.4.1 Indian Rock Python (*Python molurus*)

Python molurus is a large, nonvenomous python species native to tropical and subtropical regions of the Indian subcontinent and Southeast Asia. It is known by the common names Indian python, black-tailed python, Indian rock python, and Asian rock python. It is generally lighter colored than the Burmese python and reaches usually 3 m (9.8 ft). The rock python's color pattern is whitish or yellowish with the blotched patterns varying from tan to dark brown shades. This varies with terrain and habitat. Specimens from the hill forests of Western Ghats and Assam are darker, while those from the Deccan Plateau and Eastern Ghats are usually lighter. The nominate subspecies occurring in India typically grows to 3 m (9.8 ft). This value is supported by a 1990 study in Keoladeo National Park, where 25% of the python population was 2.7–3.3 m (8.9–10.8 ft) long. Two individuals even measured nearly 3.6 m (12 ft).

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Reptilia
Order: Squamata
Suborder: Serpentes
Family: Pythonidae
Genus: Python
Species: P. molurus

Conservation Status

IUCN: Near Threatened (NT)

IWPA: Schedule I.

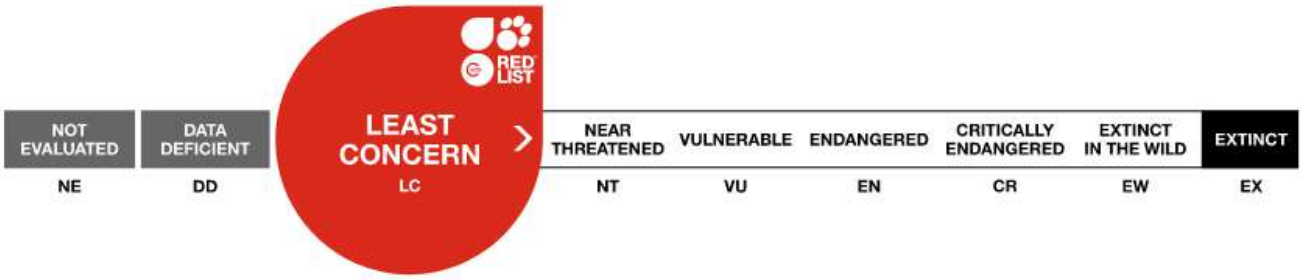
6.4.2 Flapshell Turtle (*Lissemys punctata*)

The Indian flapshell turtle is a freshwater species of turtle found in South Asia. The "flap-shelled" name stems from the presence of femoral flaps located on the plastron. These flaps of skin cover the limbs when they retract into the shell. It is unclear what protection the flaps offer against predators.

CLASSIFICATION

Kingdom: Animalia
Phylum: Chordata
Class: Reptilia
Order: Testudines
Suborder: Cryptodira
Family: Trionychidae
Genus: Lissemys
Species: L. punctata

Conservation Status



IUCN: Least Concern

IWPA: Schedule I.

6.4.3 Indian Monitor Lizard (*Varanus bengalensis*)

The Bengal monitor or common Indian monitor, is a monitor lizard found widely distributed over the Indian Subcontinent, as well as parts of Southeast Asia and West Asia. This large lizard is mainly terrestrial.

Classification

Kingdom: Animalia
Phylum: Chordata
Class: Reptilia
Order: Squamata
Family: Varanidae
Genus: Varanus
Subgenus: Empagusia
Species: *V. bengalensis*

Conservation Status

IUCN: Least Concern

IWPA: Schedule I

6.4.4 Recommendations

As the project unit will not discharge any water from the project unit, no hydrological impacts are envisaged on this species by the project activities. The proposed project is ZLD and treatment of domestic waste STP will be provided. There will be no impact on surrounding reptilian fauna due to proposed project. Following mitigation measures will be strictly followed;

- It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases.
- The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies
- Night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr.
- No blasting shall be carried out during construction phase of the project.
- Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards

and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises.

- Increasing the tree cover in the surrounding area for shelter and roosting.
- Awareness programme should be conducted in nearby villages and schools for protection of reptile species. Awareness in local people to avoid stealing eggs by local people. Awareness to local people for poaching of Turtles. Protection of nesting areas. Etc..

6.4.5 Additional conservation measures implemented and followed by Ipca Laboratories

- Total plot area will be fenced with RCC barrier sheets or by woven wires so as to protect the area by any wild animal trespassing, height of the fence will be min. 12 feet to avoid conflict with wild animals. (No open barb wire fencing will be used as it can harm the animal passing close to it)
- Watch towers will be placed in different areas for surveillance. Main gate of the site will be located at the opposite site of the Forest area.
- Traffic movement shall be with minimum speed in factory and night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr.
- Agricultural Canal passing through site will be sufficiently fenced/enclosed so as to avoid Human Wildlife Conflict.
- Noise barrier will be installed around the noise making equipment's. Also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise.
- Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc.
- Since the animals generally enter the fields in the night and cause damage to the property, as they are not visible in the darkness and chance of conflict increases, lights are necessary along the boundary of the villages to reduce the conflicts. It is suggested to provide eco-friendly solar lights in the villages where the problems are very high and frequent. Villagers should be trained in managing and maintenance of the solar lights in order to provide long life and benefit.
- All mitigations measures will be strictly followed to reduce the pollution at source, ESP/Multicyclone along with bag filter will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere.
- Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan.
- Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards

and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises.

- Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments.
- Ipca has already developed a matured greenbelt around its premises. It shall be continued further to strengthen greenbelt, additional greenbelt will be developed around the proposed plot that will serve as buffer zone between factory and forest area.
- Ipca shall ensure that whenever protected common species is observed in premises, with the help and guidance of Forest Department they will carefully shift them out of impact prone areas.
- Ipca will ensure that whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat.
- In consultation with the forest department, Ipca will explore possibilities to extend support to the existing forest and wildlife conservation plans through its on-going CSR/CER activities and various other programs from time to time.
- Ipca will also participate and involve in conducting awareness campaigns by forest department at the village level to make the locals aware about the protected species in the area; their behaviour, habitat, ecology, breeding/nesting seasons, threats to habitats and species, laws regarding protection of species.
- Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc.

6.5 Additional conservation measures implemented by Ipca Laboratories in surrounding area

6.5.1 Habitat Improvement Programme

Habitat improvement programme will be carried out in the buffer zone through plantation in nearest Reserve Forest area and in the surrounding villages Village covering various public places i.e. school premises, temple premises and bus stop area.

The plant species that can be planted in order of priority among desirable species are recommended as: Teak, Tiwas, Saja, Bija, Karam, Haldu, Shisham, Dhaora, Khair, Siwan, Rohan, Salai, Mowai, Dhaman, Lendia, Semal, Kulu, Bhirra, etc. Valuable local species suitable for the site shall be preferred in plantations. Teak, Shisham, Khair, Siwan, Sisoo, Siris, Chichwa, Karanj, Ain, Bija, Dhaora, Awla, Chinch, Neem, Maharukh, Semal, Sitaphal, Bamboo, etc. may be considered among the recommended species. In addition to these Arjun, Babul, Jamun and Ain may be preferred. The broad list of recommended plant species is given

in table. Mixed species plantations is also recommended like, Anjan, Neem, Sissoo, Ficus, Babul, Gular, Pakar, Maharukh, Kinhi, Siwan, Karanj, Siras, Sitaphal, *etc*. The plant species suitable for green belt development should be selected based on the following characteristics:

- It should have thick canopy cover
- They should be perennial and evergreen
- They should have high sink potential for pollutants
- They should be efficient in absorbing pollutants without significantly affecting their growth
- Healthy sapling 2-3 years old shall be planted to ensure better survival rate
- Preference shall be given for trees with ecological values followed by aesthetic value.

List of plant species suggested

Scientific Name	**Common Name**	**Height (m)**	**Growth Rate**	**Evergreen/ Deciduous**	**Crown**
Adina cordifolia	Haldu	15	Fast	Deciduous	Spreading
Aegle marmelos	Bel	12	Slow	Evergreen	Oblong
Ailanthus excelsa	Mahraruk	20	Quick	Deciduous	Round
Anogeissus latifolia	Dhaura	28	Slow	Evergreen	Round
Azadirachta indica	Neem	20	Quick	Evergreen	Spreading
Bauhinia variegata	Kachanar	5	Quick	Deciduous	Oblong
Buchanania cochinchinensis	Char	13	Fast	Evergreen	Round
Butea monosperma	Palas	10	Moderate	Deciduous	Ovoid
Capparis decidua	Nepti	4	Slow	Deciduous	Oblong
Caryota urens	Shankarjata	15	Quick	Evergreen	Round
Cassia fistula	Garmal	12	Quick	Deciduous	Round
Cassia renigera	Pink Cassia	10	Quick	Deciduous	Spreading
Cassine glauca	Bhutya	10	Moderate	Evergreen	Round
Celastrus paniculata	Dhimarvel	5	Moderate	Deciduous	Climbing
Chloroxylon swietenia	Bhirra	10	Fast	Deciduous	Round
Cochlospermum religiosum	Gogal	12	Fast	Deciduous	Round
Cordia dichotoma	Bhokar	10	Moderate	Deciduous	Oblong
Dalbergia sisoo	Sisam	10	Moderate	Evergreen	Round
Diospyros montana	Bistendu	10	Slow	Deciduous	Round
Emblica officinalis	Aola	5	Quick	Deciduous	Spreading
Ficus hispida	Katumbar	5	Moderate	Evergreen	Oblong
Flacourtia indica	Kakai	5	Moderate	Deciduous	Spreading
Gardenia jasminoides	Anant	5	Quick	Evergreen	oblong
Garuga pinnata	Kakad	15	Fast	Deciduous	Spreading
Heterophragma roxburghii	Waras	18	Quick	Evergreen	Round

Holoptelia integrifolia	Wavli	20	Fast	Deciduous	Oblong
Lagerstroemia parviflora	Lendia	10	Quick	Deciduous	Oblong
Lagerstroemia speciosa	Taman	10	Quick	Evergreen	Oblong
Limonia acidissima	Kawath	15	Slow	Evergreen	Round
Madhuca latifolia	Moha	15	Fast	Deciduous	Round
Mangifera indica	Amba	8	Moderate	Evergreen	Oblong
Miliusa tomentosa	Hum	15	Moderate	Deciduous	Oblong
Mimusops elengi	Borssali	10	Quick	Evergreen	Oblong
Ougeinia oojeinensis	Tiwas	10	Fast	Deciduous	Spreading
Phoenix sylvestris	Shindi	20	Moderate	Evergreen	Round
Pongamia pinnata	Karanj	10	Quick	Evergreen	Round
Saraca asoka	Ashok	5	Quick	Evergreen	Spreading
Schleichera oleosa	Kusum	10	Quick	Evergreen	Spreading

6.5.2 Encourage local villagers to grow trees on their own on field bunds/court yards etc.

In consultation with Forest Department the company will provide some finance, to grow saplings of tree species, having importance for wood, small timber and fuel wood to distribute to the villagers. Bamboo will be another important species with a lot of environmental and economic value. This will, no doubt, will help reduce dependence of people on RF forest; as a result the ecological condition of the area will improve so the wild life will be attracted to this area.

6.5.3 Sign board at Schools

Sign boards with images of not killing of Indian Python, Indian Monitor Lizard & other fauna and will be placed near the village schools as well as at public places. Sign board will be explained by teachers to the young students.

6.5.4 Eco-Development Works

People in and around the forest area generally are hostile against the forest department and its staff, because they are prevented from taking out timber and other forest products illegally. Such antagonistic behavior is mainly because little effort is made to meet their genuine demands either from outside the forest area or from the forest area but in a sustainable manner. Regular interaction with them with agreement for sustainable utilization of forest resources combined with some incentives can completely change their indifferent or even un-concerned attitude to conservative attitude.

6.5.5 Development of Non-timber Forest Produce and Medicinal Plants

Due to growing demand habitats and populations of these valued plant species are increasingly threatened. Most of the Medicinal plants are being collected from the wild source. According to

an estimate nearly about 90% of the plant species used by the pharmaceutical industry are collected from the wild. This situation is causing concern in conservation of plant species in wild. Attempts should be made to list and cultivate the species which are being used as Medicinal Plants. Cultivation of Medicinal plants will bring in good income for the people who dwell in villages.

6.5.6 Reducing man wildlife conflicts

Unauthorized entry into forest for illegal grazing, cutting or poaching are the major causes for Man-Wildlife conflicts. These practices will be reduced as much as possible. Pressure horn: Noise generated by pressure horn disturbs the wild life and forces them to leave the place. No pressure horn will be fixed on vehicle plying in this area. All the drivers will be advised to make minimum use of horn while working. Vehicles head lights: Efforts will be made to cover the lights suitably with paint so that strong beam of head light is not formed and light falls in front of the vehicle only.

6.5.7 Training and Awareness Programme

This is the most important aspect of wildlife conservation. People will be educated regarding the importance of wildlife conservation through mass publicity by installing sign boards, conducting audio visual classes and distributing literature in respective villages in the buffer zone. Experts in the field of wildlife conservation will also be invited to deliver talks through slides.

6.6 Summary matrix of Impact Identified and Conservation plan suggested

Impact on	Description	Probable Impacts	Mitigations/Conservation Plan
Sensitive Habitats	Protected and Reserve Forest area, Wildlife Sanctuary	Pollution loads from project activities, noise, increase vehicle movements, illumination, air and water emissions, human movement etc. could potentially degrade forest land and affect its fauna. As the proposed project is not using any forest land and all the emissions will be treated/captured at source, there will not be any impact of proposed project on surrounding environment.	• No blasting shall be carried out during construction phase of the project. • Noise barrier will be installed around the noise making equipment's. • 35% Green belt will be maintained. Also the Greenbelt area will be more strengthen by additional plantation which will be the natural barrier for generated noise. • All mitigations measures will be strictly followed to reduce the pollution at source, ESP will

				be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere. • Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan. • Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises. • Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments. • It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases. • Alternative fuel like Bio- Briquette / husk etc will be used having very low sulfur contain and hence there will not be much impact
Flora	**Overall Vegetation**	The area shows moderate vegetation and represents a dry deciduous forests.	• Various gases evolved from the manufacturing processes which are harmful to the surrounding biodiversity. If these gases comes out without scrubbing could cause air pollution and leads to loss of diversity • Dust deposited on vegetation can inhibit the normal respiration and photosynthesis mechanisms within the leaf of the plants. • High concentration of Nox Contributes to eutrophication,	• All mitigations measures will be strictly followed to reduce the pollution at source, ESP will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere. • Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan.
	Schedule Flora	No Schedule I flora reported		

			killing fish Damages leaves of plants, retard the photosynthetic activity and causes chlorosis. Nox also reacts with other pollutants in the presence of sunlight to form ozone which can damage vegetation at high concentrations • Industrial effluent and domestic effluent if discharged untreated will have impact on plants survival. If discharged in agricultural field pollute the soil and affect the crop productivity.	• Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises. It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases. • Alternative fuel like Bio- Briquette / husk etc will be used having very low sulfur contain and hence there will not be much impact
Fauna	**Schedule Mammals**	Schedule I mammals like Tiger, Indian Bisen, Leoprad, Sloth Bear and Indian Gazelle are reported from the reigion	Movement of vehicle, human movement, machinery noise, air emissions, Water discharge and lighting arrangements in factory could cause disturbance to these species and affect their movements if any in the proximity of the project site.	• Total plot area will be fenced with RCC barrier sheets or by woven wires so as to protect the area by any wild animal trespassing, height of the fence will be min. 12 feet to avoid conflict with wild animals. (No open barb wire fencing will be used as it can harm the animal passing close to it) • Watch towers will be placed in different areas for surveillance. Main gate of the site will be located at the opposite site of the Forest area. • It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases. • The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies • Night traffic near to

				protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr. • Agricultural Canal passing through site will be sufficiently fenced/enclosed so as to avoid Human Wildlife Conflict. • Noise barrier will be installed around the noise making equipment's. also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise. • Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc. • All mitigations measures will be strictly followed to reduce the pollution at source, ESP will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere. • Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan. • No blasting shall be carried out during construction phase of the project. • Lightings within factory area shall be adjusted to ensure minimum illuminations spreading outside the project area. • Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water

				outside the premises. • Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments. • Awareness programmes, Habitat improvement program and Conservation related activities shall be conducted in and around area. • Whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat.
	Schedule Birds	Report of Schedule I species from the surroundings. Vulture, Grey Headed Fishing eagle and Indian Peafowl reported from region.	Movement of vehicle, human movement, machinery noise, air emissions, Water discharge and lighting arrangements in factory could cause disturbance to these species and affect their movements if any in the proximity of the project site.	• It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases. • The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies • Night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr. • Noise barrier will be installed around the noise making equipment's. Also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise. • All mitigations measures will be strictly followed to reduce the pollution at source, ESP will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere. • No blasting shall be

				carried out during construction phase of the project. • Lightings within factory area shall be adjusted to ensure minimum illuminations spreading outside the project area • Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises. • Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments. • Increasing the tree cover in the surrounding area for shelter and roosting. This will be achieved by planting of tree groves (a group of trees that grow close together, generally without many bushes or other plants) in the area. Some local species such as Neem, Siris, Amaltash, Ardu, Shesham, Dhak, Peepal tree etc. will be plant. Planting of tree groves in school compounds in the villages of surrounding area will be plant as per the plantation program. • By conducting awareness programs (community and school level) for conservation in the area and also through organizing competitions during Wildlife Week and Van Mahotsav celebrations. • Some provision of rewards to informers for the control of poaching and illegal trade in wildlife. • Carrying out census and research projects to know the potential threats and population status of the

				species. • Provision of veterinary care and cages for injured or sick or deformed birds. • Suggest strategies to minimize negative impacts of changing environment in nearby area and to promote conservation of habitats. • Awareness programmes, Habitat improvement program and Conservation related activities shall be conducted in and around area. • Whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat.
	Schedule Reptiles	Reporting of Schedule I species like Indian Python, Flapshell turtle and Monitor Lizard	Since the reptile species are cold blooded & burrowing, it may be subjected to impacts related to water pollution, increase in temperature, impact on Soil, habitat degradation and human movement arising due to proposed project. These species is otherwise hunted or eaten by the people. Therefore, changes of degradation of overall aquatic habitat qualities in the buffer area are likely to affect these species and their distribution. As these species are slow and mostly terrestrial there are more chances of road kills of these species due to increase in traffic.	• It is recommended that project proponent shall take utmost care in controlling dust, fugitive emissions using best pollution control methods during construction and operation phases. • The air and water pollution control measures during construction and operation phases would ensure minimum degradation of surrounding vegetation, forest area and waterbodies • Night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr. • No blasting shall be carried out during construction phase of the project. • Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises.

				• Increasing the tree cover in the surrounding area for shelter and roosting. • Awareness programme should be conducted in nearby villages and schools for protection of reptile species. Awareness in local people to avoid stealing eggs by local people. Awareness to local people for poaching of Turtles. Protection of nesting areas. Etc.. • Whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat.
	Other Species	Other Fauna (Reptiles, Mammals, Birds, etc..)	Movement of vehicle, human movement, machinery noise, air emissions, Water discharge and lighting arrangements in factory could cause disturbance to these species and affect their movements if any in the proximity of the project site	• Total plot area will be fenced with RCC barrier sheets or by woven wires so as to protect the area by any wild animal trespassing, height of the fence will be min. 12 feet to avoid conflict with wild animals. (No open barb wire fencing will be used as it can harm the animal passing close to it) • Watch towers will be placed in different areas for surveillance. Main gate of the site will be located at the opposite site of the Forest area. • Traffic movement shall be with minimum speed in factory and night traffic near to protected area should be avoided or if necessary the vehicles should maintained max speed of 25 km/hr. • Agricultural Canal passing through site will be sufficiently fenced/enclosed so as to avoid Human Wildlife Conflict. • Noise barrier will be installed around the noise making equipment's. Also the Greenbelt area will be more strengthen which will be the natural barrier for generated noise.

				• Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc. • All mitigations measures will be strictly followed to reduce the pollution at source, ESP will be installed to Boiler and Thermopack to arrest the particulate emission and adequate stack height will be provided for effective dispersion of pollutant into the atmosphere. • Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan. • Waste water should be treated as per standard; there should not be any direct discharge of waste water. Proposed project will run on Zero Liquid Discharge basis, total effluent will be treated as per standards and will be recycle back in plant, there will not be any discharge on treated or untreated water outside the premises. • Noise levels should be kept within the standards limits as per guidelines by providing acoustic enclosures to noise making equipments. • Ipca has already developed a matured greenbelt around its premises. It shall be continued further to strengthen greenbelt, additional greenbelt will be developed around the proposed plot that will serve as buffer zone between factory and forest area. • Ipca shall ensure that whenever protected common species is observed in premises, with the help and guidance of Forest Department they will carefully shift them out of impact prone areas. • Ipca will ensure that

				whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat. • In consultation with the forest department, Ipca will explore possibilities to extend support to the existing forest and wildlife conservation plans through its on-going CSR/CER activities and various other programs from time to time. • Ipca will also participate and involve in conducting awareness campaigns by forest department at the village level to make the locals aware about the protected species in the area; their behaviour, habitat, ecology, breeding/nesting seasons, threats to habitats and species, laws regarding protection of species. • Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc.

7.0 Budget Allocation

To implement the conservation plan following works are proposed within the core zone, buffer zone and adjoining forest and revenue area. More emphasis will be given to soil and water conservation structures and creation of water holes along with the habitat development works. To improve the habitat and conserve the flora and fauna following items of works are proposed and tentative financial allocation for the same is given in front of them. EMP and budetory allocation during construction and operation phase along with proposed CER activities are mentioned in below table.

7.1 Environmental Management Plan

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
Air Environment				
1	Emission of PM10,NOx and SO2 from the proposed boiler (16 TPH x 2 Nos, 8 TPH x 1 No.) & Thermopack (10 LacKcal/Hr x 2 Nos)	500 to 1,500 meters in predominant wind direction.	• Provision of adequate stack height will be ensured. • Installation of the ESP/multi dust cyclone followed by bag filter and online monitoring system for the proposed boiler • Alternative fuel like Bio-Briquette / husk etc will be used having very low sulfur contain and hence there will not be much impact .	Process Head
2	Proposed HCl, SO2, Ammonia etc due to operation of plant.	250 to 500 meters in predominant wind direction.	• Provision of adequate stack height will be ensured with high efficient wet scrubbers. • Ensuring that the plants are operated 24 x 7 by providing necessary power backups (DG Sets) • Efficient 2 stage Scrubbers will be	Process Head

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
			provided on reaction vessels and storage tanks for capturing emissions . • Ensuring the provision of all safety features along with water spraying, • Ensure Onsite plans are made and followed, also strictly adhered to offsite plans too during emergency situations; • Ensure periodic monitoring of stacks for parameters prescribed by MPCB.	
3	Fugitive emissions plant operation and storage of raw material and finished goods.	Within 100 m from the source.	• Ensure periodic work place monitoring of for HCl and SO_2	Process Head
4	Dust generation due to Transportation activity.	Nearby villages & roads.	• Transportation of raw materials and finished goods will be carried out in covered trucks.	Process Head
Water Environment				
5	Generation of wastewater from boiler blow down	Within plant	Boiler blow-downs will be treated in conventional effluent treatment plant having Primary Secondary and tertiary treatment.	EHS Manager
6	Waste water generation from Cooling tower blow down	Within plant premise	Cooling tower blow-downs will be treated in conventional effluent treatment plant having Primary Secondary and tertiary treatment.	EHS Manager /
7	Workforce requirement for proposed plants	Within plant premise	The waste water generated from domestic activity will be treated in proposed STP .	Head, Civil
8	Waste Water Generation from ETP	Surrounding Surface Water	High TDS stream will be treated separately in MEE-1. Condensate from MEE- 1	Head ETP

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
			along with Low TDS stream from washings and utility blow-downs will be treated in conventional effluent treatment plant having Primary Secondary and tertiary treatment. Treated effluent will be fed to RO, permeate will be reused in utilities and reject will be again treated in MEE-2, condensate from MEE-2 will be reused in utilities, achieving Zero Liquid Discharge (ZLD).	
9	Consumption of water (surface) for operation of plant	Fresh water from Bor Dam	The fresh water demand will be reduced by recycling and reuse of treated water through RO, Solvent stripper, MEE, ATFD and Conventional Effluent treatment plant.	Head process in charge
10	Mixing of contamination form Process, chemical fuel storage and handling area, Effluent treatment plant with storm water	Surrounding surface water bodies	Separate drain for storm water and for effluent Management will be proposed to avoid run off contamination.	Top Management for CAPEX, Projects Team, Head, Civil
Land Environment				
1	Removal of top soil and Land clearance during site preparation	Within plant premise	The land is private land owned by Ipca and meant for Industrial activity. Top layer of soil will be used for Landscaping purpose.	Head, Civil
2	Generation of construction waste and scraps to accommodate the expansion capacity.	Within plant premise	Debris will be used in filling of low lying area as far as possible, Concrete bags, aggregates will be given for the authorized	Head, Civil

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
			vendors for reuse	
3	Generation of scraps from Heavy fabrication work	Within plant premise	Scraps will be handled as per rules and sold to authorized vendors	Head, Civil
4	Generation of Process Residues, ETP sludge , MEE salts	Within plant premise	Process residue, ETP sludge and MEE salts will be sent to CHWTSDF/ Preprocessing/Coprocessing	Head process in charge
6	Generation of Waste Drums/Barrels/bags and containers	Within plant premise	Will be given to authorized vendors	Head, Civil
7	Generation of Sewage sludge due to influx of workers	Within plant premise	Proper sanitation and STP Sludge will be used as manure for gardening.	HRD and civil department
8	Generation of used oil and lubricants, scraps and used spares etc from Equipment maintenance	Within plant premise	Used oil and Lubricants will be given to authorized refineries as per HW rules and scraps and used spares etc will be given to authorized vendors	Head process in charge
Noise Environment				
1	Noise Generation due to vehicular movement for transportation of raw materials and finished goods	Within plant premise	Maintenance and servicing of mechanized equipment and vehicles, Project activities to be undertaken during regular working hours, Erection of temporary barriers	Security officer and Head, Civil department
2	Noise Generation from Heavy fabrication work	Within plant premise	Properly certified, tested and calibrated equipment's will be used. Ear plugs/Muffs will be provided / and use ensured	Contractor / Third Party
3	Noise Generation due to operation of Cooling towers, pumps, compressors, blowers, DG sets etc	Within plant premise	Acoustic enclosures will be built-in with equipment by technology provider. PPE like Ear Plugs & ear muffs will be provided and its use shall be ensured	Head Process In charge

Rs. 1.5 Cr. (150 Lacs) will be allocated from CER budget towards conservation of scheduled fauna in the area for the implementation of conservation plan.

Following is the proposed budget allocation for 5 years after getting approval from all statutory bodies

S. No.	Conservation Activities	Expected Expenditure (In Lakh) for 5 years
1	Habitat Improvement Programme	10.00
2	Encourage local villagers to grow trees on their own on field bunds/court yards etc.	10.00
3	Sign board at Schools	5.00
4	Eco-Development Works	10.00
5	Development of Non-timber Forest Produce and Medicinal Plants	5.00
6	Reducing man wildlife conflicts by Training and Awareness Programme	10.00
7	Funds allocated for Development works at Bor Wildlife sanctuary Core and Buffer Zone	100.0
Total		**150.00**

7.2 Environment Management Plan (Construction Phase)

Sr. No.	Attribute	Mitigation measures/Details	Capital Cost (Rs lakh)
1	**Air**	Water sprinkling through sprinkler for the dust suppression during the construction	**8**
2	**Water**	Provision of the onsite mobile portable toilets for the construction labors and the silt traps for prevention of soil erosion along with runoff	**12**
3	**Noise**	Noise damping pads, enclosure of the area by tin sheets	**6**
4	**Soil**	Preserving top soil for the later use in green belt by storing at a temporary place	**4**
5	**Solid waste**	Segregation of the solid waste in wet and dry waste and provision of the separate bins for the same	**11**
6	**Hazardous waste**	Storage areas for the hazardous waste such as empty paint cans etc and barrels for used oil , etc	**2**
7	**Fuel & Energy**	Use of cleaner fuel for construction machineries	**6**
8	**Safety & heath**	Provision of the PPE kit for the workers such as safety harness, safety goggles, safety helmets , gloves	**7**
Total			**56**

7.3 Environment Management Plan (Operational Phase)

Sr. No.	Pollution Activity	Mitigation Measures/Details	Responsibility in Organization	Capital cost (In Rs. lacs)	Recurring cost (Rs. Lacs/yr)	Purchase/Implementation Schedule
1	**Air pollution**	Provision of Boiler stack, Scrubbers, Provision of Multicyclone, Bag filters etc.	EHS Team	400	100	During Commissioning and operation phase
2	**Water Pollution**	Effluent Treatment Plant & STP	EHS Team	2135	1906	During Commissioning and operation phase
		RO System & Multiple Effect Evaporators				
3	**Noise pollution**	Acoustic encl./ Anti vibration pads	EHS Team	Included in capital cost	20	During Construction, Commissioning and operation phase
4	**Occupational health**	Medical check-up	HR/Admin/ EHS Team	50	36	During operation phase
		Health insurance policy				
		Medical staff charges				
		First aid facilities consumables				
		In-house first aid room				
		Other infrastructure and Equipment				
5	**Green belt**	Potholes digging, Saplings, labor cost, Fertilizers, Drip irrigation facility &maintenance	HR/ EHS Team	25	80	From Construction Phase
6	**Hazardous Waste**	Segregation & Storage of Waste, Disposal to CHWTSDF site	EHS Team	150	2500	During Construction and Operation phase
7	**Environmental monitoring and Management**	Regular monitoring of Ambient Environmental Conditions & Pollution Control Equipments	EHS Team	--	25.0	During Operation phase
8	**Carbon Footprint Monitoring**	Installation of solar Panels for reduction of consumption of electricity which indirectly reduce carbon footprint. Provision of bigger tank farm to	Project Team/ EHS Team	1030	20	During Construction and Operation phase

		reduce number of transportation resulting in reduction of CO2, Reduction of fuel consumption by using well efficient insulation to heating equipment.				
9	**Water Footprint Monitoring**	Rain water harvesting & use of rain water in utilities & domestic, *Recycling & reuse of treated waste water in utilities Regular maintenance of equipment to reduce wastage of water due to leaks	Project Team/ EHS Team	50	20	During Operation phase
	Sub Total			3840.00	4707.0	
10	**Corporate Environmental Responsibility (CER)**			553.00	--	
	Final Total			4393.00	4707.0	

7.4 Conclusion:

As the company will take all the required precautionary measures to control the pollution at source, so it can be concluded that after implantation of all the precautionary measures there will be negligible impact on biological environment due to proposed project.

Annexure V

PT. ANINDYA WIRAPUTRA KONSULT
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Indonesia Telp. +62-21-22606207

Job No. : C0320080606-TDISV-AF
Cert. No. : C02.I.01I20.011
Date : September 01, 2020

CERTIFICATE OF SAMPLING AND ANALYSIS

NAME OF VESSEL	: **MV. MANDARIN RIVER**
QUANTITY	: 56,275 METRIC TONS
DESCRIPTION OF GOODS	: INDONESIAN STEAM COAL IN BULK
SHIPPER	: **PT. INDEXIM COALINDO** WISMA HAYAM WURUK, JL. HAYAM WURUK NO. 8, KEBON KELAPA, GAMBIR, JAKARTA PUSAT, INDONESIA
PORT OF LOADING	: KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

Gross samples were drawn by our Indonesia's representative during mother vessel loading. The samples were prepared and analysed according to **ASTM Standard** Specifications and shown the following results / SPECIFICATIONS AS PER **ASTM STANDARDS** AS FOLLOWS :

SPECIFICATIONS :		**RESULT**	
TOTAL MOISTURE (ARB)	:	**35.33**	**PCT**
INHERENT MOISTURE (ADB)	:	**15.74**	**PCT**
ASH (ADB)	:	**5.21**	**PCT**
SULPHUR (ADB)	:	**0.54**	**PCT**
VOLATILE MATTER (ADB)	:	**40.01**	**PCT**
FIXED CARBON (ADB)	:	**39.04**	**BY DIFFERENCE**
GROSS CALORIFIC VALUE (ARB)	:	**4097**	**KCAL/KG**
NET CALORIFIC VALUE (ARB)	:	**3717**	**KCAL/KG**
HGI	:	**44**	
SIZE (0-50MM)	:	**90.9**	**PCT**
AFT(IDT)	:	**1170**	**°C**

This certificate refers to sampling for quality analysis and sizing only and does not certify any other matters. It reflects to our finding at time and place of attending only and is issued without prejudice.

ISSUED AND INSPECTED AND SIGNED BY
PT. ANINDYA WIRAPUTRA KONSULT
AT LOAD PORT

Muhamad Darul Qutni
Head Of Laboratory

BANJARBARU : Jl. Ahmad Yani KM 21, RT.02/02, Kel. Landasan Ulin Barat, Kec. Liang Anggang, Banjarbaru – 70722, Kalimantan Selatan, +62-511-4706093
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SAMARINDA : Jl. KH. Harun Nafsi No 58 RT 22, Kel Rapak Dalam, Kec. Loa Janan Ilir, Samarinda - 75131, Kalimantan Timur. Telp. +62-541-7269686, 7269705. Fax +62-541-72697053.
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BARA TABANG : Senyiur KM 00, Jetty PT. Bayan Resources Tbk. Desa Senyiur, Kec. Muara Ancalong, Kab. Kutai Timur - 75656, Kalimantan Timur
TARAKAN : Jl Flamboyan No.57, RT.27, Kel. Karang Anyar, Kec. Tarakan Barat, Tarakan - 77111, Kalimantan Utara. Telp: +62-511-25210
TAMIANG LAYANG : Jl. Tumpa Dayu RT 011, Ds Tamiang Layang, Kec. Dusun Timur, Kab. Barito Timur, Tamiang Layang - 73617, Kalimantan Tengah.
PONTIANAK : Jl. Arteri Supadio Gg. Anyar, RT 7 RW 10, Desa Arang Limbung, Kec. Sungai Raya, Kab. Kubu Raya 78391 Pontianak, Kalimantan Barat
PALEMBANG : Komp. Pergudangan Sukarame, Blok D No. 09, Jl. Tembus Terminal, Kel. Talang Kelapa. Kec. Alang-Alang Lebar Palembang 30151, Sumatra Selatan
JAMBI : Jl. Abdul Rahman Saleh No. 8, The Hok, Jambi Selatan, Jambi - 36138. Jambi. Telp. +62-741-572805.
BENGKULU : Jl. R.E. Martadinata No. 5, RT.02/RW.01, Kel. Kandang, Kec. Kampung Melayu, Kota Bengkulu - 38216, Bengkulu.
KENDARI : Jl.Poros Bandara Haluoleo, Desa Onewila, Kec.Ranomeeto, Kab.Konawe Selatan - 93372, Sulawesi Tenggara.
CIKARANG : Kawasan Industri Delta Silikon 3, Lippo Cikarang, Jalan Rotan Blok F 27 Nomor 23 C, Kel. Cicau, Kec. Cikarang Pusat, Kab Bekasi 17531, Jawa Barat

C-02.22213

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Date : September 01, 2020

ADDITIONAL CERTIFICATE OF SAMPLING AND ANALYSIS

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PORT OF LOADING	: KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

Gross samples were drawn by our Indonesia's representative during mother vessel loading. The samples were prepared and analysed according to **ASTM Standards** Specifications and shown the following results / SPECIFICATIONS ACCORDING TO **ASTM STANDARDS** AS FOLLOWS :

SPECIFICATIONS			**RESULTS**	
VOLATILE MATTER (DAF)		:	**50.61**	PCT
VOLATILE MATTER (DMMF)		:	**51.07**	PCT
ASH (DB)		:	**6.18**	PCT
ASH (ARB)		:	**4.00**	PCT
TOTAL SULPHUR (DB)		:	**0.64**	PCT
TOTAL SULPHUR (ARB)		:	**0.41**	PCT
GROSS CALORIFIC VALUE (MAF)		:	**5262**	KCAL/KG
GROSS CALORIFIC VALUE (ADB)		:	**5338**	KCAL/KG
GROSS CALORIFIC VALUE (MMMF)		:	**5299**	KCAL/KG
AFT (ST)		:	**1180**	°C
Ultimate Analysis			**TEST RESULTS**	
Hydrogen	(DAF)	:	**5.59**	PCT
Carbon	(DAF)	:	**72.28**	PCT
Nitrogen	(DAF)	:	**1.05**	PCT
Sulphur	(DAF)	:	**0.68**	PCT
Oxygen and Error	(DAF)	:	**20.40**	PCT
Ash Analysis				
SiO_2 in ash		:	**23.86**	PCT
Al_2O_3 in ash		:	**10.72**	PCT
Fe_2O_3 in ash		:	**26.55**	PCT
CaO in ash		:	**16.10**	PCT
MgO in ash		:	**7.76**	PCT
TiO_2 in ash		:	**0.89**	PCT
Na_2O in ash		:	**0.23**	PCT
K_2O in ash		:	**0.54**	PCT
Mn_3O_4 in ash		:	**0.51**	PCT
P_2O_5 in ash		:	**0.28**	PCT
SO_3 in ash		:	**11.31**	PCT

Ash Fusion Temperature		**Reducing**	**Oxidizing**	
Initial Deformation	:	**1170**	**1220**	°C
Spherical	:	**1180**	**1230**	°C
Hemispherical	:	**1190**	**1280**	°C
Flow	:	**1210**	**1330**	°C

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ISSUED AND INSPECTED AND SIGNED BY
PT. ANINDYA WIRAPUTRA KONSULT
AT LOAD PORT

Muhamad Darul Qutni
Head Of Laboratory

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CERTIFICATE OF SIZING

NAME OF VESSEL	: **MV. MANDARIN RIVER**
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PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

Gross samples were drawn by our Indonesia's representative loading to the vessel. The samples were prepared and analysed according to **ASTM Standard** Specifications and shown the following results / SPECIFICATIONS AS PER **ASTM STANDARDS** AS FOLLOWS :

Sizing		**% Weight**
Retained on	50.0 mm	**9.10**
Retained on	31.5 mm	**22.06**
Retained on	22.4 mm	**41.63**
Retained on	11.2 mm	**49.39**
Retained on	6.70 mm	**65.92**
Retained on	4.75 mm	**71.06**
Retained on	2.0 mm	**83.40**
Retained on	1.0 mm	**92.38**
Retained on	0.5 mm	**94.86**
Passing	0.5 mm	**5.14**
		100.00

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Job No. : C0320080606-TDISV-AF
Cert. No. : C02.I.01I20.011OR
Date : September 01, 2020

CERTIFICATE OF ORIGIN

NAME OF VESSEL	: **MV. MANDARIN RIVER**
QUANTITY	: 56,275 METRIC TONS
DESCRIPTION OF GOODS	: INDONESIAN STEAM COAL IN BULK
SHIPPER	: **PT. INDEXIM COALINDO** WISMA HAYAM WURUK, JL. HAYAM WURUK NO. 8, KEBON KELAPA, GAMBIR, JAKARTA PUSAT, INDONESIA
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PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

We hereby certify that the goods are of INDONESIAN ORIGIN

This certificate refers to the findings indicated above only and does not constitute a statement of quantity as refered in the Metrology Law No. 2 year 1981.

THIS DOCUMENT WAS NOT FOR CUSTOM CLEARANCE PURPOSES AT DESTINATION COUNTRY

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AT LOAD PORT

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Job No. : C0320080606-TDISV-AF
Cert. No. : C03.I.01I20.011
Date : September 01, 2020

CERTIFICATE OF WEIGHT

NAME OF VESSEL	: **MV. MANDARIN RIVER**
QUANTITY	: 56,275 METRIC TONS
DESCRIPTION OF GOODS	: INDONESIAN STEAM COAL IN BULK
SHIPPER	: **PT. INDEXIM COALINDO** WISMA HAYAM WURUK, JL. HAYAM WURUK NO. 8, KEBON KELAPA, GAMBIR, JAKARTA PUSAT, INDONESIA
PORT OF LOADING	: KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

This is to Certify at the request of the shipper, our Indonesia's representative attended on board the above vessel both prior to and after loading for the purpose of establishing the weight of cargo by Draft Survey.

WEIGHT (B/L) : 56,275 METRIC TONS

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AT LOAD PORT

Hery Fajar
Head Of Operational

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Job No. : C0320080606-TDISV-AF
Cert. No. : C03.I.01I20.011DS
Date : September 01, 2020

DRAFT SURVEY

NAME OF VESSEL	: **MV. MANDARIN RIVER**
QUANTITY	: 56,275 METRIC TONS
DESCRIPTION OF GOODS	: INDONESIAN STEAM COAL IN BULK
SHIPPER	: **PT. INDEXIM COALINDO** WISMA HAYAM WURUK, JL. HAYAM WURUK NO. 8, KEBON KELAPA, GAMBIR, JAKARTA PUSAT, INDONESIA
PORT OF LOADING	: KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

This is to Certify, that upon request of shipper, our Indonesia's representative proceeded to the vessel concerned for the purpose of conducting draft-reading at initial and final stage, to estimate the quantity of the consignment through calculating of the respective displacement of light and loaded vessel, based on figures obtained through draft-reading.

According to the relevant data available on board vessel and as detailed in the attached schedule which from inseparable part of report, we arrived at the following figure :

Net Displacement Loaded	:	**67,741.901**	**METRIC TONS**
Net Displacement Light	:	**11,466.817**	**METRIC TONS**
Estimated Quantity of Consignment **(Rounded to WM/Tons)**	:	**56,275**	**METRIC TONS**

This certificate refers to the findings indicated above only and does not constitute a statement of quantity as refered in the Metrology Law No. 2 year 1981.

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PT. ANINDYA WIRAPUTRA KONSULT
AT LOAD PORT

Hery Fajar
Head Of Operational

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DRAFT SURVEY

NAME OF VESSEL : **MV. MANDARIN RIVER**
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DESCRIPTION OF GOODS : INDONESIAN STEAM COAL IN BULK
SHIPPER : **PT. INDEXIM COALINDO**
WISMA HAYAM WURUK,
JL. HAYAM WURUK NO. 8, KEBON KELAPA,
GAMBIR, JAKARTA PUSAT, INDONESIA
PORT OF LOADING : KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE : ANY PORT(S) IN INDIA
BL DATE : AUGUST 28, 2020

Report of Draft Survey			Initial Survey	Final Survey
Date of Draft Reading			August 24, 2020	August 28, 2020
Hours / Local Time			at 12.30 - 13.30 hrs	at 11.00 - 12.00 hrs
1.	a.	Draft, forward port, m	4.080	13.080
	b.	Draft, forward starboard, m	4.080	13.080
	c.	Draft, forward mean, m	4.080	13.080
	d.	Stem correction, m	-0.044	0.000
	e.	Draft, forward correction to F.P, m	4.036	13.080
2.	a.	Draft, after port, m	6.680	13.080
	b.	Draft, after starboard, m	6.680	13.080
	c.	Draft, after mean, m	6.680	13.080
	d	Stern correction, m	0.011	0.000
	e.	Draft, after correction to A.P, m	6.691	13.080
3.	a.	Draft, midships port, m	5.340	13.140
	b.	Draft, midships starboard, m	5.340	13.140
	c.	Draft, midships mean, m	5.340	13.140
	d	Stern correction, m	-0.012	0.000
	e.	Draft, midships correction, m	5.328	13.140
4.	Draft, fore and after mean, m		5.3635	13.0800
5.	Mean of means draft, m		5.34575	13.11000
6.	Quarter Mean of means draft corrected for Hog/Sag, m		5.320875	13.109000
7.	Displacement, M/T		25,729.952	69,502.318
8.	a.	Trim by stern, m	2655.000	0.000
	b.	Correction for trim, M/T	-382.734	0.000
	c.	Displacement for trim corrected, M/T	25,347.218	69,502.318
9.	a.	Density observed, kg/l	1.0200	1.0190
	b.	Corrected for density observed, M/T	-123.645	-406.843
10.	Displacement for density corrected, M/T		25,223.573	69,095.475
11.	Deductibles weight	a. Ballas water, M/T	12,958.600	598.800
		b. Fresh water, M/T	280.000	260.000
		c. Fuel oil, M/T	474.812	452.245
		d. Diesel oil, M/T	43.344	42.529
		e. Lubricated oil, M/T	0.000	0.000
	Total Deductibles, M/T		13,756.756	1,353.574
12.	Net Displacement, M/T		11,466.817	67,741.901
13.	**Rounded to, MT**		**56,275**	

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Telp. : +62-22-87346430
Website : www.anindya.biz

JAKARTA (Regional Office)
Springhill Office Tower Lantai 18,
Jl. H Benyamin Suaeb Ruas D7 Blok D6
Pademangan Timur, Jakarta Utara 14410,
Indonesia Telp. +62-21-22606207

Job No. : C0320080606-TDISV-AF
Cert. No. : C03.I.01I20.011HC
Date : September 01, 2020

CERTIFICATE OF HOLD CLEANLINESS

NAME OF VESSEL	: **MV. MANDARIN RIVER**
QUANTITY	: 56,275 METRIC TONS
DESCRIPTION OF GOODS	: INDONESIAN STEAM COAL IN BULK
SHIPPER	: **PT. INDEXIM COALINDO** WISMA HAYAM WURUK, JL. HAYAM WURUK NO. 8, KEBON KELAPA, GAMBIR, JAKARTA PUSAT, INDONESIA
PORT OF LOADING	: KALIORANG ANCHORAGE, EAST KALIMANTAN, INDONESIA
PORT OF DISCHARGE	: ANY PORT(S) IN INDIA
BL DATE	: AUGUST 28, 2020

We, as the surveyors of the above mentioned vessel at port of loading, confirm that we have inspected the cargo holds and found them to be free from any foreign materials and are suitable for loading of goods.

ISSUED AND INSPECTED AND SIGNED BY
PT. ANINDYA WIRAPUTRA KONSULT
AT LOAD PORT

Hery Fajar
Head Of Operational

BANJARBARU : Jl. Ahmad Yani KM 21, RT.02/02, Kel. Landasan Ulin Barat, Kec. Liang Anggang, Banjarbaru – 70722, Kalimantan Selatan, +62-511-4706093
BATULICIN : Jl. Transmigrasi KM 3,5, Kel. Barokah, Kec. Simpang Empat, Batulicin, Kab. Tanah Bumbu - 72213, Kalimantan Selatan. Telp. +62-518-75638.
SAMARINDA : Jl. KH. Harun Nafsi No 58 RT 22, Kel Rapak Dalam, Kec. Loa Janan Ilir, Samarinda - 75131, Kalimantan Timur. Telp. +62-541-7269686, 7269705. Fax +62-541-72697053.
BERAU : Jl. H.A.R.M Ayoeb RT 13, Gang Rahmad No 2, Kel. Gunung Tabur, Kec Gunung Tabur, Kab Berau - 77352, Kalimantan Timur
BARA TABANG : Senylur KM 00, Jetty PT. Bayan Resources Tbk. Desa Senyiur, Kec. Muara Ancalong, Kab. Kutai Timur - 75656, Kalimantan Timur
TARAKAN : Jl Flamboyan No.57, RT.27, Kel. Karang Anyar, Kec. Tarakan Barat, Tarakan - 77111, Kalimantan Utara. Telp: +62-511-25210
TAMIANG LAYANG : Jl. Tumpa Dayu RT 011, Ds Tamiang Layang, Kec. Dusun Timur, Kab. Barito Timur, Tamiang Layang - 73617, Kalimantan Tengah.
PONTIANAK : Jl. Arteri Supadio Gg. Anyar, RT 7 RW 10, Desa Arang Limbung, Kec. Sungai Raya, Kab. Kubu Raya 78391 Pontianak, Kalimantan Barat
PALEMBANG : Komp. Pergudangan Sukarame, Blok D No. 09, Jl. Tembus Terminal, Kel. Talang Kelapa, Kec. Alang-Alang Lebar Palembang 30151, Sumatra Selatan
JAMBI : Jl. Abdul Rahman Saleh No. 8, The Hok, Jambi Selatan, Jambi - 36138, Jambi. Telp. +62-741-572805.
BENGKULU : Jl. R.E. Martadinata No. 5, RT.02/RW.01, Kel. Kandang, Kec. Kampung Melayu, Kota Bengkulu - 38216, Bengkulu.
KENDARI : Jl.Poros Bandara Haluoleo, Desa Onewila, Kec.Ranomeeto, Kab.Konawe Selatan - 93372, Sulawesi Tenggara.
CIKARANG : Kawasan Industri Delta Silikon 3, Lippo Cikarang, Jalan Rotan Blok F 27 Nomor 23 C, Kel. Cicau, Kec. Cikarang Pusat, Kab Bekasi 17531, Jawa Barat

C-03.17646

Annexure VI

Greenbelt Development Plan

The green belt development is an aid the lost biomass and lead to sustainable development. The green belt enriches soil organic matter thereby nitrogen. It is developed to attain maximum attenuation of noise. Green belt is also control temperatures and keep the surroundings cool. It will attract avifauna and create suitable habitat to micro flora and fauna. The green belt helps as a sink to dust and gaseous pollutants. On the whole it has a positive impact on the environment.

Existing Green belt of 105276.0 Sq. m. (35% of total plot area) is already developed at the site and around 15800 Nos. of native and pollution resistant species are planted in the green belt. In addition to this 5300 Nos of trees additionally planted in in green belt at a distance of 2 m x 2.5 m to achieve 2000 Nos of trees/ Ha.

To strengthen the Green belt the additional plantation will be done around the proposed site of 5 to 10m width, this additional plantation will work as buffer area between Factory site and Forest area. Around 5000 Nos of Tree species will be planted in around the factory. Pollution resistant/tolerant and native species will be selected for greenbelt development as per CPCB guidelines.

Treated wastewater from STP will be used for development of green belt in non-monsoon season. Drip Irrigation system will be provided for effective water conservation.

The plant species suitable for green belt development will be selected based on the following characteristics:

- It will have thick canopy cover.
- They will be perennial and evergreen.
- They will have high sink potential for pollutants.
- They will be efficient in absorbing pollutants without significantly affecting their growth.
- Healthy sapling 2-3 years old will be planted to ensure better survival rate.
- Preference shall be given for trees with ecological values followed by aesthetic value.
- Local/native species with High Carbon Sequestration values will be selected.

EMP budget of Rs. 50.00 Lakhs as a capital cost and Rs. 20 Lakhs per Annum as a recurring cost has been allocated for green belt development.

For the calculation of cost for green belt development, following parameters have been considered.

For Capital cost

a) Cost of sampling (Trees)

b) Transportation charges

c) Planting cost (Including soil workings, pits etc.)

d) Fencing cost
e) Drip irrigation charges

For Recurring Cost:

a) Annual weeding and soil working
b) Req. of water for irrigation
c) Fertilization cost
d) Drip irrigation system maintenance
e) Security and vigilance

List of existing trees and proposed species with their common names for green belt is depicted in Table below.

Existing Plantation details

Sr. No	Scientific Name	Common/Local Name	Nos. planted	High Carbon sequestration Species
1	*Pongamia pinnata*	Karanj	1450	Yes
2	*Azardirachta indica*	Neem	1290	Yes
3	*Cocus nucifera*	Coconut	60	-
4	*Mangifera indica*	Mango	100	Yes
5	*Sweetenia mahogany*	Mahogany	3540	-
6	*Phyllanthus emblica*	Amla	250	-
7	*Leucaena leucocephala*	Subabul	4200	
8	*Ficus religiosa*	Pipal	20	Yes
9	*Ficus bengalensis*	Banyan	12	Yes
10	*Jatropha curcas*	Jatropa	4600	-
11	*Ailanthus excelsa*	Maharukh	38	Yes
12	*Polyalthia longifolia*	Ashok	88	-
13	*Tamarindus indica*	Chinch	19	Yes
14	*Tectona grandis*	Teak	129	Yes
15	*Butea monosperma*	Palas	67	Yes
	Total		15800	

Proposed Plantation details

Scientific Name	Common Name	Height (m)	Growth Rate	Evergreen/ Deciduous	Crown	High carbon sequestration species
Adina cordifolia	Haldu	15	Fast	Deciduous	Spreading	Yes
Aegle marmelos	Bel	12	Slow	Evergreen	Oblong	Yes
Ailanthus excelsa	Mahraruk	20	Quick	Deciduous	Round	-
Anogeissus latifolia	Dhaura	28	Slow	Evergreen	Round	-
Azadirachta indica	Neem	20	Quick	Evergreen	Spreading	Yes
Bauhinia variegata	Kachanar	5	Quick	Deciduous	Oblong	-
Buchanania cochinchinensis	Char	13	Fast	Evergreen	Round	-
Butea monosperma	Palas	10	Moderate	Deciduous	Ovoid	Yes
Capparis decidua	Nepti	4	Slow	Deciduous	Oblong	-
Caryota urens	Shankarjata	15	Quick	Evergreen	Round	Yes
Cassia fistula	Garmal	12	Quick	Deciduous	Round	Yes
Cassia renigera	Pink Cassia	10	Quick	Deciduous	Spreading	Yes
Cassine glauca	Bhutya	10	Moderate	Evergreen	Round	-
Celastrus paniculata	Dhimarvel	5	Moderate	Deciduous	Climbing	-
Chloroxylon swietenia	Bhirra	10	Fast	Deciduous	Round	-
Cochlospermum religiosum	Gogal	12	Fast	Deciduous	Round	-
Cordia dichotoma	Bhokar	10	Moderate	Deciduous	Oblong	Yes
Dalbergia sisoo	Sisam	10	Moderate	Evergreen	Round	Yes
Diospyros montana	Bistendu	10	Slow	Deciduous	Round	-
Emblica officinalis	Aola	5	Quick	Deciduous	Spreading	Yes
Ficus hispida	Katumbar	5	Moderate	Evergreen	Oblong	-
Flacourtia indica	Kakai	5	Moderate	Deciduous	Spreading	-
Gardenia jasminoides	Anant	5	Quick	Evergreen	oblong	-
Garuga pinnata	Kakad	15	Fast	Deciduous	Spreading	Yes
Heterophragma roxburghii	Waras	18	Quick	Evergreen	Round	-
Holoptelia integrifolia	Wavli	20	Fast	Deciduous	Oblong	-
Lagerstroemia parviflora	Lendia	10	Quick	Deciduous	Oblong	Yes
Lagerstroemia speciosa	Taman	10	Quick	Evergreen	Oblong	Yes
Limonia acidissima	Kawath	15	Slow	Evergreen	Round	-
Madhuca latifolia	Moha	15	Fast	Deciduous	Round	Yes
Mangifera indica	Amba	8	Moderate	Evergreen	Oblong	Yes
Miliusa tomentosa	Hum	15	Moderate	Deciduous	Oblong	-
Mimusops elengi	Borssali	10	Quick	Evergreen	Oblong	-
Ougeinia oojeinensis	Tiwas	10	Fast	Deciduous	Spreading	-
Phoenix sylvestris	Shindi	20	Moderate	Evergreen	Round	Yes
Pongamia pinnata	Karanj	10	Quick	Evergreen	Round	Yes
Saraca asoka	Ashok	5	Quick	Evergreen	Spreading	Yes
Schleichera oleosa	Kusum	10	Quick	Evergreen	Spreading	-

Annexure VII

Details of water consumption & effluent generation

Particulars **Water Requirement**	**Water consumption**	**Loss (-)/ Gain (+)**	**Effluent generation**
Domestic	40	-8	32 (to STP)
Industrial process, Scrubber	345	15	360*
Reactor washing/Floor Washing/ Drum Washings	55	-5	50
Cooling Towers makeup	760	-661	99
Boilers makeup	288	-240	48
Gardening	260	-260	0
Total	**1748**	**-1159**	**589**
Live steam condensate from MEE I and II			**60**
Recycled water (water from STP+RO permeate+ condensate from MEE-2)	**32+440+177= 649 CMD**		
Net fresh water requirement	**1099**		

Total 1748 CMD water is required for the proposed project, out of water requirement **490 CMD will met from Ground water source** (application for CGWA is submitted) and **remaining 1258 CMD will me met from Bor Dam** (application to irrigation department is submitted).

Annexure VIII

महाराष्ट्र शासन

" जलसंपदा विभागाच्या या - https://wrd.maharashtra.gov.in संकेतस्थळास भेट द्या"

कार्यकारी अभियंता, वर्धा पाटबंधारे विभाग वर्धा यांचे कार्यालय

डॉ. आंबेडकर पुतळ्याजवळ सिव्हील लाईन वर्धा

E-mail:- eewidn@gmail.com / eewid@yahoo.in**Tel / Fax : 07152-243548**

जावक क्रमांक /---६३८---/ महसुल / २०२० दिनांक :- ९/०३/२०२१.

प्रति,

मे.ईपका लेबॉरटरीज लिमी.
हिंगणी पो. हिंगणी
(जुने नाव — नोबल एक्सप्लोकेम)
ता.सेलु जि.वर्धा.

विषय :- Restoration of facilily for non - irrigation water supply Bor Dam to our Factory Locate at village hingani Tah. Seloo.Dist Wardha.

संदर्भ :- १) आपले पत्र क्रमांक IPCA:CMD:P&A:Irri:२०२१/०२-०१. Date.२५/०२/२०२१.
२) मा.मुख्य अभियंता,जलसंपदा विभाग नागपुर यांचे पत्र क्रमांक ४२९२/तांशा-६(१) बि.सि. करारनामा / नोबल एक्सप्लोकेम २०१७/दिनांक ०३/१०/२०१७.

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उपरोक्त विषयांकित प्रकरणी संदर्भ पत्र १ च्या अनुषंगाने कळविण्यात येते की, नोबल एक्सप्लोकेम लिमीटेड हिंगणी यांना बोर प्रकल्पामधुन शासन मंजुर असलेले ५.७९ दलघमी.पाणी आरक्षण मा.मुख्य अभियंता,जलसंपदा विभाग नागपुर यांनी संदर्भ पत्र २ अन्वये रद्द करण्यात आलेले असल्यामुळे सदर पाणी आरक्षण पुर्नजिवीत (Restoration) करता येणे शक्य नाही. या बाबत आपणास प्रत्यक्ष व भ्रमणध्वणी व्दारे कळविले आहे.

त्यामुळे सदर प्रकरणी नव्याने बिगर सिंचन पाणी आरक्षण प्रस्ताव तयार करुन शासन मंजुरीस्तव उपविभागीय अभियंता ,पाटबंधारे उपविभाग,सेलु यांचे मार्फत सादर करणे क्रमप्राप्त आहे.

करिता ,माहिती व पुढील कार्यवाहीस अग्रेषीत.

मुळ प्रत का अ कडुन मंजुर

सहपत्र:- संदर्भिय २ ची छायाप्रत

उपकार्यकारी अभियंता
वर्धा पाटबंधारे विभाग,वर्धा

प्रतिलिपी:- उपविभागीय अभियंता, पाटबंधारे, उपविभाग ,सेलु यांना माहिती व प्रकरणी पाणी आरक्षण प्रस्ताव प्रारुप संबंधितास देवुन संबधिता कडुन आरक्षण प्रस्ताव प्राप्त करुन शिफारसीसह अविलंब विभागास पुढील कार्यवाहीस्तव सादर करावा.

मुख्य अभियंता, जलसंपदा विभाग, नागपूर
सिंचन सेवा भवन, सिव्हील लाईन्स, नागपूर ४४० ००१
दूरध्वनी क्र. (का) २५६४४३१, पी.बी.एक्स : २५६०३४७, २५६५३०१, २५६७४९,
फॅक्स : ०७१२-२५३२३१० ई-मेल : cewrdngp@gmail.com

जा. क्र.४२९२/ तांशा-६ (१)/बि.सि.करारनामा/नोबल एक्सप्लोकेम/२०१७ दिनांक ०३/१०/२०१७

प्रति,

अधीक्षक अभियंता व प्रशासक
लाभक्षेत्र विकास प्राधिकरण,
नागपूर,

विषय :- नोबल एक्सप्लोकेम लिमि. हिंगणी ता. सेलु जि. वर्धा हया योजनेचे पाणी आरक्षण रद्द करणेबाबत

संदर्भ :- १) शासन पत्र क्र. बिकेएस ३८८०/४४४०/आय.एम.जी. १/ दिनांक ३०.०७.१९८१
२) प्राधिकरणाचे पत्र क्र. ४७२९/लाविप्रा/महसुल/प्रदका/२०१७, दिनांक २३.०८.२०१७

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नोबल एक्सप्लोकेम लि. हिंगणी ता. सेलु जि. वर्धा या बिगरसिंचन पाणीवापर संस्थेस संदर्भ- १ अन्वये ५.७९ द.ल.घ.मी. औद्योगिक वापराकरिता पाणी आरक्षणास मंजूरी प्रदान करण्यात आली आहे. प्रकल्पातून सदर संस्थेला सन १९८५-८६ पासुन सन २००३-२००४ पर्यंत पाणीवापर सुरु होता. सदर संस्थेसोबत दिनांक ०१.१२.२००४ ते दिनांक ३१.१०.२०१० पर्यंत सहा वर्षाकरिता करारनामा केला होता.

सन २००४-२००५ पासुन कारखाना बंद असल्यामुळे पाणी उचल केली नाही. वर्धा पाटबंधारे विभाग, वर्धा मार्फत संस्थेसोबत सन २०१३ ते सन २०१५ पर्यंत करारनामा करणेबाबत पत्रव्यवहार करण्यात आलेला असुन संस्थेने करारनामा नुतणीकरण संबंधात प्रतिसाद दिलेला नाही.

संदर्भ - २ अन्वये अधीक्षक अभियंता व प्रशासक, लाभक्षेत्र विकास प्राधिकरण, नागपूर यांनी सदर संस्थेकडे थकबाकी नसल्याचे कळविले आहे. तसच सदर संस्था बंद असुन पाणी उचल करीत नसल्यामुळे सदर संस्थेला मंजूर असलेले ५.७९ द.ल.घ.मी. पाणी आरक्षण रद्द करण्याबाबत शिफारस केलेली आहे.

नोबल एक्सप्लोकेम लि. हिंगणी ता. सेलू जि.वर्धा संस्थेकडे थकबाकी नसल्यामुळे व संस्थेस आरक्षित पाण्याची आवश्यकता नसल्यामुळे सदर पाणी आरक्षण रद्द करण्यांत येत आहे. शासुदे बिगर सिंचन आरक्षणाबाबत Return सादर करतांना या आरक्षणाचा समावेश करु नये.

सहपत्र : निरंक
"मुळ प्रत मु.अ.यांना मान्य"

सहाय्यक मुख्य अभियंता
जलसंपदा विभाग,
नागपूर

प्रतिलीपी:- १) मा. कार्यकारी संचालक, विदर्भ पाटबंधारे विकास महामंडळ, नागपूर यांना माहीतीकरिता सविनय सादर
२) कार्यकारी अभियता, वर्धा पाटबंधारे विभाग, वर्धा यांना माहितीस व पुढील कार्यवाहीस्तव अग्रेषित.

D:\Dashekar Comp No.1\NT-6 (1)\CADA\N.I. Agrment\Nobal axplokem ltd.doc

Restoration of facility for non -irrigation water supply from Bor Dam to our factory located sat village Hingani Tah Seloo , Dist Wardha.

As per the above mentioned subject , this is to inform you that the water permission amounting to 5.79 million m3 for Noble Explochem from Bor dam was cancelled by Chief Engineer Irrigation Dept Nagpur with reference to Letter no.2. Therefore it cant be restored. The same has been informed to you via phone as well as in person.

Hence a new application shall be submitted for non -irrigation purpose for approval to Irrigation Dept sub division Seloo. This is for your information and necessary action please.

Letter no.2 : Noble Explochem Hingani Tal Seloo, Wardha had been allocated water for industrial use amounting to 5.79 million m3. They were being supplied water from Bor dam from period 1985 – 86 to 2003 -04.

Noble Explochem had entered into agreement for 6 years from 1/11/2004 to 31/10/2010. The aforesaid industry was closed since 2004-2005 and hence didn't lift water. So irrigation Dept. directed them to enter into agreement from 2013 -2015, but the industry has not responded.

It is with reference to letter at Sr.No.2 supervisory engineer Nagpur informed that they have no outstanding payment towards them and as the said unit is closed they are not lifting water which is 5.79 million m3 Hence supervising engineer keeping in view the above has directed to cancel the allocation.

Hence there are no outstanding due to be paid by Noble Explochem and they don't require water so the allocation of water stands cancelled. After this whenever you apply for the next water permission , please don't consider the current permission.

Annexure IX

Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development and Ganga Rejuvenation
Central Ground Water Authority (CGWA)

Application for Issue of NOC to Abstract Ground Water (NOCAP)

Welcome : ipcawardha
Previous Login Date Time: 15/05/2021 17:48:17 PM , **IP Address:** 106.193.165.205

Logout

Applicant Home | Apply | Feedback | Change Password | Profile

- Location Details
- Communication Address
- Land Use Details
- Water Requirement Details
- Recycled Water Usage
- Groundwater Abstraction Structure- Existing
- Groundwater Abstraction Structure- Proposed
- Other Details
- Self Declaration
- Attachment
- Final Submit

INDUSTRIAL USE : SUCCESSFUL SUBMISSION

Print Application

Your Application Submitted Successfully.Your Application Detail are :

Application Number : 21-4/6629/MH/IND/2021

Name of Industry : IPCA LABORATORIES LTD.

Submitted Date: 15/05/2021

Net Ground Water Requirement: 490.00

Please note your application number for future reference.

Your application has been submited to office:

Regional Director
Central Ground Water Board Central Region
N.S. Building
Civil Lines
NAGPUR
MAHARASHTRA
PinCode : 440001

No SMS was send to External User Mobile

SMS not send to : 9300036263

Annexure X

Ref: IPCA:CMD:PH:API:2021/ **3rd April 2021**

Chief Conservator of Forest
3rd Floor, Van Bhavan
Ramgiri Road, Civil Lines,
Nagpur – 440 001.

Subject : Application for NOC for our proposed new project for manufacturing of active pharmaceuticals ingredients by Ipca Laboratories Limited at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra for obtaining Environmental Clearance

Dear Sir,

We, Ipca Laboratories Limited (Ipca) proposes new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra. The proposed production capacity of the unit will be 4470 TPA.

As per the EIA Notification S.O. 1533 dated 14th September 2006, proposed activity is covered under Synthetic Organic Chemicals Industry 5(f) and needs prior environmental clearance for establishment. Keeping in view the MoEF&CC's notification S. O. 1233 (E) dated 27th March 2020 proposals related to Active Pharmaceutical Ingredients will be categorized as B2 category in the light of the COVID-19 crisis. Considering this Ipca submitted application for prior environmental clearance to MoEFCC Delhi under B2 category.

As the proposed project is located within 5 km of protected forest (at distance of 2.4 km from protected forest (buffer area) of Notified Bor Wildlife Sanctuary) NOC from Forest department will be required.

Ipca herewith commit that there will not be any negative impact due to operation of the project on the surrounding environment. Ipca will take care of all the aspects of the environment viz. water, soil and air. Ipca will run the plant on complete Zero Liquid Discharge basis and all wastewater generated due to operation will be treated in full-fledged effluent treatment plan, Multiple Effect Evaporator and RO. Treated water will be recycled and reused in utilities and

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Regd. office : 48, Kandivali Industrial Estate, Kandivali (West), Mumbai, India. - 400067. I T: + 91 22 6647 4444 F.: +91 22 2868 6613

there will not be any discharge on the land or water bodies hence, there will not be any negative impact on water bodies.

All the hazardous waste will be sent to coprocessor or CHWTSDF for disposal and will not be dump anywhere and hence will not be any impact on soil. All hazardous waste will be stored separately category wise.

To control the emissions from process scrubbers will be provided and to control the emissions from heating unit's adequate stack height and multicyclone followed by bag filter will be provided. Regular monitoring will be carried out to confirm the emissions level whether they are within stipulated standards of MPCB.

Ipca has allotted amount of Rs.4,393.00 Lacs (including CER cost of 5.53 Crores) towards capital cost and Rs. 4707.00 Lacs per annum towards Operation and Maintenance cost.

Further Ipca will spent Rs.1.5 Cr. towards conservation of Bor wildlife sanctuary, Bor dam and surrounding area. Detailed conservation plan is prepared and attached herewith for your record as Annexure.

We request you to kindly issue us NOC for the proposed project and oblige us.

Thanking you,

Yours Faithfully

For Ipca Laboratories Limited

Authorised Signatory

Encl : as above

1. **Range Forest Officer, Hingni Div.**
   Near Bank of India,
   Navargaon Road, Hingni.
   Tah. Seloo
   Dist. Wardha

2. **The Deputy Conservator of Forests**
   Civil Lines,
   Ambedkar Chowk
   Wardha -

Dt. 05/04/2021

पूसंपादनाच्या प्रकरणांमध्ये वन [illegible] ना-हरकत [illegible] / प्रमाण पत्र देण्याबाबत.

[illegible]

[illegible] विभाग

शासन परिपत्रक क्रमांक :- [illegible]/२०११/प्र.क्र.-[illegible]/फ-३,

मंत्रालय, मुंबई [illegible] ०३२,

दिनांक- ८ [illegible]

परिपत्रक

वाचा :- [illegible] विभागीय आयुक्त, [illegible] विभाग [illegible] यांचे [illegible]/पुसं/कार्या-१/डि-३/[illegible]/वनदाखला/१६, दिनांक १९ डिसेंबर, २०११.

शासनाच्या विविध प्रकल्पासाठी / प्रयोजनासाठी पूसंपादन करणे आवश्यक [illegible]. अशा प्रकारे जमिनीचा [illegible] किंवा त्यास वन कायद्याच्या तरतुदी लागू होतात किंवा कसे, याबाबतची माहिती वन विभागाकडून [illegible] करणाऱ्या यंत्रणेस देणे अपेक्षित आहे. तथापि, अशा प्रकरणात विभागाकडून कोणत्याही प्रकारच्या "ना-हरकत" दाखला / प्रमाणपत्र देण्याची तरतूद वन कायद्यात आढळून येत नाही.

राखीव वने, संरक्षित वने, खुडपी जंगल, खाजगी वने तसेच [illegible] क्षेत्र (Identified Forest) या क्षेत्रांना वन (संवर्धन) अधिनियम १९८० च्या तरतुदी लागू असून केंद्र शासनाच्या पूर्व मंजुरी शिवाय त्यावर कोणतेही वनेतर कामे करता येणार नाही. अशा वनक्षेत्राबाबत वन जमिनीचा दर्जा / प्रकार नमूद करून त्यावर केंद्रशासनाच्या पूर्व मंजुरी शिवाय वनेतर कामे करण्यात येवू नये, असे स्पष्ट नमूद करून मागणी करणाऱ्या यंत्रणेस वन विभागाकडून कळविणे अपेक्षित आहे.

उक्त नमूद वनक्षेत्राव्यतिरिक्त अन्य वनेतर क्षेत्रासंबंधी भाष्य करणे वन विभागाच्या अखत्यारितील बाब नसून [illegible] कोणतेही "ना-हरकत" प्रमाणपत्र देणे अपेक्षित नाही. याबाबत संबंधितांनी दक्षता घ्यावी.

महाराष्ट्राचे राज्यपाल यांचे आदेशानुसार व नावाने.

(संजीव [illegible])

सह सचिव ([illegible])

प्रति,

१) अपर मुख्य सचिव (महसूल), महसूल व वन विभाग, मंत्रालय, मुंबई ३२.

२) प्रधान मुख्य वनसंरक्षक (वनबल प्रमुख), महाराष्ट्र राज्य, नागपूर.

३) अपर प्रधान मुख्य वनसंरक्षक (संधारण), महाराष्ट्र राज्य, नागपूर.

४) अपर प्रधान मुख्य वनसंरक्षक (केंद्रस्थ अधिकारी), महाराष्ट्र राज्य, नागपूर.

५) सर्व विभागीय आयुक्त.

६) सर्व मुख्य वनसंरक्षक (प्रा.).

७) सर्व जिल्हाधिकारी.

८) सर्व उप वनसंरक्षक / विभागीय वन अधिकारी / उप विभागीय वन अधिकारी

Annexure XI

Date: 25.03.2021

The Chairman/Member Secretary,
Expert Appraisal Committee (Industry III)
Ministry of Environment and forests and Climate Change,
Room No. 302, Vayu Wing, 3rd Floor
Indira Paryavaran Bhavan,
Jorbaug Road, New Delhi - 110003

Kind Attn: The Member Secretary, EAC-III

Subject: Submission of self-declaration for non-violation of EIA Notification 2006 and Amendments thereof for proposed new project of Ipca Laboratories Limited for manufacturing of Active Pharmaceutical Ingredients (APIs) at Village Hingni, Tal. Seloo, Dist.Wardha, Maharashtra

Dear Sir,

We Ipca Laboratories Limited are a leading global player in the domain of API's. Ipca is one of the world's largest manufacturers of APIs - Atenolol (anti-hypertensive), Chloroquine Phosphate (anti-malarial), Furosemide (diuretic), Hydroxychloroquine Sulphate (NSAID), Metoprolol Succinate (anti-hypertensive), Metoprolol Tartrate (anti-hypertensive) and Pyrantel Salts (anthelmintic) - besides being one of the largest suppliers of these APIs worldwide. The land where the manufacturing unit is proposed previously belongs to Noble explochem and Ipca purchased this land through NCLT in year 2019, the details for the same are as follows:

Nobel Explochem Limited established the unit for the manufacturing of Nitro glycine base explosives and started operation in February 1987.However, due to ban on these products from Government of India in the year 2004 the production was discontinued by Nobel and applied for CTO on 14.12.2004 for the manufacturing of new products in same premises viz. 2-Ethyl Hexyl Nitrate (Fuel Additives) 7200 MT/A, Nobel Miracle 1 & 2 (class II Explosives) 10,000 MT/A and Emulsion/Slurry Explosives 25000 MT/A . After that Noble received RCTO for the manufacturing of same products on 8.10.2006. As Noble has not increased the production capacity granted in the consent before 2006 have not violated EIA notification 2006.

Though unit had received the RCTO for manufacturing of said products, Nobel stopped the manufacturing of products due to non-favourable conditions at that time and company was not working from year 2006.

Ipca Laboratories Ltd.
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Regd. Office: 48, Kandivli Industrial Estate, Kandivli (West), Mumbai 400 067, India | T: +91 22 6647 4444 F: +91 22 2868 6613
E: ipca@ipca.com CIN: L24239MH1949PLC007837

Ipca buy this land in the year 2019 which was earlier belongs to Nobel Explochem Limited (Nobel) to establish new facility for manufacturing of APIs and seek prior environmental clearance under B2 category in the light of the MoEF & CC's office memorandum S. O. 1233 (E) dated 27th March 2020 related to Active Pharmaceutical Ingredients according to which the aforesaid project will be categorized as B2 category in the light of the COVID-19 crisis. With reference to OM dated 15th October 2020 proposal submitted before 30th March 2020 should be categorised as B2 for manufacturing of APIs.

Considering this kindly accept our application for the environmental clearance under Category B-2.

Yours faithfully,

For Ipca Laboratories Limited

Authorized Signatory

Manoj Kumar Mittal

Vice President (Corp) EHS

Encl: Copy of the CTO of Nobel Explochem Limited dated 2001

Copy of the RCTO of Nobel Explochem Limited dated 8.10.2006

MAHARASHTRA POLLUTION CONTROL BOARD

Gram :" PREPOLL"
Tel. : 269 2345 (4 Lines)
: 261 4459/261 4348.
Fax : 022 - 261 2125

Shri Chhatrapati Shivaji Maharaj
Municipal Market Bldg., 4th Floor,
Mata Ramabai Ambedkar Marg,
Mumbai : 400 001.

RED/LSI
Consent No: PO/RO(N)/WARDHA-19 /R/TAIN/CC-257 Dated: 2-6-12-2001

Consent to Establish / Operate under Section28 / 26 of the Water (Prevention & Control of Pollution) Act, 1974; under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorisation / Renewal of Authorisation under Rule 5 of The Hazardous Wastes (Management & Handling) Rules, 1989 & Amendment Rules, 2000. [To be referred as Water Act, Air Act and HW(M&H) Rules respectively].

.....

CONSENT is hereby granted to:
M/s Noble Explosives Ltd.,
Village Khapri (M) Seloo,
Dist.Wardha.
located in the area declared under the provisions of the Water Act, Air Act and Authorisation under the provisions of HW(M&H) Rulessubject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. The Consent to Operate granted for a period upto- 31-12-2002.

The validity to the authorisation granted under HW(M&H) Rules, 1989 and Amendment Rules, 2000, however, will be valid for a period of 5 years from the date of issue after which, the industry shall submit a fresh application for authorisation, if required.

2. The Consent is valid for the manufacture of -

Sr.No.	Product	Maximum Quantity
1.	Noble Gel (60, 80, 90)	1250 T/Month
2.	Noblex (80, 60)	
3.	Noble Coal 1, 3, 5	
4.	Noble Blast 1, 3	
5.	Noble Boost Prime	
6.	Noble Soluney	
7.	Noble Smooth	
8.	Slurry explosive column chase cap, booter sensitives	1000 T/Month

3. CONDITIONS UNDER WATER ACT :

(i) The daily quantity of trade effluent from the factory shall not exceed 132.0 M3.

(ii) The daily quantity of sewage effluent from the factory shall not exceed 31.8 M3.

(iii) Trade Effluent :
Treatment: The applicant shall provide comprehensive treatment system consisting of primary / secondary and / or tertiary treatment as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of the treated effluent to the following standards :

1)	pH	Between 5.5 to 9.0
2)	Suspended Solids	Not to exceed 100 mg/l.
3)	BOD 3 days 27oC	Not to exceed 30 mg/l.
4)	COD	Not to exceed 250 mg/l.
5)	Oil & Grease	Not to exceed 10 mg/l.
6)	D.O.	Not less than 5 mg/l.
7)	Chlorides	Not to exceed 600 mg/l.
8)	Total Dissolved Solids	Not to exceed 2100 mg/l.
9)	Sulphate	Not to exceed 1000 mg/l.

(iv) Trade Effluent Disposal : The treated effluent shall be discharged on land for irrigation only.

(v) Sewage Effluent Treatment : The applicant shall provide comprehensive treatment system as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of treated effluent to the following standards :

Suspended Solids	Not to exceed 100 mg/l.
BOD 3 days 27oC	Not to exceed 100 mg/l.

(vi) Sewage Effluent Disposal : The treated sewage effluent shall be soaked in a soak pit which shall be got cleaned. Overflow, if any, shall be used on land for gardening / plantation only.

(vii) Non-hazardous Solid Waste :

Type of waste	Quantity	Treatment	Disposal
--			

(viii) Other conditions :

The applicant shall comply with the provisions of The Water (Prevention & Control of Pollution) Cess Act,1977 (to be referred as Cess Act) and Rules thereunder :

The industry falls in the 7th category of the Cess Act and the Rules made thereunder.

The daily water consumption for the following categories is as under :

i) Domestic	40.0 CMD
ii) Industrial Processing	103.0 CMD
iii) Industrial Cooling/Boiler	155.0 CMD
iv) Agriculture/Gardening	-- CMD

The applicant shall regularly submit to the Board the returns of water consumption in the prescribed form and pay the cess as specified under Section 3 of the said Act.

5. CONDITIONS UNDER AIR ACT :

(i) The applicant shall install a comprehensive control system consisting of control equipments as is warranted with reference to generation of emissions and operate and maintain the same continuously so as to achieve the level of pollutants to the following standards

Control Equipments :
Scrubber of sufficient capacity shall be provided to De-Nitration, Mix Acid Tank, Spent Acid Tank, Oleum storage tank should be operated and maintained properly to achieve the quality of pollutants to the following standards.

Standards of Emissions of Air Pollutants :

SPM/TPM not to exceed.....150 mg/NM3.
SO2.....not to exceed .....72 Kg/Day.

(ii) The applicant shall observe the following fuel pattern :-

Sr No.	Type of fuel	Quantity
1)	Furnace Oil	0.8 MT/Day

(iii) The applicant shall erect the chimney(s) of the following specifications :

Sr.No.	Chimney attached to	Height in Mtrs.
1)	Boiler	20.0
2)	Absorption	22.0

(iv) The applicant shall provide ports in the chimney/(s) and facilitates such as ladder, platform, etc. for monitoring the air emissions and the same shall be open for inspection to/and for use of the Board's staff. The chimney/(s) vents attached to various sources of emission shall be designated by numbers such as S-1, S-2 etc. and these shall be painted/ displayed to facilitate identification.

(v) The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standard in respect of noise to less than 75 dB(A) during day time and 70 dB(A) during night time. Day time is reckoned in between 6 a.m. and 10 p.m. and night time is reckoned between 10 p.m. and 6 a.m.

(vi) The ambient air quality standard in respect of noise as notified under Environmental (Protection) Rules 1986 shall be followed at the boundary line of your unit.

(vii) Other conditions :

1) The industry should not cause any nuisance in surrounding area.

2) The industry should monitor stack emissions and ambient air quality regularly.

3) The green belt afforestation shall be done minimum upto 33% of the open available space.

6. CONDITIONS UNDER HW(M&H) RULES, 1989 & AMENDMENT RULES, 2000 :

(i) The applicant shall handle hazardous wastes as specified below :

Sr. No.	Item No. of Process Generating HW as per Schedule-I	Waste substance contain as per classes of Schedule-II	Type of waste	Quantity	Disposal
1.	1.9		ETP Sludge	125 KG/M	Incenration

(ii) Treatment : --

(iii) The authorisation is hereby granted to operate a facility for collection, storage, transport and disposal of hazardous waste.

(iv) The industry should comply with the Hazardous Wastes (Management & Handling) Amendment Rules, 2000.

7. Whenever due to any accident or other unforeseen act or event such emissions occur or is apprehended to occur in excess of standards laid down, such information shall be forthwith reported to Board, concerned Police Station, Office of Directorate of Health Services, Department of Explosives, Inspectorate of Factories and Local Body. In case of failure of pollution control equipments, the production process connected to it shall be stopped.

The applicant shall comply with the conditions as stipulated under Annexure-I & II enclosed.

This issued persuent to the decision of the CAC of board in its meeting held on 21-09-2001.

For and on behalf of the
Maharashtra Pollution Control Board

27/12/01

(Dr. Munshi Lal Gautam)
Member Secretary

ANNEXURE-II

TERMS AND CONDITIONS OF AUTHORISATION

1. The authorisation shall comply with the provisions of the Environment (Protection) Act, 1986 and the rules made thereunder.
2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.
3. The person [illegible] for or otherwise transport the hazardous wastes [illegible] the Pollution Control Board.
4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.
5. It is the duty of the authorised person to take permission of the State Pollution Control Board to close down the facility.
6. An application for the renewal of an authorisation shall be made as laid down in rule 5 [illegible]
7. (a) Category No. [illegible] by land fill.

The hazardous waste to be disposed of through landfill shall not contain following constituents in excess of limits specified below:—

Sulphide	100 mg/kg.
Chloride	[illegible] mg/kg.
Mixture of heavy metals (Cu+Ni+Cr+Zn)	25 mg/kg.
Lead	6 mg/kg.
Hg	0.01 mg/kg.

The firm shall take appropriate measures to put a lining to land fill site so as to arrest the passage of leachates to ground water. Leachates generated, if any shall be [illegible] to existing Effluent Treatment Plant facilities for treatment and disposed of as per the consent conditions stipulated under Water (Prevention and Control of Pollution) Act, 1974.

7. (b) Category No. [illegible] by land fill.

The wastes which are either disposed of through contractor or which are sold through the contractor shall be disposed of under intimation of this office. The firm shall ensure that the Contractor/s holds valid consent under Water (Prevention and Control of Pollution) Act, 1974 and authorisation under Environment (Protection) Act, 1986, i.e. under Rules notified on [illegible] July, 1989 and 27th November, 1989.

(c) Category No. [illegible] by incineration through incinerator.

The firm shall meet the emission standards as prescribed below for the incineration plant:—

Particulate	150 mg/Nm3.
HCl	100 mg/Nm3.
HF	2 mg/Nm3.
SO_2	300 mg/Nm3.
NO_x	50 ppm.
Lead	10 mg/Nm3.
Mixture of As+Cd+Cr+Hg+Ni	0.2 mg/Nm3.
TOC	20 mg/Nm3.
CO	100 ppm.

The firm shall make efforts to reduce emissions by adopting—

(i) Improved burning technology.

(ii) Optimised technology for the gas cleaning and shall create facilities for monitoring the gaseous emission.

The ash generated in incinerator plant shall be disposed of through landfill at [illegible] selected site.

MAHARASHTRA POLLUTION CONTROL BOARD

Tel : 2402 0781 / 2401 0437
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Visit us at :
Website : http://mpcb.mah.nic.in
E-mail : mpcb@vsnl.net

Kalpataru Point,
2nd , 3rd & 4th floor,
Opp. Cineplanet,
Near Sion Circle, Sion (E),
Mumbai - 400 022.

Red/LSI
Consent No.BO/ RO Nagpur/ PCI-I/ EIC-0722-06/R/ CC- [illegible] Date: 8 / 10 /2006

Consent to Renewal under Section 26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization / Renewal of Authorization under Rule 5 of the Hazardous Wastes (Management & Handling) Rules 1989 and Amendment Rules. [To be referred as Water Act, Air Act and HW (M&H) Rules respectively].

CONSENT is hereby granted to

M/s. Noble Explochem Ltd.
At. Post Hingni,Tah.Seloo,
Dist. Wardha.

located in the area declared under the provisions of the Water Act, Air act and Authorization under the provisions of HW(M&H) Rules and amendments thereto subject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. The Consent to Renewal is granted for a period upto- 31/ 12/ 2006.

2. The Consent is valid for the manufacture of -

Sr.No.	Product	Maximum Quantity
1.	2-Ethyl Hexyl Nitrate (Fuel Additives)	7200 MT/Annum
2.	Noble Miracle 1&2 (Class II Explosives)	10,000 MT/Annum
3.	Emulsion / Slurry Explosives	25,000 MT/Annum

3. CONDITIONS UNDER WATER ACT :

(i) The daily quantity of trade effluent from the factory shall not exceed 29.0 M^3

(ii) The daily quantity of sewage effluent from the factory shall not exceed 20.8 M^3

(iii) Trade Effluent :
Treatment : The applicant shall provide comprehensive treatment system consisting of primary / secondary and/or tertiary treatment as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of the treated effluent to the following standards:

1)	pH	Between	5.5 to 9.0	
2)	Suspended Solids	Not to exceed	100	mg/l
3)	BOD 3days 27 Deg. C	Not to exceed	100	mg/l
4)	COD	Not to exceed	250	mg/l
5)	Oil & Grease	Not to exceed	10	mg/l
6)	Total Dissolved Solids	Not to exceed	2100	mg/l
7)	Sulphate	Not to exceed	1000	mg/l.
8)	Chlorides	Not to exceed	600	mg/l

Trade Effluent Disposal : The treated effluent shall be discharged on land for irrigation only.

(v) **Sewage Effluent Treatment :** The applicant shall provide comprehensive treatment system as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of treated effluent to the following standards:

(1)	Suspended Solids	Not to exceed	100	mg/l.
(2)	BOD 3 days 27° C.	Not to exceed	100	mg/l

(vi) **Sewage Effluent Disposal :** The treated domestic effluent shall be soaked into soak pit which shall be got cleaned periodically Overflow if any shall be used on land for gardening / plantation only.

(vii) **Non-Hazardous Solid Wastes:**

Type of waste	Quantity	Treatment	Disposal

(viii) **Other conditions :** The industry shall monitor effluent quality regularly

4. The applicant shall comply with the provisions of the **Water (Prevention & Control of Pollution) Cess Act, 1977** (to be referred as **Cess Act**) and Rules thereunder. The daily water consumption for the following categories is as under:

(i) Domestic	...	26.0	CMD
(ii) Industrial Processing	...	31.0	CMD
(iii) Industrial Cooling	...	35.0	CMD
(iv) Agriculture/Gardening	...	34.0	CMD

The applicant shall regularly submit to the Board the returns of water consumption in the prescribed form and pay the Cess as specified under Section 3 of the said Act.

5. **CONDITIONS UNDER AIR ACT :**

(i) The applicant shall install a comprehensive control system consisting of control equipments as is warranted with reference to generation of emission and operate and maintain the same continuously so as to achieve the level of pollutants to the following standards :

Control Equipment : The Industry should provide scrubbing system of sufficient capacity to control the process emissions.

Conditions for D.G. Set :-

1] Noise from the D.G. Set should be controlled by providing an acoustic enclosure or by treating the room acoustically.

2] Industry should provide acoustic enclosure for control of noise. The acoustic enclosure/acoustic treatment of the room should be designed for minimum 25 dB(A) insertion loss or for meeting the ambient noise standards, whichever is on higher side. A suitable exhaust muffler with insertion loss of 25 dB(A) shall also be provided. The measurement of insertion loss will be done at different points at 0.5 metres from acoustic enclosure/room and then average.

3] The industry shall take adequate measures for control of noise levels from its own sources within the premises in respect of noise to less than 55 dB(A) during day time and 45 dB(A) during the night time. Day time is reckoned between 6 a.m. to 10 p.m and night time is reckoned between 10 p.m to 6 a.m.

4] Industry should make efforts to bring down noise level due to DG set, outside industrial premises, within ambient noise requirements by proper siting and control measures.

5] Installation of DG Set much be strictly in compliance with recommendations of DG Set manufacturer.

6] A proper routine and preventive maintenance procedure for DG set should be set and followed in consultation with the DG manufacturer which would help to prevent noise levels of DG set from deteriorating with use.

7] D.G. Set shall be operated only in case of power failure.

8] The applicant should not cause any nuisance in the surrounding area due to operation of D.G. Set.

Standards for Emissions of Air Pollutants :

(i)	SPM/TPM	Not to exceed	150 mg/Nm^3
(ii)	SO_2	Not to exceed	304 Kg/Day.

(ii) **The applicant shall observe the following fuel pattern :-**

Sr.No.	Type of Fuel	Quantity
1	Furnace Oil	2.4 KL/Day.
2	High Speed Diesel	0.14 KL/Day

(iii) **The applicant shall erect the chimney(s) of the following specifications :-**

Sr.No.	Chimney attached to	Height in Mtrs.
1.	Boiler-1	20.0 mtrs.
2.	Boiler-2	10.0 mtrs.
3.	D.G.Set (320 KVA)	3.0 mtrs.(above the crest)
4.	Nitric Acid Concentration plant	22.0 mts.

(iv) The applicant shall provide ports in the chimney/(s) and facilities such as ladder, platform etc. for monitoring the air emissions and the same shall be open for inspection to/and for use of the Board's Staff. The chimney(s) vents attached to various sources of emission shall be designated by numbers such as S-1, S-2 etc. and these shall be painted/displayed to facilitate identification.

(v) The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standard in respect of noise to less than 75 dB(A) during day time and 70 dB(A) during night time. Day time is reckoned in between 6 a.m. and 10 p.m. and night time is reckoned between 10 p.m. and 6 a.m.

(vi) **Other Conditions :**

1) The industry should not cause any nuisance in surrounding area
2) The industry should monitor stack emissions and ambient air quality regularly

6. **CONDITIONS UNDER HW (M&H) RULES, 1989 & AMENDMENT RULES :**

(i) The applicant shall handle hazardous wastes as specified below:

Sl.	Item No. as per Sch-I	Type of Waste	Quantity	Disposal
1.	5.1	Used/Spent Oil	100 Kg/ day	Sent to CHWSDF
2.	34.3	Chemical Sludge of W.W. Treatment	0.3 MT/M	Sent to CHWSDF
3.	33.3	Discarded Containers/Barrels	600 Nos /M	Returned to Manufactuers

(ii) Treatment :

(iii) The authorisation is hereby granted to operate a facility for collection, storage, transport and disposal of hazardous waste.

7. Whenever due to any accident or other unforeseen act or even, such emissions occur or is apprehended to occur in excess of standards laid down, such information shall be forthwith Reported to Board, concerned Police Station, office of Directorate of Health Services, Department of Explosives, Inspectorate of Factories and Local Body. In case of failure of pollution control equipments, the production process connected to it shallbe stopped.

8. The applicant shall comply with the conditions as stipulated under Annexure - I & II enclosed.

9. This consent is issued subject to post facto approval of Consent Appraisal Committee of the Board.

D.B.Boralkar
(D.B.Boralkar)
Member Secretary

To,
M/s. Noble Explochem Ltd.
At. Post Hingni,Tah.Seloo,
Dist. Wardha.

Copy to:

1) Regional Officer, MPCB, Nagpur / Sub-Regional Officer, MPCB, Nagpur-II.
2) Chief Accounts Officer, MPCB, Mumbai

Received Consent fee of –

Amount	D.D.No.	Date	Drawn on
Rs.10,000/-	143454	16-12-2003	State Bank of India
Rs.10,000/-	875127	17-12-2004	State Bank of India
Rs.1,00,000/-	010105	13-02-2004	State Bank of India

3) Cess Branch, MPCB.

4] Master file.

Annexure XII

Ref: IPCA/CMD-DIS/ECRFO/2021

11 May 2021

The Range Forest Officer
Forest Department
Wardha Division
Village Hingani, Tah. Seloo,
Dist. Wardha

Subject : Application for the permission for the tree cutting for our proposed new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra.

Dear Madam,

This bears reference to the above mentioned subject.

Our proposed new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra was appraised for the environmental clearance in the 9th meeting of the EAC(Industry III) held on 13th April 2021 (Proposal No. IA/MH/IND2/205120/2021)

During the deliberations, the EAC (Industry –III) directed us to submit the details of application and its approval from forest department for cutting of trees.

In this context we would like to mention that a total 320 number of trees will be cut and compensatory afforestation will be done in & around the plot, on land which is under possession of IPCA Laboratories.

We will plant 1 no. of trees for cutting of 1 tree. A Total 320 Nos. of trees will be planted as compensatory afforestation. We are also enclosing herewith the pertinent plan for the same.

We hope that the submission is in line with your requirement and will suffice the purpose.

We request you kindly to process our application at the earliest and grant us tree cutting permission keeping in view the strategic importance of the project which will manufacture the APIs which will be used in the treatment of malaria, hypertension etc.

Yours faithfully,

For IPCA Laboratories Ltd.,

IPCA Laboratories Ltd.

Authorized Signatory

Encl : a/a

Ipca Laboratories Ltd.
www.ipca.com

Plot No. 32, House No. 649, W No 5, Vanrakshak Co-op. Society, Wadi Nagpur, Wadi, Nagpur, India. - 440 023. T: +91 7104 22 6611 F: +91 7104 22 6463
Regd. office: 48, Kandivli Industrial Estate, Kandivali (West), Mumbai, India. 400067. T: +91 22 6647 6444 F: +91 22 2868 6013

वनपरिक्षेत्र (प्रा.)
आ. क्र. 100
दि. 12/5/2021
- कार्यालय -

Pertinent plan for Compensatory afforestation

Our proposed new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra was appraised for the environmental clearance in the 9th meeting of the EAC (Industry III) held on 13th April 2021 (Proposal No. IA/MH/IND2/206120/2021)

For construction of proposed unit total 320 number of trees will be cut and compensatory afforestation will be done in & around the plot, on land which is under possession of IPCA Laboratories. We will plant 1:80 of trees for cutting of 1 tree. A Total 320 Nos. of trees will be planted as compensatory afforestation. The proposed afforestation will be completed within 6 months after obtaining the EC.

The plant species suitable for Compensatory afforestation will be selected based on the following characteristics:

- It will have thick canopy cover.
- They will be perennial and evergreen.
- They will have high sink potential for pollutants.
- They will be efficient in absorbing pollutants without significantly affecting their growth.
- Healthy sapling 2-3 years old will be planted to ensure better survival rate.
- Preference shall be given for trees with ecological values followed by aesthetic value.
- Local/native species with High Carbon Sequestration values will be selected.

List of proposed species with their common names for Compensatory afforestation is depicted in Table below.

Proposed Plantation details

Scientific Name	Common Name	Height (m)	Growth Rate	Evergreen/ Deciduous	Crown	High carbon sequestration species
Adina cordifolia	Haldu	15	Fast	Deciduous	Spreading	Yes
Aegle marmelos	Bel	12	Slow	Evergreen	Oblong	Yes
Ailanthus excelsa	Mahiraul	20	Quick	Deciduous	Round	-
Anogeissus latifolia	Dhaura	28	Slow	Evergreen	Round	-
Azadirachta indica	Neem	20	Quick	Evergreen	Spreading	Yes
Bauhinia variegata	Kachanar	5	Quick	Deciduous	Oblong	-

Ipca Laboratories Ltd.
www.ipca.com
Plot No. 22, House No. 845, W. No. 3, Vakrodant Co-op. Society, Mouli Nagar, Wadi, Nagpur India - 441501. T: +91-7104-221941 F: +91-7104-221942
Regd. office : 48, Kandivali Industrial Estate, Kandivali (West), Mumbai India - 400067. T: +91 22 6647 4444 F: +91 22 2868 1613

Buchanania cochinchinensis	Char	13	Fast	Evergreen	Round	-
Butea monosperma	Palas	10	Moderate	Deciduous	Ovoid	Yes
Capparis decidua	Nepti	4	Slow	Deciduous	Oblong	-
Carvota urens	Shankarjata	15	Quick	Evergreen	Round	Yes
Cassia fistula	Garmal	12	Quick	Deciduous	Round	Yes
Cassia renigera	Pink Cassia	10	Quick	Deciduous	Spreading	Yes
Casuine glauca	Bhutya	10	Moderate	Evergreen	Round	-
Celastrus paniculata	Dhimarvel	5	Moderate	Deciduous	Climbing	-
Chloroxylon swietenia	Bhirra	10	Fast	Deciduous	Round	-
Cochlospermum religiosum	Gogal	12	Fast	Deciduous	Round	-
Cordia dichotoma	Bhokar	10	Moderate	Deciduous	Oblong	Yes
Dalbergia sisoo	Sisam	10	Moderate	Evergreen	Round	Yes
Diospyros montana	Bistendu	10	Slow	Deciduous	Round	-
Emblica officinalis	Aola	5	Quick	Deciduous	Spreading	Yes
Ficus hispida	Katumbar	5	Moderate	Evergreen	Oblong	-
Flacourtia indica	Kakai	5	Moderate	Deciduous	Spreading	-
Gardenia jasminoides	Anant	5	Quick	Evergreen	oblong	-
Garuga pinnata	Kakad	15	Fast	Deciduous	Spreading	Yes
Heterophragma roxburghii	Waras	18	Quick	Evergreen	Round	-
Holoptelia integrifolia	Wavli	20	Fast	Deciduous	Oblong	-
Lagerstroemia parviflora	Lendia	10	Quick	Deciduous	Oblong	Yes
Lagerstroemia speciosa	Taman	10	Quick	Evergreen	Oblong	Yes
Limonia acidissima	Kawath	13	Slow	Evergreen	Round	-
Madhuca latifolia	Moha	15	Fast	Deciduous	Round	Yes
Mangifera indica	Amba	8	Moderate	Evergreen	Oblong	Yes
Miltusa tomentosa	Hum	15	Moderate	Deciduous	Oblong	-
Mimusops elengi	Borssali	10	Quick	Evergreen	Oblong	-
Ougeinia oojeinensis	Tiwas	10	Fast	Deciduous	Spreading	-
Phoenix sylvestris	Shindi	20	Moderate	Evergreen	Round	Yes
Pongamia pinnata	Karanj	10	Quick	Evergreen	Round	Yes
Saraca asoka	Ashok	5	Quick	Evergreen	Spreading	Yes
Schleichera oleosa	Kusum	10	Quick	Evergreen	Spreading	-

12th May 2021

The Member Secretary,
Expert Appraisal Committee (Industry –III)
Ministry of Environment and forests and Climate Change,
Room No. 302, Vayu Wing, 3rd Floor
Indira Paryavaran Bhavan,
Jorbaug Road, New Delhi - 110003

Dear Sir,

Subject: Submission of undertaking for compensatory afforestation done by Ipca Laboratories Limited on land belongs to us.

This bears reference to the above mentioned subject.

Our proposed new project for manufacturing of active pharmaceuticals ingredients at Village Hingni, Tal. Seloo, Dist. Wardha, Maharashtra was appraised for the environmental clearance in the 9th meeting of the EAC(Industry III) held on 13thApril 2021 (Proposal No. IA/MH/IND2/206120/2021)

In this context we would like to mention that a total 320 number of trees will be cut for the proposed manufacturing unit construction and compensatory afforestation will be done in & around the plot.

Hereby we will commit that we will conduct the compensatory afforestation program and plant trees as per guidance of Forest Division, Wardha. Accordingly the additional budget will be allocated for this afforestation program.

The above information is verified and true to my knowledge.

Thanking You,

Yours Faithfully,

For Ipca Laboratories Ltd

Authorized Signatory

Manoj Kumar Mittal

Vice President (Corp.) EHS

Ipca Laboratories Ltd.
www.ipca.com
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E: ipca@ipca.com CIN: L24239MH1949PLC007837

Annexure XIII

RESVISED ENVIRONMENTAL MANAGEMENT PLAN

For

Proposed New Project for Manufacturing of Active Pharmaceutical Ingredients (API)

Total Production Quantity: 4470 MT/A

5(f) Category B-2

M/s. Ipca Laboratories Limited

Village Hingni, Tal Seloo, Wardha, Maharashtra 442106.

Environmental Consultant:

GOLDFINCH ENGINEERING SYSTEMS PRIVATE LIMITED
Thane, Maharashtra

QCI-NABET Accredited EIA Consultancy for Schedule 5 (f)

Certificate No. – NABET/EIA/1922/RA 0145

Certified by ISO 9001:2015 & BS OHSAS 18001:2007

June 2021

1.1 Introduction

The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental impacts or reduce them to acceptable levels. The detailed environmental management plan ensures the components of environment are not affected during the different activities forming part of the manufacturing processes. It ensures regular monitoring of critical parameters, ensuring good health of operating staff, ensures all safety precautions and installation of adequate pollution control equipment by allotting required funds.

The EMP document can be used throughout the project life cycle – commissioning, mobilization & construction, operation & maintenance and decommissioning. It is regularly updated to be aligned with the project progress from commissioning to mobilization to construction to operation to decommissioning. EMP's outline the environmental impacts, the mitigation measures, roles and responsibilities, timescales and cost of mitigation. EMP is a practical and achievable plan of management to ensure that any environmental impact during all the phases is minimized and lead in the direction of sustainable development. An important objective of environmental assessment is to develop procedures and plans to ensure that the mitigation measures and monitoring requirements approved during the environmental compliance review will actually be carried out in subsequent stages of the project. Mitigation measures may then be of a more generic nature without compromising its importance to be implemented. The EMP is a dynamic and flexible document subject to review and updating. During the implementation of a project there is always the 2011 2nd International Conference on Environmental Engineering and Applications IPCBEE vol.17 (2011) © (2011) IACSIT Press, Singapore 253possibility that unforeseen issues could arise, this EMP should therefore be revised where necessary to mitigate unanticipated impacts. The study shows an EMP is developed to outline measures that are to be implemented in order to minimize adverse environmental degradation associated with the construction and operation of proposed API manufacturing unit. It serves as a guide for the contractor and the workforce on their roles and responsibilities concerning environmental management on site , and it provides a framework for environmental monitoring throughout the development period.

Purpose of the EMP:

• Encourage good management practices through planning and commitment to environmental issues concerning any project;

• It tells how the management of the environment is reported and performance evaluated periodically;

• To provide rational and practical environmental guidelines that will assist in minimizing the potential environmental impact of activities;

• Helps in minimizing disturbance to the environment (physical, biological and ecological, socioeconomic, cultural, and archeological,) ;

• Combat all forms of pollution through monitoring air, noise, land, water, waste, and energy and natural resources;

• Protection of sensitive and endangered flora and fauna;

• Prevent land degradation;

• Comply and adhere to all applicable laws, regulations, standards and guidelines for the protection of the environment;

• Adopt best practicable waste management for all types of waste (liquid and solid) with objective on prevention, minimization, recycling, treatment or disposal of wastes;

• Describe all monitoring procedures required to identify impacts on the environment;

• Train and bring awareness to employees and contractors with regard to environmental obligations and compliance.

• Reduce environmental risk and provide better Health, Safety and Environment (HS&E) • Increase efficiency through minimum consumption and conservation of energy deplete-able resources

• An EMP also provides with a plan answering - what, where, when, how and who?

• Establishing the reporting system to be undertaken during the construction.

Annual review of the entire system and various environment management as well as process control and monitoring systems shall be done. Environment monitoring shall be done to collect the data on air, water, soil, noise etc. and duly recorded. Environmental Management Plan which shall be implemented is detailed under the following heads.

- Pollution Control Systems
- Waste Minimization and Resource Conservation
- Occupational Health and Safety
- Socio-Economic Development
- Greenbelt Development Plan

Brief environment management plan during operation and construction phase is mentioned in Table below, however details plan of environmental management during Operational phase has been explained in detail in this chapter.

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
During Construction Phase					
1	Construction of Plant building, Erection of Plant Machineries	• Fugitive Emissions • Noise generation due to handling of heavy machineries and construction activities • Generation of employment opportunity • Increase in turbidity/ deposition of silt content in nearby water body/channel due to release of silt containing water from construction activity • Pollution of soil due to discharge of water used in construction • Loss of soil	Air, Noise, Water, Socio-economic, Soil	Impact will be limited to project site but release of polluted water may affect surrounding water body	• Vehicles must be PUC certified • Ensure vehicular movement only during day time • Well maintained vehicles will be used • Paved road for vehicle movement • Well maintained equipment will be utilized to prevent noise generation • Local labour will be hired for the work so that housing arrangement will be avoided • Mobile toilets will be arranged during construction phase for workers • Silt trap shall be provided to avoid water turbidity • Excavated soil shall be stored separately and used for greenbelt development within project premises • Construction material shall be stored away from water

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
		(Natural resources) due to removal of soil for construction purpose			consumption area to avoid contamination of water with cement and other construction chemicals.
During Operational Phase					
1	Internal vehicular movement	Fugitive dust generation, Traffic emissions within project site due to lack of parking space, Incremental concentration at project site due to vehicle movement	Air Environment	Project premises and Internal roads	• Sufficient parking area shall be provided to avoid traffic • Movement of vehicles shall be monitored and managed on periodic basis • Offsite parking shall be restricted • Internal, paved road shall be developed • Regular scrapping of road or sprinkling of water on road shall be done to avoid dust emissions within project site.
2	Generation of waste water from operational phase	Release of untreated, HCOD/HTDS effluent into water bodies may leads to degradation of water bodies, also it may damage present flora and fauna within it.	Water, Soil, Air	Within premises and surrounding region	• The project shall be operated on the basis of ZLD principle. HCOD/HTDS & LCOD/LTDS effluent will be treated separately • HCOD effluent will be treated in Stripper MEE-1 with ATFD; after giving primary treatment to it

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
		Release of untreated water on land may degrade soil quality and also may kills the bacterial diversity present into it. Release of untreated effluent into environment may also increase risk of inhalation of unwanted fumes like acid/VOC.			• The condensate from MEE-1 will be treated in ETP along with LCOD/LTDS effluent. • LCOD/LTDS effluent from utilities will be treated in ETP comprises of Primary, Secondary & Tertiary treatment facility; • Treated effluent will be feed to RO. Permeate from RO will be reused in utilities and reject will be fed to MEE-2. Condensate from MEE-2 will be reused achieving ZLD. • Domestic effluent load of unit will be treated in Proposed STP. • ETP&STP area shall be paved • Suitable PPEs shall be provided to ETP handlers/ operators.

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
3	Burning of Fuel: 182.8 TPD coal will be burned to fulfill steam and heat energy required in manufacturing process	Gaseous Emissions like PM10, SO2, NOx & CO may affect health status of workers and surrounding colonies Deposition of dust and release of gases may affect nearby flora and fauna species, it will also affect nearest habitation	Air, land, water, ecology biodiversity	Surrounding regions	• ESP/ Multicyclone followed by Bag filters and stack with sufficient height shall be provided. • DG Power backup shall be provided to all APCDs. • Low sulfur containing coal is proposed • High speed ID Fan shall be provided to increase effective stack height, result in dispersion of pollutant at higher atmosphere
4	Release of process emissions from manufacturing activity	Release of volatile and acidic fumes may damage closet and surrounding ecosystem, it may also affect health of workers and nearby locals, 800 nos. of workers may affect due to inhalation of released gases	Air, Ecology and biodiversity	Within the Premises and Surrounding environment	• Suitable acid alkali scrubbers shall be provided with effective stack height • All reactor vents shall be connected to scrubbers • Maintenance of scrubber shall be done periodically • Backup scrubbing system is advised • Scrubber shall be in operation during charging of reactors
5	Hazardous waste generation from	HW stored on land may degrade soil	Land, Air, Water	Within the premises	• HW shall be stored in paved areas • Dedicated area for storage of HW

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
	Manufacturing process and Effluent treatment	quality Storage of chemically incompatible HW may leads to reaction and release of gases or it may leads to hazardous situation			shall be given • Segregation of HW waste shall be done at site • HW Management Rule, 2016 shall be followed • Disposal shall be done authorized agency
6	Noise generation from industrial operations	Noise pollution can affect hearing capability of workers, it may also create symptoms like headache, nausea etc.	Noise	Within the premises	• All noise generating equipments shall be isolated/ enclosed with acoustic enclosures • Regular maintenance of machineries shall be done • PPEs shall be provided to all workers • Job rotation system shall be adopted • Regular medical checkup shall be done to identify negative effect on workers health
2	Storage & handling of hazardous chemicals and hazardous waste	Fugitive Emissions from storage area may leads to generation of toxic vapor clouds leads to health issues of workers and nearby locals	Air	Within the premises	• Ensure the storage and handling of all the chemicals in a proper manner to avoid any spillages and also to prevent runoff contamination in monsoon • Ensure collection & treatment of spillages, if any Ensure good

SN	Activity	Sub-activity/ Impacts	Environmental Attribute	Impact Zone	Mitigation Measures
		Chemical Spillage may leads to generation of unwanted scenario like fire, exposure to toxic vapors and thermal radiation	Air	Within the premises and some extent in vicinity	housekeeping to maintain clean and orderly working environment • Provide training to the persons handling chemicals & hazardous wastes • Ensure the provision of designated hazardous waste storage area with proper roofing and leachate collection • Ensure the disposal of hazardous wastes at approved TSDF/CHWTSDF with manifest only • Ensure availability of MSDS of all the Hazardous materials to the on-site emergency team • Recommendations of QRA and HAZOP studies shall be followed

SN	Component	Specific Target	Time Frame for Completion	Resources Required	Specific Responsibility
EMP during Construction Phase					
1.	Air Environment	To confirm minimum air emissions from vehicular movement by periodically checked it for PUC.	Immediate before commissioning of project activity and after six month of previously taken PUC.	1) Revenue 2) MPCB authorized PUC Center	EHS Team shall ensure to obtain PUC certificate for all transport vehicles.
		Spraying of water on loose top soil to prevent re-suspension of dust into ambient air due to movement of vehicles etc.	Everyday till completion of construction work or till construction of paved road.	1) Water Tankers 2) Manpower 3) Revenue	EHS Team shall ensure to mitigate dust emissions during vehicular transport within plant premises.
		Traffic Management	During Construction Phase	Man Power & Vacant Space	Security personal has to maintain the records of vehicle and to control internal vehicle traffics to avoid accidents
2.	Water Environment	Construction of ETP	Before commissioning of proposed production; 2 Month after grant of Environmental Clearance.	1) Man power 2) Electricity 3) Pre-fabricated aeration and settling tank 4) Pumps for effluent transfer 5) PPEs 6) Transportation 7) Welding and fitting machineries 8) Competent Person 9) Revenue	Project Manager has to ensure completion of ETP construction work with recommended specifications. Safety officer has to ensure safe working operation by workers

SN	Component	Specific Target	Time Frame for Completion	Resources Required	Specific Responsibility
		Provision of silt trapping in the surface drainage system for the stockpile area	It shall be done before storage of construction material at site	1) Manpower 2) Revenue 3) Silt traps	EHS Team in consultation of EHS manager shall ensure fixing of silt traps wherever necessary, to avoid chocking of drainage line and contamination of nearby water streams.
		Sanitation Facilities for proposed workers- Mobile Toilets	It shall be provided during construction phase of the unit, shall be cleaned weekly.	Revenue	EHS team shall ensure it.
3	Noise Environment	Provision of PPEs and safety training to workers	Suitable PPEs and Safety training/ safe work instruction shall be given before starting of any activities	PPEs as required for particular operation	Safety officer shall make arrangement of suitable PPEs for workers.
		Installation of acoustic enclosures to all noise generating equipment's	Before commissioning of proposed production; 1 Month after grant of Environmental Clearance	1) Acoustic enclosures as per IS standard 2) Competent personnel 3) Electricity 4) PPEs 5) Fitting equipment's	Project & EHS Manager has to ensure installation of all components with IS specification. Safety officer has to ensure safe working operation by workers
4	Solid Waste Management	Disposal of solid waste generated during construction waste	Timely disposal of construction waste or After completion of construction phase	1) Man power 2) Transport 3) PPEs	EHS Manager &Safety officer has to ensure safe and scientific disposal of construction waste.
EMP during Operational Phase					

SN	Component	Specific Target	Time Frame for Completion	Resources Required	Specific Responsibility
1.	Air Environment	Installation of new air pollution control devices like, scrubber with new stack, ESP, cyclone system followed by Bag filter	Before commissioning of proposed production; 1 Month after grant of Environmental Clearance	1) Man power 2) Electricity 3) Metal Sheet 4) Welding and fitting Machineries 5) Transportation 6) PPEs Competent 7) Personals 8) Revenue	Project Manager has to ensure installation of all APCDs with IS specification.
					Safety officer has to ensure safe working operation by workers
		To ensure continuous operation and timely maintenance of all APCDs	Continuous during operational phase of the unit, shall be checked once in shift.	1) Manpower 2) Revenue	Environmental officer of the plant & designated operator shall ensure continuous working of all APCDs
		Ambient Air Quality, Point Source and Work place air Monitoring to ensure Safe work environment and efficiencies of APCDs	As mentioned in Environmental Monitoring Program	1) Monitoring equipment's 2) NABL approved Laboratory for testing 3) Competent person 4) Electricity 5) PPEs	EHS team shall ensure implementation of Environment Management Plan
		To confirm no air emissions from vehicular movement by periodically checked it for PUC.	Every Six month after commissioning of operational phase	Revenue MPCB authorized PUC Center	EHS team Shall ensure to obtain PUC certificate for all transport vehicles.

SN	Component	Specific Target	Time Frame for Completion	Resources Required	Specific Responsibility
2.	Water Environment	Operation of ETP of, HCOD and LCOD effluent shall be treated separately, ZLD condition to be followed	Operation of same shall be done to treat entire raw effluent from overall daily activity of the unit.	1) Electricity 2) Manpower 3) PPEs 4) Training Program	Operator of respective ETP shall ensure continuous and efficient operation of it, However, EHS manager shall monitor overall activity and ensure ZLD operation of unit. Safety officer shall ensure safe work operation by providing PPE & training to the operators.
		Water quality monitoring (ETP)	As mentioned in Environmental Monitoring Program	1) Sampling equipment's 2) NABL approved Laboratory for testing 3) Competent person 4) Electricity 5) PPEs	EHS team shall ensure implementation of Environment Management Plan, and to maintain the range outlet parameter as part of MPCB consent compliance
		Maintenance of storm water drainage line	Maintenance of storm drainage line shall be done prior to arrival of monsoon season	1) Maintenance equipment's 2) Manpower 3) Revenue	EHS Team with consultation of Plant manager shall ensure yearly maintenance of drainage line.
3.	Noise Environment	Noise Monitoring of different work zones	As mentioned in Environmental Monitoring Program	1) Monitoring equipment's 2) Laboratory for testing 3) Competent person 4) Electricity 5) PPEs	EHS team implementation Management Plan shall ensure of Environment
		Provision of PPEs to workers	Before commissioning of activities	1) PPEs 2) Revenue	Safety officer shall ensure provision of PPEs for all workers

SN	Component	Specific Target	Time Frame for Completion	Resources Required	Specific Responsibility
		Regular medical examination for any symptoms of hearing loss.	Every year for general employees & monthly for workers, continuously exposing to higher noise level	1) Certified Medical Practitioner 2) Revenue	HR team shall ensure periodic medical checkup of employees with consultation of project manager & EHS team
4.	Solid Waste Management	Solid Waste Management - Hazardous Waste	As per HW management guidelines	Storage area, PPEs, Competent person, Transpiration, Weigh balance	EHS team has to comply all statutory conditions mentioned under HW management rule
5	Greenbelt Development	Greenbelt shall be developed to increase aesthetic values of project land and to mitigate impacts from Dust and noise pollution	Greenbelt is already developed. Additional greenery will be developed in and around the factory premises.	1) Plant Saplings 2) Soil 3) Manure 4) Equipment's 5) Manpower 6) Water	EHS team shall ensure development of greenbelt and its maintenance.
6	Occupational health & safety	To maintain safe & healthy work environment by providing PPEs, trainings, conducting medical checkups, Mock drills etc.	Periodically as needed	1) PPEs 2) Medical Practitioners 3) Trainers 4) Safety Committee	Safety office shall ensure to fulfill the said requirement.

1.2 Pollution Control System

Detailed study of the pre-project commissioning environment and also the likely (and predicted) implications after the plant commissioning suggests that the following preventive/control measures are considered necessary to reduce the adverse impact to the utmost practicable limit.

1.2.1 Air

- Stack of adequate height will be provided to air pollution control devices
- Proponent will install multi-cyclone followed by bag filter to counter the emission of particulate matter from the proposed boilers.
- Final dispersion shall be restricted to permissible limits of air quality as per NAAQS. It will be ensured height of stack provided is as per the CPCB standards.
- Ambient air quality and stack emission would be quarterly monitored as detailed in environment monitoring program. In case of any malfunction corrective action shall be initiated.
- In order to avoid fugitive emissions from different sources, system will be under vacuum wherever reaction can be carried out under vacuum.
- Roads within the premises will be paved to prevent dust generation.
- The ambient air monitoring will be carried out regularly in the work zone and surrounding areas, it will be ensured that ambient air levels of the contaminants are below the stipulated norms.
- Existing Green belt of 105276.0 Sq. m. (35% of total plot area) is already developed at the site and around 15800 Nos. of native and pollution resistant species are planted in the green belt. In addition to this 5300 Nos of trees additionally planted in in green belt at a distance of 2 m x 2.5 m to achieve 2000 Nos of trees/ Ha.To strengthen the Green belt the additional plantation will be done around the proposed site of 5 to 10m width, this additional plantation will work as buffer area between Factory site and Forest area. Around 5000 Nos of Tree species will be planted in around the factory. Pollution resistant/tolerant and native species will be selected for greenbelt development as per CPCB guidelines.
- Work place monitoring will be done regularly for proposed activity. The Environment Management Plan focusing on air pollution related impacts due to the project are listed in Table below :

Table -2 : Environmental Management Plan for air component

S. No.	Potential Impact	Action	Parameters for Monitoring	Timing
1.	Air Emissions	All equipment operated within specified design parameters. (Operational phase)	N/A	Duration of programme.
		Any dry, dusty materials (chemicals, etc.) shall be stored in sealed containers.	Absence of stockpiles or open containers of dusty materials.	

Ipca will install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.

Ipca will consider Bio Briquette as an alternate fuel which is cleaner fuel in place of coal. Ipca will utilized Bio Briquette to the tune of 200 TPD as a fuel for heating equipment's. However, only in case of non-availability of Bio briquette, Imported coal having very less content of ash and sulfure as per enclosed analysis reports as annexure will be utilized in order to avoid shut down of manufacturing facility. All the mitigations will be followed considering worst case scenario. ESP will be provided as Air pollution control equipment. As CNG/PNG is not available in the area this fuel is not mentioned in the application. However, once the Gas is available in the vicinity Ipca will immediately switch over the fuel to CNG/PNG

1.3 Water

Water Balance is revised for additional water required for additional green belt development and presented here;

Water Balance

Particulars Water Requirement	Water consumption	Loss (-)/ Gain (+)	Effluent generation
Domestic	40	-8	32 (to STP)
Industrial process, Scrubber	345	15	360*
Reactor washing/Floor Washing/ Drum Washings	55	-5	50
Cooling Towers makeup	760	-661	99
Boilers makeup	288	-240	48

Gardening	260	-260	0
Total	**1748**	**-1159**	**589**
Live steam condensate from MEE I and II			**60**
Recycled water (water from STP+RO permeate+ condensate from MEE-2)	**32+440+177= 649 CMD**		
Net fresh water requirement	**1099**		

The net fresh water requirement for the unit will be 1748 CMD and as the proposed unit will run on complete Zero Liquid Discharge (ZLD) basis, after recycling of 649 CMD of treated effluent the total fresh water consumption will get reduced to 1099 CMD.

Source of water supply will be from Bor Dam/CGWA.

Water permission from Bor dam/ CGWA is in process. Detailed agreement will be made with Dam Authority for supply of water. Hereby, we will commit that we will not start any work for proposed unit before getting permission from BOR dam/CGWA

No direct discharge of wastewater on any water body. Wastewater will be treated and recycled and reused in utilities. Unit will be run on complete ZLD basis.

The ETP scheme for the treatment of effluent is given below:

Primary Treatment: (Flow 150 CMD)

Wastewaters from High TDS Stream will be collected in the equalization tank and air stripped. This effluent will then be pumped to the Flash Mixer where it will be dosed with PAC for coagulation. Flash Mixer will be followed by a flocculator where poly will be dosed for bigger flock formation. This effluent will overflow into the settling tank where the solids will settle down and will be removed.

Distillation/Stripping (Before MEE-1, Flow -150CMD, From process)

The effluent will be collected in the feed tank. The effluent will be pumped to the Packed column from top to bottom. The bottom of the packed column will be re-circulated in the reboiler using the recirculation pump. Steam will be used in the reboiler for heating. The outlet of the reboiler will enter the bottom of the packed column. The low boiling solvents will be stripped from the effluent by the rising vapors. The solvent vapour mixture will rise through the packed bed and will come in contact with the recycled solvent in the enriching section from the top. The enriched solvent vapours will be condensed in the condenser using cold water from the cooling tower. The solvent stripped effluent will be pumped to the MEE.

Multi Effect Evaporator (MEE-1) (High TDS from Process)

Multi Effect Evaporator (MEE) – For high COD & TDS stream from process (150 CMD) will be fed to MEE where the effluent will be concentrated up to 50 % w/w by evaporating the water with the high pressure steam. The condensate of the evaporator will be fed to ETP for removal of volatile organics that will get carried away in the condensate. The concentrated liquor will be pumped to the ATFD for the removal of solids. Thus the dissolved solids will be completely removed from the liquor and it will also reduce the concentration of other polluting parameters. The solids recovered from ATFD will be sent for disposal to CHWTSDF. The condensate of MEE will be pumped to the Effluent Treatment Plant for the removal of organics.

Effluent Treatment Plant: The system will be designed to treat 650 CMD of waste water.

Primary Treatment (Utilities and washing Flow: 407 CMD)

Wastewaters from washings, cooling tower and boiler blow downs etc. will be collected in the equalization tank and air stripped. This effluent will then be pumped to the Flash Mixer where it will be dosed with PAC for coagulation. Flash Mixer will be followed by a flocculator where poly will be dosed for bigger flock formation. This effluent will overflow into the settling tank where the solids will settle down and will be removed.

Secondary (Aerobic) Treatment: (Primary treated effluent 407+180 (150+30 live steam condensate) from MEE

The neutralized effluent from primary will enter the bioreactor and mixed with condensate of MEE-1. In the bio reactor, dissolved organic material is degraded by the micro–organisms present in the bio reactor. Oxygen required for the oxidation of organic matter will be provided by means of proposed diffuser aeration system which will mix the contents of the bioreactor also. The mixed liquor will overflow into Secondary Settling Tank (SST).

In the secondary settling tank, solid-liquid separation takes place and solids i.e. biomass will settle at the bottom of the tank. Settled biomass will be recycled to the bio reactor for maintaining the MLVSS concentration by using proposed sludge recycle pumps and excess biomass will be wasted periodically to the sludge sump. Two stage treatments are proposed where the overflow from the 1st stage clarifier will enter the 2nd stage bioreactor where the non-degraded organics from the 1st stage bioreactor will be treated. The clear overflow from the 2nd stage Secondary Settling Tank will be collected in the intermediate sump.

Tertiary Treatment:

The clear effluent from the intermediate sump will be pumped by tertiary Feed pumps through the pressure sand filter (PSF) & activated carbon filters.

Reverse Osmosis: (Flow 587 CMD)

Tertiary treated effluent (587 CMD) will be fed to RO. RO permeate (440 CMD) will be recycled and reused. RO reject (147 CMD) will be fed to MEE-2.

Multi Effect Evaporator (MEE-2)

Reject from RO (147 CMD) will be fed to separate MEE-II where the effluent will be concentrated up to 50 % w/w by evaporating the water with the high pressure steam. The concentrated liquor will be pumped to the ATFD for the removal of solids. Thus the dissolved solids will be completely removed from the liquor and it will also reduce the concentration of other polluting parameters. The solids recovered from ATFD will be sent for disposal to CHWTSDF. The condensate of MEE-2 will be reused in utility to achieve complete ZLD.

Proper drainage system for storm water and effluent will be proposed to avoid runoff contamination as well as to avoid contamination in surface water quality.

Untreated wastewater will not be discharged outside of project boundary, hence impact on surface water quality will be negligible.

Ipca will provide online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises

1.4 Rain water harvesting

Rain water from roof top area of admin building, time office and canteen is considered for calculation of rain water harvesting.

The rain water harvesting calculations are given below

Total combined roof top area of Admin Bldg + Time office + Canteen = 2102.25 Sq. m

As per IMD records annual rainfall for Wardha District: 1100.0 mm or 1.1 m

Water Collected = 2102.29 x 0.9 x 1.1 m^3 = 2081.22 m^3/Season

Rain water will be currently collected in the raw water tank of 400 KL capacity. Harvested rain water will is stored in this tank and reused in utilities. Excess rain water will be drained to drain outside factory premises. During rainy season water requirement will get reduced.

Table -3 : Rain water harvesting estimation

Source	Area (m^2)	Runoff Coefficient	Annual Rainfall (m/year)	Rain water m^3/season

Combined roof top area of the Admin Bldg + Time office + Canteen	2102.25	0.9	1.1	2081.22

The EMP for the rainwater harvesting is given in Table-4

Table-4 : EMP for the rain water harvesting

S. No.	Potential Impact	Action	Parameters for Monitoring	Timing
1	Surface water will be consumed	Rainwater storing and reuse	Installation of piezometers to monitor water level fluctuations and water quality variation with respect to space ,depth and time	Pre& Post Monsoon i,e. May & Oct.)

Recommendation:

For assessing the impact of the development both the pre and post project stage information on various parameters of water quality and quantity is necessary and therefore for collecting this information , construction of piezometers are recommended .

- In order to assess its effectiveness, observation piezometer wells need to be constructed near ETP/storage area
- Resistivity Survey is recommended for piezometers well design.

These Piezometer wells can be tested to monitor water level fluctuations and water quality variation with respect tospace, depth and time. Periodic water level measurement (Pre& Post Monsoon i,e. May & Oct.) and water sample collection for its analysis to monitor water quality variation, if any is recommended . The rain water is already stored in the water supply storage tank of 400 KL capacity.

1.5 Storm Water Management:

Storm water volumes may be estimated using the procedure. Factors to be considered include:

→ Discharges off-site should be limited to pre-site development peak flows and volumes. If volume control is impractical during major rainfall events (exceeding a one-year average recurrence interval), system designers should assess the hydrological and ecological

consequences to the downstream waterways and wetlands, and ensure protective measures are implemented. appropriate statistical return periods for high intensity rainfall and the duration of storm events should be used when assessing the risk and potential impacts on receiving environments.

→ Where practical, retention or detention storage systems should be used to manage peak storm water flows within the on-site storm water management system.

→ Controlled release points should be built into any storm water retention basin to avoid embankment failures or flooding under extreme rainfall conditions.

STORMWATER MANAGEMENT

→ Uncontaminated storm water runoff from roofs, paths and the landscape should not be allowed to mix with process effluent, stored chemicals or storm water runoff from areas susceptible to chemical spills. Where practical, processing areas involving the use of chemicals should be weatherproof or covered.

→ Areas where storm water may become contaminated should drain to treatment facilities for removal of solids and chemical residues and testing prior to disposal.

→ Paved areas exposed to rainfall where dust, litter or spilt substances accumulate should be regularly cleaned using methods that prevent drainage or leaching of fluid into the surrounding environment. Gross pollutant (litter), oil and sand traps (appropriate to the site) are recommended at drain entry points. These traps require regular inspection and residue removal.

→ Turbidity should be controlled by ensuring storm water run-off is not directed towards or over areas cleared of vegetation, raw material stockpiles or earthworks vulnerable to erosion.

→ Chemical solvents and non-degradable detergents used to clean equipment or pavements should not be released into storm water systems. These chemicals are likely to cause environmental harm if they enter groundwater, wetlands, waterways or marine environments

STORMWATER DISPOSAL

→ Storm water should be considered as a potential resource this may have particular appeal in areas where water sources are limited and storage reservoirs can be constructed economically.

Options for storm water use include…

→ Capture for process use, flushing, cooling water or dust suppression

→ Seasonal storage to supplement irrigation supplies

→ The following options for discharge of excess storm water, after it will be effectively treated should be considered in preferential order:

→ The storm water quality should be compatible with the water quality and environmental values of the receiving environment.

→ Discharge to a local government or Water Corporation main drainage system, where approved after Consideration of flow capacity and water quality characteristics.

Storm Water calculations and designs of drainage:

Storm water generated (Q)= 2.8 x C (runoff coefficient) x i(rainfall intensity= 100 mm/hr.) x A(area in hectare)(1 hectare = 10,000 m2)

= 2.8 x 0.90 x 100 mm/hr. x 30.079

= 7579.9 m^3/hr.

= 7579.9 /3600 = 2.105 m^3/s

Storm water generated will be= 2.105 m^3/s (2105 l/s)

For drainage No 1:

Storm water drainage calculation: (As per Mannings formula)

V = (1.00/n) X ($R^{2/3}$) X $S^{½}$

= (1.00/0.012) X ($0.23^{2/3}$) X $0.047^{1/2}$)

= 83.33 X 0.38 X 0.22

V = 6.96 m/s

Q = Area (A) X velocity (V)

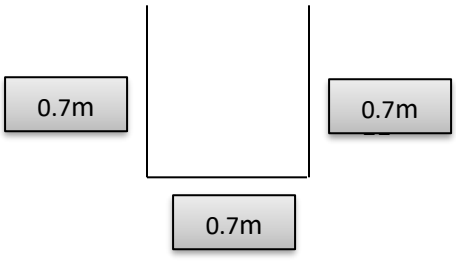
= 0.49 Sq.m X 6.96 m/s

= 3.410 m^3/s = **3410 lit/sec**

We have considered the drain size 0.7 X0.7 x 0.7, having Q of 3410 Lit/Sec which is more than storm water generated at the site.

Since the discharge capacity of provided drain is more than the calculated storm water runoff, the design capacity is correct.

n = Roughness coefficient



R = Hydraulic Radius

S = gradient of drain

A = Area of Drain

V = Velocity

Q= Capacity of discharge of the drain (lit/sec)

Highest Gradient – 321
Lowest Gradient – 289
Difference in Gradient – 32
Height of the plot – 650 / 32 = 21
Slope 1:21 = 0.047

A: 0.70*0.70= 0.49
R: A/ {(2xb)+a}
0.49/ {(2*0.70) +0.70}
=0.49 / 2.1
=0.23

For drainage No 2:

Storm water drainage calculation: (As per Mannings formula)

$V = (1.00/n) X (R^{2/3}) X S^{½}$

$= (1.00/0.012) X (0.2^{2/3}) X 0.059^{1/2})$

$= 83.33 X 0.34 X 0.242$

$V = 6.85$ m/s

Q = Area (A) X velocity (V)

= 0.36 Sq.m X 6.85 m/s

= 2.468 m^3/s = **2468 lit/sec**

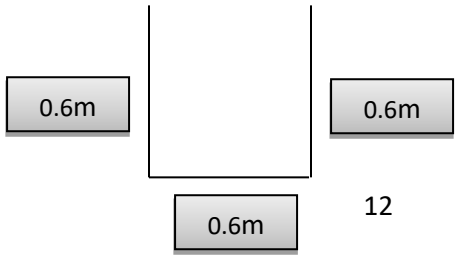
We have considered the drain size 0.6 X0.6 x 0.6, having Q of 2468 Lit/Sec which is more than storm water generated at the site.

Since the discharge capacity of provided drain is more than the calculated storm water runoff, the design capacity is correct.

n = Roughness coefficient

R = Hydraulic Radius

S = gradient of drain



A = Area of Drain

V = Velocity

Q= Capacity of discharge of the drain (lit/sec)

Highest Gradient – 321
Lowest Gradient – 292
Difference in Gradient – 29
Height of the plot – 480 / 29
= 17
Slope 1:17 = 0.059

A: 0.60*0.60= 0.36
R: A/ {(2xb)+a}
0.36/ {(2*0.6) +0.60}
=0.36 / 1.8
=0.2

1.5.1 Solid and Hazardous waste Management and Soil Environment

Hazardous waste includes Distillation residues, Used Oil, Spent solvents, ETP sludge, Spent Carbon, Discarded Drums, Containers, etc. This waste will be collected, stored properly and will be send to CHWTSDF or Pre/ Co Processing or will be sold to authorized vendors as per the requirement. The details of the hazardous waste are given below in Table-5:

Table-5

Details of the hazardous waste

Sr. No.	Category No.	Type of Waste	Unit	Total Quantity	Disposal
1	26.3	Spent Acid	MT/A	13540.8	CHWTSDF / Cement Plant or authorised recycler
2	28.6	Spent Caustic Solution	MT/A	1790	CHWTSDF/ Cement Plant or authorised recycler
3	28.6	Spent Solvent	MT/A	958.0	CHWTSDF /Sale to authorized party/ /pre/coprocessing
4	28.1	Process Residue & Waste	MT/A	1160.0	CHWTSDF/ pre/coprocessing
5	5.1	Used Oil/ Spent oil	MT/A	10	Sale to authorized party/ CHWTSDF
6	28.3	Spent Carbon (Process)	MT/A	771.0	CHWTSDF pre/coprocessing/

7	26.6	Spent Process mother liquor	MT/A	6331	CHWTSDF or authorised recycler /pre/coprocessing
8	33.1	Empty barrels/ containers/ Liners/ used PPEs contaminated with hazardous waste	MT/A	250	Sale to authorized party /CHWTSDF
9	28.5	Date expired Products (0.5% of total production capacity)	Nos./A	25	CHWTSDF/ pre/coprocessing
10	28.4	Off specification products (0.5% of total production capacity)	MT/A	25	CHWTSDF /pre/coprocessing
11	33.2	Contaminated cotton Rugs and other cleaning material	MT/A	10	CHWTSDF
12	36.2	Spent Filter media	MT/A	10	CHWTSDF
13	35.2	Spent iron exchange Resin	MT/A	2	CHWTSDF/ pre/coprocessing
14	28.2	Spent catalyst	MT/A	79.0	Sent for regeneration to Authorised pary/CHWTSDF
15	36.1	Distillation residue	MT/A	2060	CHWTSDF/ pre/coprocessing
16	35.3	ETP Sludge	MT/A	2000.0	CHWTSDF/ pre/coprocessing
17	35.3	Spent Carbon (ETP)	MT/A	135.0	CHWTSDF/ pre/coprocessing
18	35.3	MEE Salts	MT/A	26470.0	CHWTSDF
19	35.3	Spent Solvents (from Stripper)	MT/A	1620.0	CHWTSDF/ pre/coprocessing

The details of the non-hazardous waste are given in Table 5-b below:

Table -5-b

Non hazardous waste details

Sr. No.	Description	Total (MT/A)	Disposal
1	MS Barrels	600	Sale to authorized parties
2	Plastic Liners	300	Reuse/sale to authorized party
3	PVC Waste	420	Reuse/sale to authorized party
4	Steel Scrap	12000	Reuse/sale to authorized party
6	Glass Bottle Waste	240	Reuse/sale to authorized party
7	Rubber Pipe/ PVC Pipe	144	Sale to authorized parties
8	Garbage	1860	Used as Manure
9	Plastic Drums	600	Sale to authorized parties
10	Fiber Drums	600	Sale to authorized parties
11	Wooden Scrap	300	Sale to authorized parties
12	Corrugated Box	1440	Sale to authorized parties
13	Electrical Wires	48	Sale to authorized parties
14	Aluminium Scrap	24	Sale to authorized parties
15	Copper Scrap	6	Sale to authorized parties
16	Waste Paper	1140	Sale to authorized parties

17	Filter Cloth	420	Sale to authorized parties
18	Polythene Mix Class	420	Sale to authorized parties
19	Boiler Coal Ash	5850	Sale to Brick manufacturer
20	Canteen Waste	900	Used as Manure
21	HDPE Bags	660	Sale to authorized parties
22	STP Sludge	2.75	Use as manure for Gardening

The details of other waste are given in Table -5-c

Other waste:

Table-5-c Other waste

Sr. No.	Description	Total (MT/A)	Disposal
1.	E-Waste	2	Sale to authorized dismantlers/ Recyclers
2.	Battery waste	5	Returned to battery manufacturer through authorized dealer on buy back procurement
3.	Biomedical Waste	0.2	Disposal at Authorized Biomedical waste disposal site

The other solid waste like organic waste from kitchen waste or garden waste will be used as manure in greenbelt development.

Soil component

The EMP for the soil component is given in Table-6

Table-6 :EMP for the soil component

S. No.	Potential Impact	Action Parameters for Monitoring	Parameters for Monitoring	Timings
1	Soil contamination	Control spillage of construction materials	EC, pH and ESP (exchangeable sodium per cent)	Completion of construction work
2	Soil contamination	Use of ETP waste water for landscape	EC, pH and ESP (exchangeable sodium per cent)	Before plantation & once in a year post monsoon

1.6 Noise

Noise will be regularly monitored plant boundary for checking compliance against environmental noise parameters as per CPCB norms. It will also be monitored near noise generating equipment to ensure that all noise generating equipment do not emit noise in excess of the statutory norms.

All workers will be provided with required set of PPEs like earplug, earmuff etc. during construction and operation phase activities where noise levels in excess of 80 db (A) are regularly generated. For operational purpose, at design stage, procurement of low noise equipment will be used. Preventive maintenance of noise generating equipment shall be regularly carried out to ensure that noise levels are minimized to the extent possible.

Greenbelt will be maintained around the site to reduce noise levels

1.7 Ecology, Flora & Fauna

Green belt planning has been done with local ecological perspectives for proposed project of Ipca taking into consideration the nature of pollutants, availability of space. This will help in reducing the concentration of pollutants and will also be effective in attenuating noise levels.

Ipca Ltd. has already met social obligation to recreate the environmental status by providing thick green cover to suppress fugitive emission and provide aesthetic beauty.

Wildlife Conservation Plan for Schedule I fauna of the Study Area

The Wildlife Protection Act, 1972 is an Act of the Parliament of India enacted for protection of plants and animal species. Before 1972, India only had five designated national parks. Among other reforms, The Act established schedules of protected plant and animal species; hunting or harvesting these species was largely outlawed. The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India, except the State of Jammu and Kashmir which has its own wildlife act. It has six schedules which give varying degrees of protection. Schedule I and part II of Schedule II provide absolute protection - offences under these are prescribed the highest penalties. Species listed in Schedule III and Schedule IV are also protected, but the penalties are

much lower. Schedule V includes the animals which may be hunted. The plants in Schedule VI are prohibited from cultivation and planting.

As per guidelines issued by MoEF&CC, New Delhi for projects/ Activities requiring environmental clearance should provide Wildlife Conservation Plan for conservation of Schedule I fauna, If exist in the study area.

As the proposed project is at distance of 2.4 km from Bor Wildlife Sanctuary buffer area, we will submit the Conservation Plan for Schedule I species and also all the mitigations measures will be strictly followed during construction and operation phase, so there will not be any adverse impact on the surrounding ecology and biodiversity due to operation of the proposed project.

Forest Clearance is not appliable as no forest land is involved in the proposed project.
However, Ipca has submitted application to forest department for NOC. **However, as per the GR issued by Government of Maharashtra dated 8.8.2013 NOC is not applicable for the project where forest land is not been used for the activity.**

Wildlife Protection & Conservation Actions:

The following actions for wildlife protection & conservation shall be taken by M/s. Ipca Laboratories Ltd. (Ipca). Proper & efficient implementation of mitigation measures & EMP suggested for Air, Water &Noise environment.

- Regular monitoring of stack Emission & Ambient air quality to be carried out as per monitoring plan.
- Waste water should be treated as per standard; there should not be any direct discharge of waste water.
- Noise levels should be kept within the standards limits as per guidelines.
- Ipca has already developed a matured greenbelt around its premises. It shall be continued further to strengthen greenbelt.
- Ipca shall ensure that whenever protected common species is observed in premises, with the help and guidance of Forest Department they will carefully shift them out of impact prone areas.
- Ipca shall ensure that whenever any wild life species is found in vicinity of premises, they will call concern authority/party and forest department to get them back in their forest habitat.
- In consultation with the forest department, Ipca will explore possibilities to extend support to the existing forest and wildlife conservation plans through its on-going CSR/CER activities and various other programs from time to time.

- Ipca will also participate and involve in conducting awareness campaigns by forest department at the village level to make the locals aware about the protected species in the area; their behaviour, habitat, ecology, breeding/nesting seasons, threats to habitats and species, laws regarding protection of species.
- Awareness generation campaigns will include preparation of brochures in local language, film show and display of posters, etc.

For the establishment of the proposed project Ipca has purchased total land admeasuring to approximately 600 Acres from NCLT in the year 2019. However, considering the ESZ area near to site out of 600 Acres only 75 Acres land will be utilized for proposed project. The land other than 75 Acres which is under the possession of Ipca only will be act as a buffer for existing biodiversity of protected forest which is buffer zone of Bor Wildlife sanctuary located at a distance of 7.0 Km from the project site. As per the ESZ Draft notification 5th Feb.2021 which is likely to be enacted within 3-4 months the proposed project of Ipca is more than 500 meters away from the boundary of ESZ.

The Project will be established with proper mitigation measures and after implementation of all mitigation measures there will not be any impact on the surrounding Flora and Fauna due to operation of the Project.

1. Project will be ZLD and hence there will not be any impact due to waste water discharge.

2. 35 % Green Belt will be maintained ang all the minor impact due to Air Pollution will be absorbed by this buffer zone.

3. Alternative fuel like Bio- Briquette / husk etc will be used having very low sulphur contain and hence there will not be much impact.

4. Efficient 2 stage Scrubbers will be provided on reaction vessels and storage tanks for capturing emissions.

5. Storage of chemicals will be much below the there should quantities as mention in MHISC Rules.

6. Only one week inventory will be maintained.

7. No forest and wild life area will be occupied.

8. There will be 12 feet height permanent boundary all around the project area so as to arrest all the affect within project area.

Ipca will implement the improve technology to reduce emissions to the Noise, air or water. Moreover, all the unit operations considered by Ipca are of much lower scale / volumes Like storage tanks less than 30 KLD, Reactors 10-12 KLD and Boilers 8 to 10 TPH where potential for emissions are much lesser.

1.7.1 Recommendation on Green Belt Development

Tree plantation around the proposed plant helps to arrest the effects of particulate matter and gaseous pollutants in the area and plays a major role in environmental conservation efforts. Green belt development and plantation program for the proposed project shall also be a part of the environment management plan.

1.7.2 Greenbelt Development Plan

The green belt development is an aid the lost biomass and lead to sustainable development. The green belt enriches soil organic matter thereby nitrogen. It is developed to attain maximum attenuation of noise. Green belt is also control temperatures and keep the surroundings cool. It will attract avifauna and create suitable habitat to micro flora and fauna. The green belt helps as a sink to dust and gaseous pollutants. On the whole it has a positive impact on the environment.

Existing Green belt of 105276.0 Sq. m. (35% of total plot area) is already developed at the site and around 15800 Nos. of native and pollution resistant species are planted in the green belt. In addition to this 5300 Nos of trees additionally planted in in green belt at a distance of 2 m x 2.5 m to achieve 2000 Nos of trees/ Ha.

To strengthen the Green belt the additional plantation will be done around the proposed site of 5 to 10m width, this additional plantation will work as buffer area between Factory site and Forest area. Around 5000 Nos of Tree species will be planted in around the factory. Pollution resistant/tolerant and native species will be selected for greenbelt development as per CPCB guidelines.

Treated wastewater from STP will be used for development of green belt in non-monsoon season. Drip Irrigation system will be provided for effective water conservation.

The plant species suitable for green belt development will be selected based on the following characteristics:

- It will have thick canopy cover.
- They will be perennial and evergreen.
- They will have high sink potential for pollutants.
- They will be efficient in absorbing pollutants without significantly affecting their growth.
- Healthy sapling 2-3 years old will be planted to ensure better survival rate.
- Preference shall be given for trees with ecological values followed by aesthetic value.
- Local/native species with High Carbon Sequestration values will be selected.

EMP budget of Rs. 50.00 Lakhs as a capital cost and Rs. 20 Lakhs per Annum as a recurring cost has been allocated for green belt development.

For the calculation of cost for green belt development, following parameters have been considered.

For Capital cost

a) Cost of sampling (Trees)
b) Transportation charges
c) Planting cost (Including soil workings, pits etc.)
d) Fencing cost
e) Drip irrigation charges

For Recurring Cost:

a) Annual weeding and soil working
b) Req. of water for irrigation
c) Fertilization cost
d) Drip irrigation system maintenance
e) Security and vigilance

List of existing trees and proposed species with their common names for green belt is depicted in Table below.

Existing Plantation details

Sr. No	Scientific Name	Common/Local Name	Nos. planted	High Carbon sequestration Species
1	*Pongamia pinnata*	Karanj	1450	Yes
2	*Azardirachta indica*	Neem	1290	Yes
3	*Cocus nucifera*	Coconut	60	-
4	*Mangifera indica*	Mango	100	Yes
5	*Sweetenia mahogany*	Mahogany	3540	-
6	*Phyllanthus emblica*	Amla	250	-
7	*Leucaena leucocephala*	Subabul	4200	
8	*Ficus religiosa*	Pipal	20	Yes
9	*Ficus bengalensis*	Banyan	12	Yes
10	*Jatropha curcas*	Jatropa	4600	-
11	*Ailanthus excelsa*	Maharukh	38	Yes
12	*Polyalthia longifolia*	Ashok	88	-
13	*Tamarindus indica*	Chinch	19	Yes
14	*Tectona grandis*	Teak	129	Yes
15	*Butea monosperma*	Palas	67	Yes
	Total		15800	

Proposed Plantation details

Scientific Name	Common Name	Height (m)	Growth Rate	Evergreen/ Deciduous	Crown	High carbon sequestration species
Adina cordifolia	Haldu	15	Fast	Deciduous	Spreading	Yes
Aegle marmelos	Bel	12	Slow	Evergreen	Oblong	Yes
Ailanthus excelsa	Mahraruk	20	Quick	Deciduous	Round	-
Anogeissus latifolia	Dhaura	28	Slow	Evergreen	Round	-
Azadirachta indica	Neem	20	Quick	Evergreen	Spreading	Yes
Bauhinia variegata	Kachanar	5	Quick	Deciduous	Oblong	-
Buchanania cochinchinensis	Char	13	Fast	Evergreen	Round	-
Butea monosperma	Palas	10	Moderate	Deciduous	Ovoid	Yes
Capparis decidua	Nepti	4	Slow	Deciduous	Oblong	-
Caryota urens	Shankarjata	15	Quick	Evergreen	Round	Yes
Cassia fistula	Garmal	12	Quick	Deciduous	Round	Yes
Cassia renigera	Pink Cassia	10	Quick	Deciduous	Spreading	Yes
Cassine glauca	Bhutya	10	Moderate	Evergreen	Round	-
Celastrus paniculata	Dhimarvel	5	Moderate	Deciduous	Climbing	-
Chloroxylon swietenia	Bhirra	10	Fast	Deciduous	Round	-
Cochlospermum religiosum	Gogal	12	Fast	Deciduous	Round	-
Cordia dichotoma	Bhokar	10	Moderate	Deciduous	Oblong	Yes
Dalbergia sisoo	Sisam	10	Moderate	Evergreen	Round	Yes
Diospyros montana	Bistendu	10	Slow	Deciduous	Round	-
Emblica officinalis	Aola	5	Quick	Deciduous	Spreading	Yes
Ficus hispida	Katumbar	5	Moderate	Evergreen	Oblong	-
Flacourtia indica	Kakai	5	Moderate	Deciduous	Spreading	-
Gardenia jasminoides	Anant	5	Quick	Evergreen	oblong	-
Garuga pinnata	Kakad	15	Fast	Deciduous	Spreading	Yes
Heterophragma roxburghii	Waras	18	Quick	Evergreen	Round	-
Holoptelia integrifolia	Wavli	20	Fast	Deciduous	Oblong	-
Lagerstroemia parviflora	Lendia	10	Quick	Deciduous	Oblong	Yes
Lagerstroemia speciosa	Taman	10	Quick	Evergreen	Oblong	Yes
Limonia acidissima	Kawath	15	Slow	Evergreen	Round	-
Madhuca latifolia	Moha	15	Fast	Deciduous	Round	Yes
Mangifera indica	Amba	8	Moderate	Evergreen	Oblong	Yes
Miliusa tomentosa	Hum	15	Moderate	Deciduous	Oblong	-
Mimusops elengi	Borssali	10	Quick	Evergreen	Oblong	-
Ougeinia oojeinensis	Tiwas	10	Fast	Deciduous	Spreading	-
Phoenix sylvestris	Shindi	20	Moderate	Evergreen	Round	Yes
Pongamia pinnata	Karanj	10	Quick	Evergreen	Round	Yes

Saraca asoka	Ashok	5	Quick	Evergreen	Spreading	Yes
Schleichera oleosa	Kusum	10	Quick	Evergreen	Spreading	-

For proposed construction Ipca will cut 320 number of tress, a compensatory afforestation will be done in around the plot, on land which is under possession of Ipca. Ipca will plant as numbers of trees suggested by Forest department as compensatory afforestation. Application to Forest department for permission for tree cutting and plan of compensatory afforestation submitted to Forest Department

1.8 Details of Energy Conservation Measures

Solar energy will be used to illuminate street lights, office/Admin building and parking area.

Details of new & renewable energy sources are given below:

1. Cost of solar system- Rs. 10 Cr
2. Power generation from Solar panel system- 710 kWp
3. Operating load will be reduced from 6500 kW to 5790 kW
4. 11 % operating power will be saved due to use of solar system

1.9 Occupational Health and Safety

The production of APIs involves storage handling and use of several chemicals. Some of these chemicals are toxic and hazardous in nature. Information about these chemicals is therefore important for the safety of the employees and the plant. Besides, the health status of the employees may be affected due to exposure to these chemicals. The exposures may be sudden and accidental or for may remain for a long period. In both of the cases there will be different health effects. Therefore safety measures dealing with these chemicals are of vital importance and will be followed judiciously.

• In order to ensure good health of workers, regular health check-up of the plant workers will be carried out.

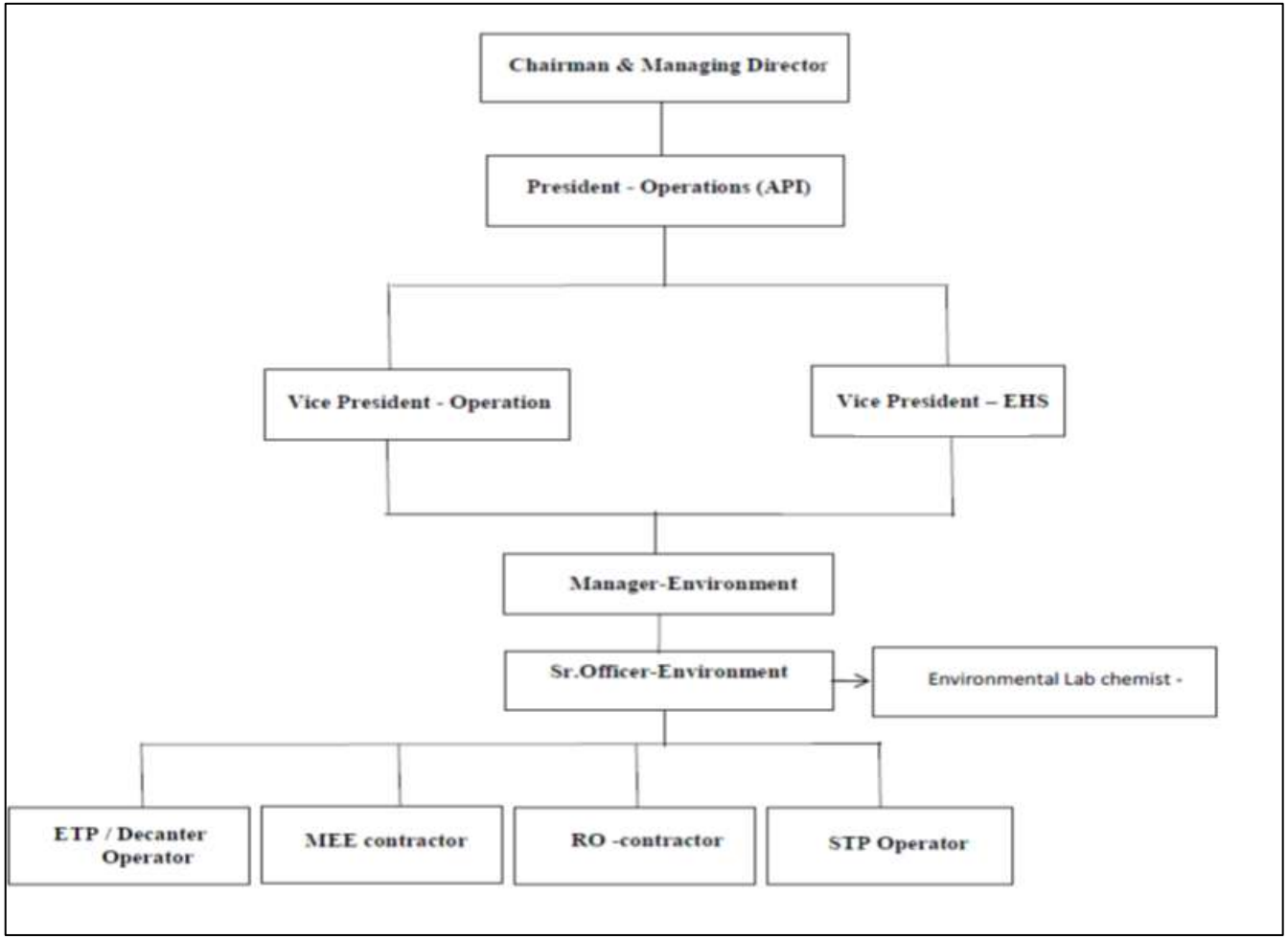
• Occupational health surveillance program will be taken as a regular exercise for all the employees and their records maintained.

- Proper storage and handling precautions will be taken. The storage area will be cool, dry and well ventilated away from any source of heat, flame or oxidizers.
- Use of Personal Protective Equipment (PPEs) will be compulsory. Proper training on use of PPEs, characteristics of the material handled and safety precautions to be adopted will be given to the workers.

- Fire safety measures will be incorporated within the factory premises. All the fire extinguishing media such as water, dry chemicals, CO2, sand, dolomite, etc. will be kept in critical locations and shall be handy in case of emergency.
- Mock drills will be arranged for the workers to ensure preparedness in case of unexpected emergency.
- Safety precautions will be displayed in the premises on the banners, boards etc.
- Both On-site and Off-site emergency preparedness plan will be drawn.

Hierarchy of Environment Management Cell is presented in Figure-1

Figure-1 :Environmental Management Cell



The responsibilities of the EMC personnel are given below

Sr. No	Designation	Responsibility
1.	Dy. Manager EHS	• Monitoring of the operations, maintenance and trouble shooting of Effluent Treatment Plant. • Overall operations and supervision in the functioning of Effluent treatment plant. • Liaisoning with Government agencies and statutory bodies with respect to water and air pollution, if necessary. • Monitoring of required quality parameters of effluent discharge and provide help wherever required. • Maintaining the cleanliness of the Effluent treatment plant. • Fully responsible for the operation of Effluent treatment plant &laboratory. • Manpower planning for Effluent treatment plant. • Ensure maintenance and timely calibration of all Instruments in ETP Laboratory as per laid down procedures. • Maintaining and monitoring documents of Effluent treatment plant. • Ensure strict compliance to GMP guidelines in all areas of EHS. • Coordination with Maintenance dept. in case of any breakdown. • Conduct job related training to subordinates and ensuring the documentation. • Write the SOPs and GMP related documents. • Ensuring the functioning of safety appliances by carrying out trials of such equipment's. • Organizing training programmes on safety and first aid for the employees. • Records of Hazardous waste disposals
2.	Asst. Manager	• Monitoring various Safety Work Permits and related Safety activities. • Organize & deliver the Safety trainings and First Aid for the employees & contractor.

		• Investigate the Accident and Near miss with corrective action in place. • Coordination related to safety with Maintenance dept. in case of any breakdown. • Perform HAZOP study & job safety analysis, hazardous area classification. Industrial hygiene, walk through survey, general safety. • To conduct Internal Safety Audit && support to External Safety Audit. • Write the SOPs and GMP related documents & implement in departmental level. • Ensuring the functioning of safety appliances by carrying out trials of such equipments. • Conduct job related training to subordinates and ensuring the documentation. • Supervise the various activities in Effluent Treatment Plant operations. • Maintaining the cleanliness of the Effluent Treatment Plant.
3.	Executive	• Supervise the various activities in Effluent Treatment Plant operations. • Maintaining the cleanliness of the Effluent Treatment Plant. • Maintaining and monitoring documents of Effluent treatment plant. • Fully responsible for the operation of ETP laboratory. • Ensure strict compliance to GMP guidelines in all areas of Effluent treatment plant. • Coordination with Maintenance dept. in case of any breakdown. • Ensuring the functioning of safety appliances by carrying out trials of such equipments. • Conduct job related training to subordinates and ensuring the documentation.

		• Monitoring various Safety permits and related Safety activities • Organizing training programmes on safety and first aid for the employees. • To make accident investigation and Near miss • To arrange HAZOP study of new products. • To conduct safety audit. • Write the SOPs and GMP related documents. • Records of Hazardous waste disposals
4.	Sr.Officer	• Supervise the various activities in Effluent treatment plant operations. • Overall operations and supervision in the functioning of Effluent treatment plant. • Maintaining the cleanliness of the Effluent treatment plant. • Fully responsible for the operation of ETP laboratory • Maintaining and monitoring documents of Effluent treatment plant. • Coordination with Maintenance dept. in case of any breakdown. • Ensure strict compliance to GMP guidelines in all areas of Effluent treatment plant. • Operation & maintenance of fire hydrant system. • Records of Hazardous waste disposals
5.	Sr. Officer	• Monitoring of the operations, maintenance and troubleshooting Safety appliances • Overall checking of operations and supervision in the functioning of plant area. • Maintaining the housekeeping of the plant. • Fully responsible for the safety activity. • Manpower planning for safety activity of plant.

		• Ensure maintain and timely calibration of all Instruments of safety appliances as per laid down procedures. • Maintaining and monitoring documents of Safety department • Ensure strict compliance to GMP guidelines in all areas of plant. • Coordination with Maintenance dept. in case of any breakdown. • Conduct job related training to subordinates and ensuring the documentation. • Organizing training programme on Safety for the employees. • Incorporate the GMP activities. • Write the SOPs and GMP related documents. • Monitoring various Safety permits and related Safety activities. • Ensuring the functioning of safety appliances by carrying out trials of such equipment's. • Organizing training programmes on safety and first aid for the employees. • Records of Hazardous waste disposals
6.	Officer	• Supervise the various activities in Effluent treatment plant operations. • Overall operations and supervision in the functioning of Effluent treatment plant. • Maintaining the cleanliness of the plant. • Fully responsible for the operation of ETP laboratory • Maintaining and monitoring documents of Effluent treatment plant. • Coordination with Maintenance dept. in case of any breakdown. • Ensure strict compliance to GMP guidelines in all areas of Effluent treatment plant. • Operation & maintenance of fire hydrant system. • Records of Hazardous waste disposals

7.	Officer	• Supervise the various activities in Effluent treatment plant operations. • Overall operations and supervision in the functioning of Effluent treatment plant. • Maintaining the cleanliness of the plant. • Fully responsible for the operation of ETP laboratory • Maintaining and monitoring documents of Effluent treatment plant. • Coordination with Maintenance dept. in case of any breakdown. • Ensure strict compliance to GMP guidelines in all areas of Effluent treatment plant. • Operation & maintenance of fire hydrant system. • Records of Hazardous waste disposals
8.	Junior Officer	• Supervise the various activities in Effluent treatment plant operations. • Overall operations and supervision in the functioning of Effluent treatment plant. • Maintaining the cleanliness of the plant. • Fully responsible for the operation of ETP laboratory • Maintaining and monitoring documents of Effluent treatment plant. • Coordination with Maintenance dept. in case of any breakdown. • Ensure strict compliance to GMP guidelines in all areas of Effluent treatment plant. • Operation & maintenance of fire hydrant system. • Records of Hazardous waste disposals
9.	Junior Officer	• Supervise the various activities in Effluent treatment plant

		• Overall Analysis and operations in the functioning of Effluent treatment plant. • Maintaining the cleanliness of the ETP laboratory. • Fully responsible for the operation of ETP laboratory • Maintaining and monitoring documents of ETP laboratory • Coordination with Maintenance dept. in case of any breakdown. • Ensure strict compliance to GMP guidelines in all areas of ETP laboratory • Operation & maintenance of fire hydrant system. • Records of Hazardous waste disposals

1.9.1 Medical Facilities

The Factory will be provided with the following medical facilities to handle any emergency and same will be provided in same manner for proposed activities:

1. Well-equipped First Aid Boxes are provided in each Section of the factory.

2. The First Aid Boxes are distinctively marked with a Red Cross on green background and contain the following equipment/accessories:

a) Sterilized dressings

e) Packets sterilized cotton

g) Pair of scissors

h) Bottle of Potassium Permanganate

i) Bottle containing 2% of alcoholic solution of iodine.

k) One copy of first aid leaf-let

l) Bandages

n) Adhesive plaster

o) Triangular bandage

p) Packets of safety pins

q) Supply of suitable splints

r) One tourniquet

Factory has provided well equipped occupational health centre as per the Maharashtra Factory Rule 1963.

24 hrs Ambulance with driver is available at site. About 9 Nos. of trained First Aiders are available at site and equally distributed in each shift.

Yearly routine periodical examination of all employees (permanent & contract) conducted by qualified medical officers. Annual health check-up of all employees carried out by certified medical officer and in which all required test as per factory act are covered.

Details of sanitation facility for workers, drivers, during construction & operational phase are given in Table-8

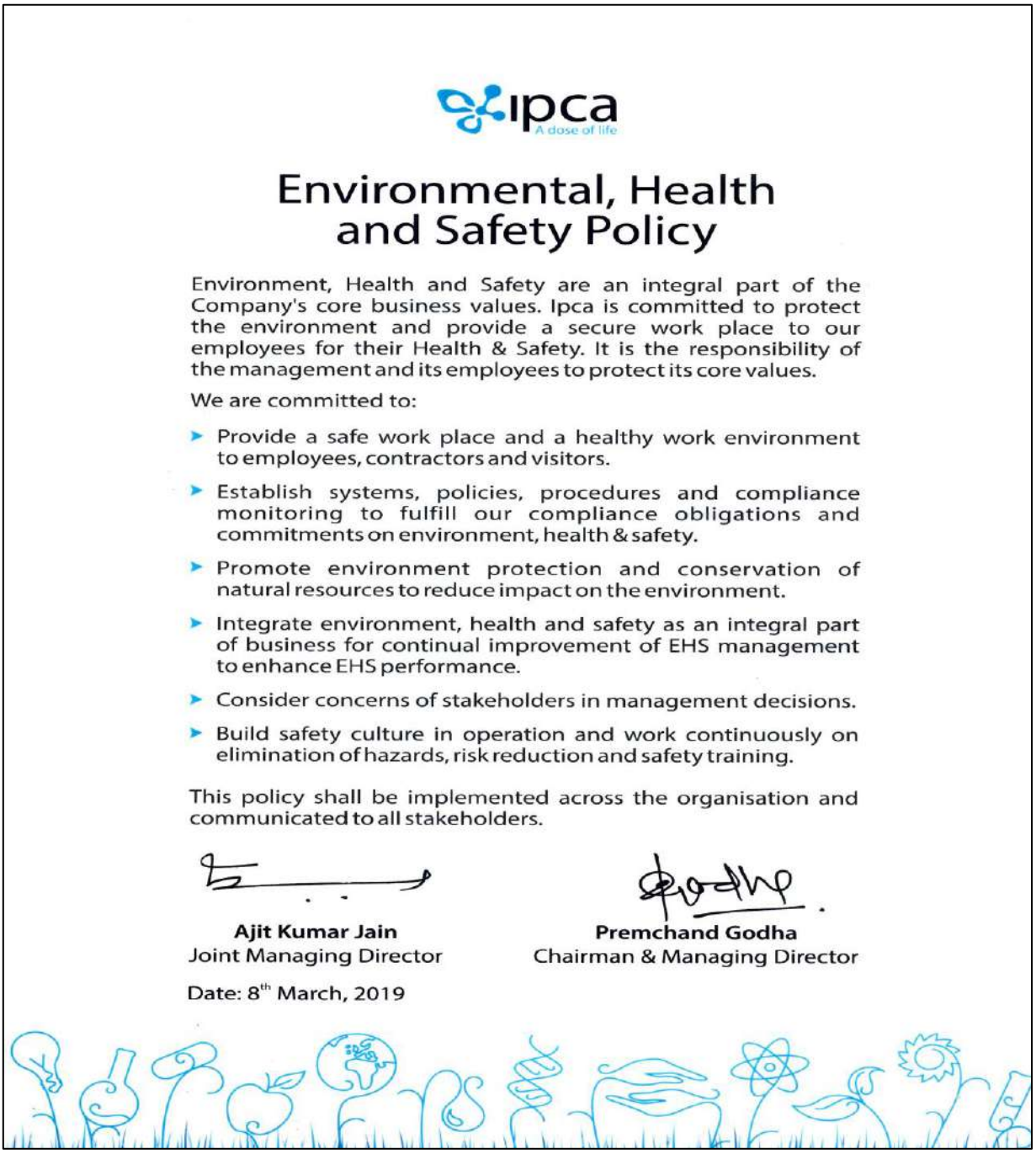
Table-8 : Details of facilities for workers

Particulars	Male	Female	Total
Toilets & Latrines	12	4	16
Rest/Clock Rooms	1	1	2
Canteen	1		1
Drivers Room	1		1
Visitor Room	1		1
OHC	1		1

In future toilets, latrines, rest rooms and canteen will be provided as per statues.

The Health, Safety and Environment Policy is depicted in Figure

Figure -2 : Environmental Health and Safety Policy



ipca
A dose of life

Environmental, Health and Safety Policy

Environment, Health and Safety are an integral part of the Company's core business values. Ipca is committed to protect the environment and provide a secure work place to our employees for their Health & Safety. It is the responsibility of the management and its employees to protect its core values.

We are committed to:

- Provide a safe work place and a healthy work environment to employees, contractors and visitors.
- Establish systems, policies, procedures and compliance monitoring to fulfill our compliance obligations and commitments on environment, health & safety.
- Promote environment protection and conservation of natural resources to reduce impact on the environment.
- Integrate environment, health and safety as an integral part of business for continual improvement of EHS management to enhance EHS performance.
- Consider concerns of stakeholders in management decisions.
- Build safety culture in operation and work continuously on elimination of hazards, risk reduction and safety training.

This policy shall be implemented across the organisation and communicated to all stakeholders.

Ajit Kumar Jain
Joint Managing Director

Premchand Godha
Chairman & Managing Director

Date: 8th March, 2019

1.10 CER activity

As per Corporate Environmental Responsibility (CER) Notification , of May1, 2018 the Company has earmarked Rs. 5.53 Cr (which is 1% of proposed project cost Rs. 553.0 Cr for Greenfield/new projects) for undertaking the CER activities. The proposed CER will be implemented in nearby area of the project site for betterment of surrounding environment and Socio economic status of locals.

1.11 Additional Studies

1.11.1 Land Use

Remote Sensing is a process of identification and demarcation of various earths' objects from a distance without directly coming into contact with them. Remote sensing is largely concerned with the measurement of electromagnetic radiation from the sun, which is reflected, scattered, and emitted by the objects on the surface of the earth. Different objects on the surface of the earth reflect different amounts of the electromagnetic spectrum. The potential of remote sensing in natural resources mapping basically depends on spatial, radiometric and temporal resolution of the sensor. Thus, the satellite remote sensing with its capability of repetitive coverage, multi-spectral imaging, synoptic view and low cost can play an important role in the delineation of various land use landcover classes.

Land cover is a fundamental parameter describing the Earth's surface. This parameter is a considerable variable that impacts on and links many parts of the human and physical environments. Remote sensing technique has ability to represent of land cover categories by means of classification process. With the availability of multispectral remotely sensed data in digital form and the developments in digital processing, remote sensing supplies a new prospective for land-cover/land-use analysis. Geographical Information Systems have already been used for assessing environmental problems, since they provide a flexible environment and a powerful tool for the manipulation and analysis of spatial information for land cover feature identification and the maps of all variables were combined to extract information to better understand analyzing. Satellite remote sensing, in conjunction with geographic information systems, has been widely applied and been recognized as a powerful and effective tool in analysing land cover/use categories This study made use of remotely sensed data and GIS technologies; to evaluate qualitatively and quantitatively outcome of part of Wardha district land cover/use distribution. Obtained results were compared, visualized and analyzed, in Geographic Information System.

The study area is proposed Project site IPCA Pharmaceutical, Wardha . The Project site is having latitudes of 20°54'53.47"N and longitudes of 78°42'20.23"E.

PC based GIS and image-processing software's are used for the purpose of image classification and for delineating drainage and other features in the study area. Number of peripheral devices such as scanner, plotter, printer etc. has also been interfaced with the system.

Objectives:

- Delineation of Land use/ Landcover categories on the 1:50,000 scale for 10 km, 5 km and 1 km radius area around Project site.

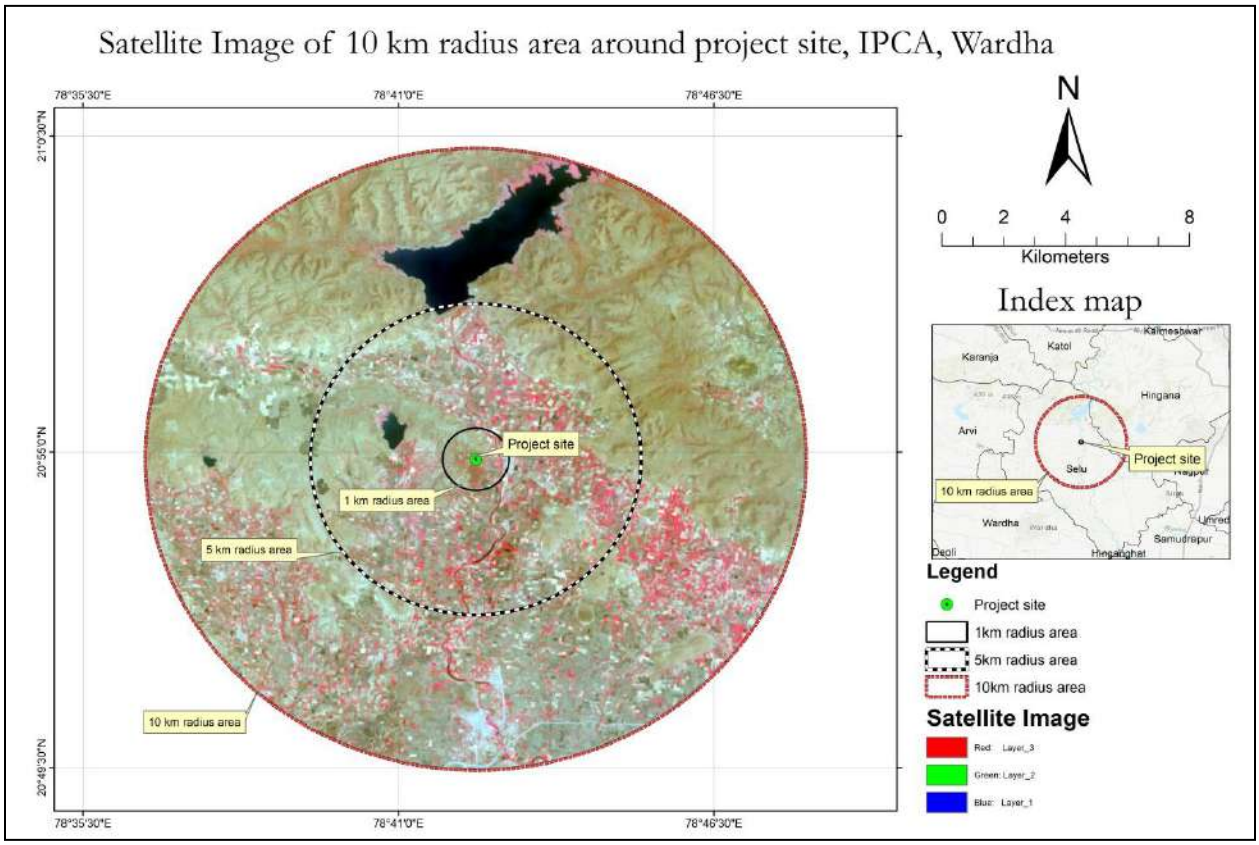


Fig. 1: Satellite Image of 10 km radius area around project site, IPCA, Wardha

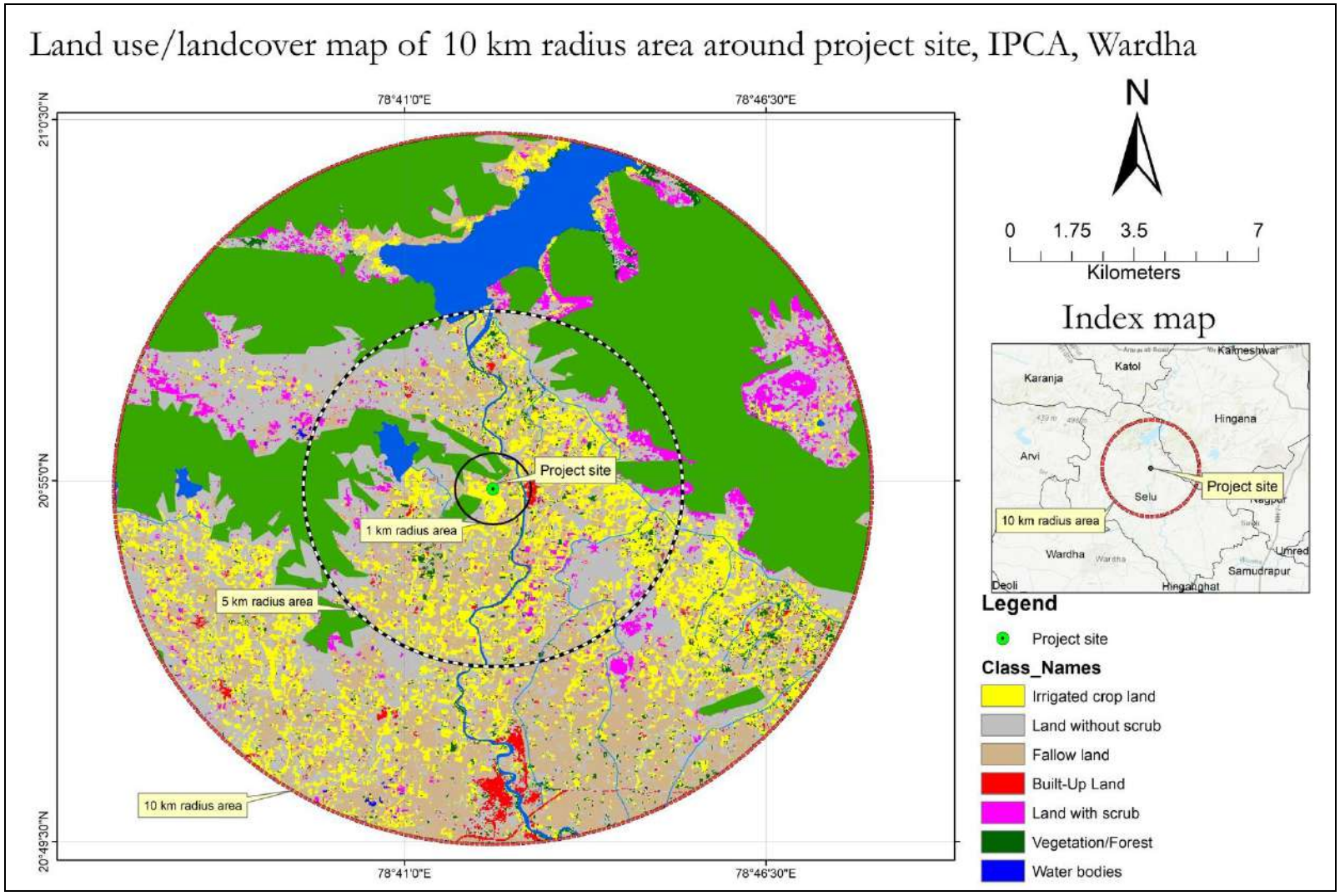


Fig. 2: Land use/landcover map of 10 km radius area around project site, IPCA, Wardha

Table 1: Landuse/ Landcover Statistics of the 10 km radius area around project site.

Sr. No.	LAND USE/LAND COVER	AREA (Hectare)	AREA (%)
1	**Built-Up Land**		
	Settlements, Road etc.	360.99	1.15
2	**Water Bodies**		
	River/tank	965.07	3.06
3	**Reserved Forest / Vegetation**		
	Vegetation / Deciduous Broadleaf Forest	11218.32	35.61
4	**Waste land**		
	Land with scrub	1086.3	3.45
	Land without scrub	7866.12	24.97
5	**Agriculture land**		
	Irrigated crop land	4353.57	13.82
	Fallow Land	5653.17	17.94
	Total	31503.54	100

Interpretation

From the Table 1 it has been showed that total five major land use/land cover classes were identified in the area under consideration. As seen from the land cover classes that were derived Agriculture land appears to be second highest area in the land use pattern that the areas are engaged i.e. 13.82%, however there is a moderate area of irrigated land while fallow land which can be later developed into a cultivable land 17.94%. It has been observed from the LULC that the total area presents under the settlement area which has area (Build up area land rural/urban, and road infrastructure) which covers 1.15%. It is observed that maximum settlements were seen in Wardha area of the study area which is shown in figure 2. It is also observed that almost moderate topography with stony mass (rocky stone). The Land without scrub is major land use having 24.97% of area as the satellite image is of January season, while land with scrub land is having 3.45% as scrub land. The area is also having Deciduous Broadleaf Forest as the highest land use present in 10 km radius area having 35.61 % of total area.

It is also observed that the study area is well connected by roadways. The presence of water bodies including the river, dam, canal, tributaries and ponds as seen from the subsequent figures as well as tables is about 3.06%.

(Source: Land use mapping and primary survey of the area)

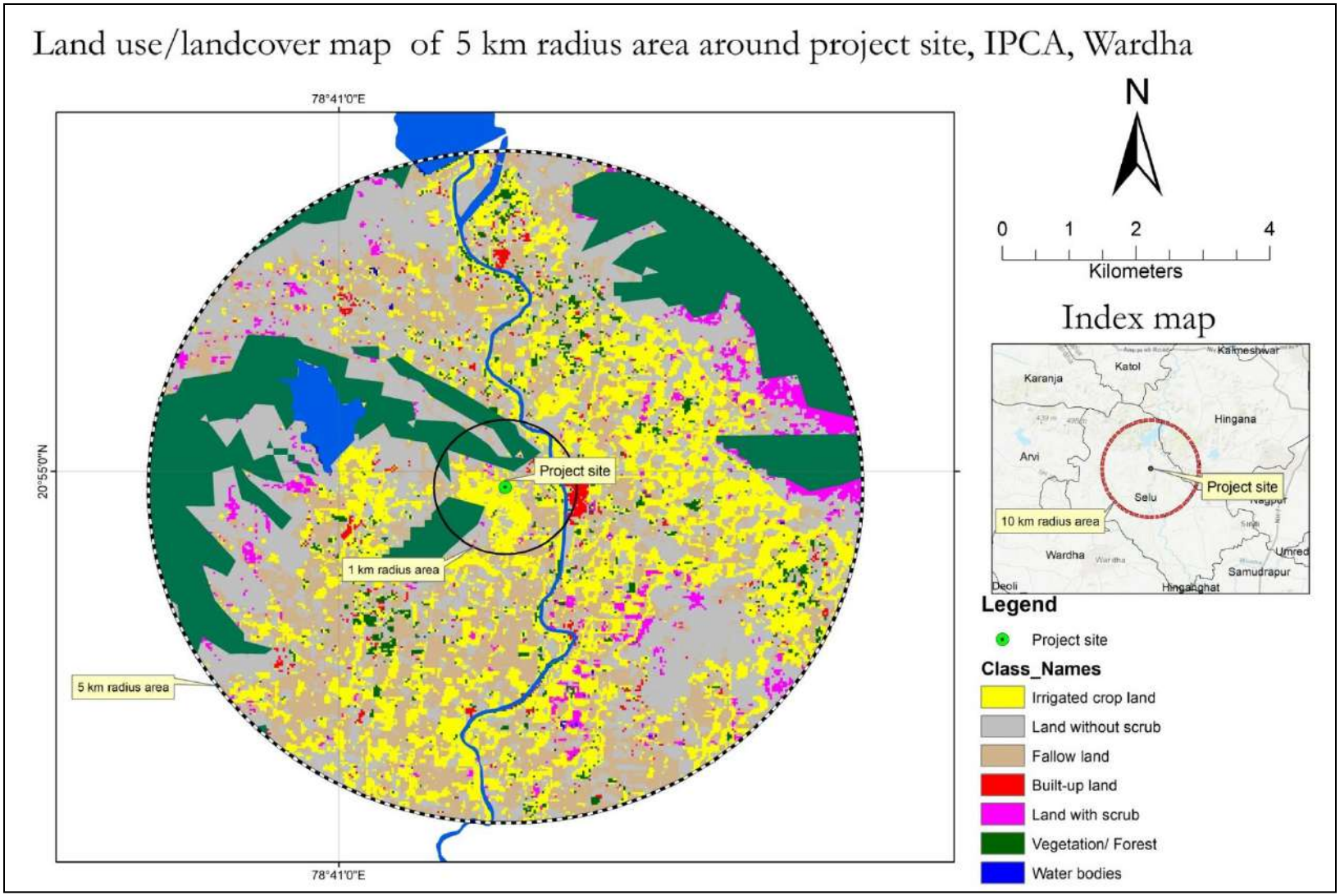


Fig. 3: Land use/landcover map of 5 km radius area around project site, IPCA, Wardha

Table 2: Landuse/ Landcover Statistics of the 5 km radius area around project site.

Sr. No.	LAND USE/LAND COVER	AREA (Hectare)	AREA (%)
1	**Built-Up Land**		
	Settlements, Road etc.	90.16	1.14
2	**Water Bodies**		
	River/tank	70.74	0.9
3	**Reserved Forest / Vegetation**		
	Vegetation	1642.33	20.8
4	**Waste land**		
	Land with scrub	713.43	9.04
	Land without scrub	2156.14	27.31
5	**Agriculture land**		
	Irrigated crop land	1680.21	21.28
	Fallow Land	1543.21	19.54
	Total	7896.22	100

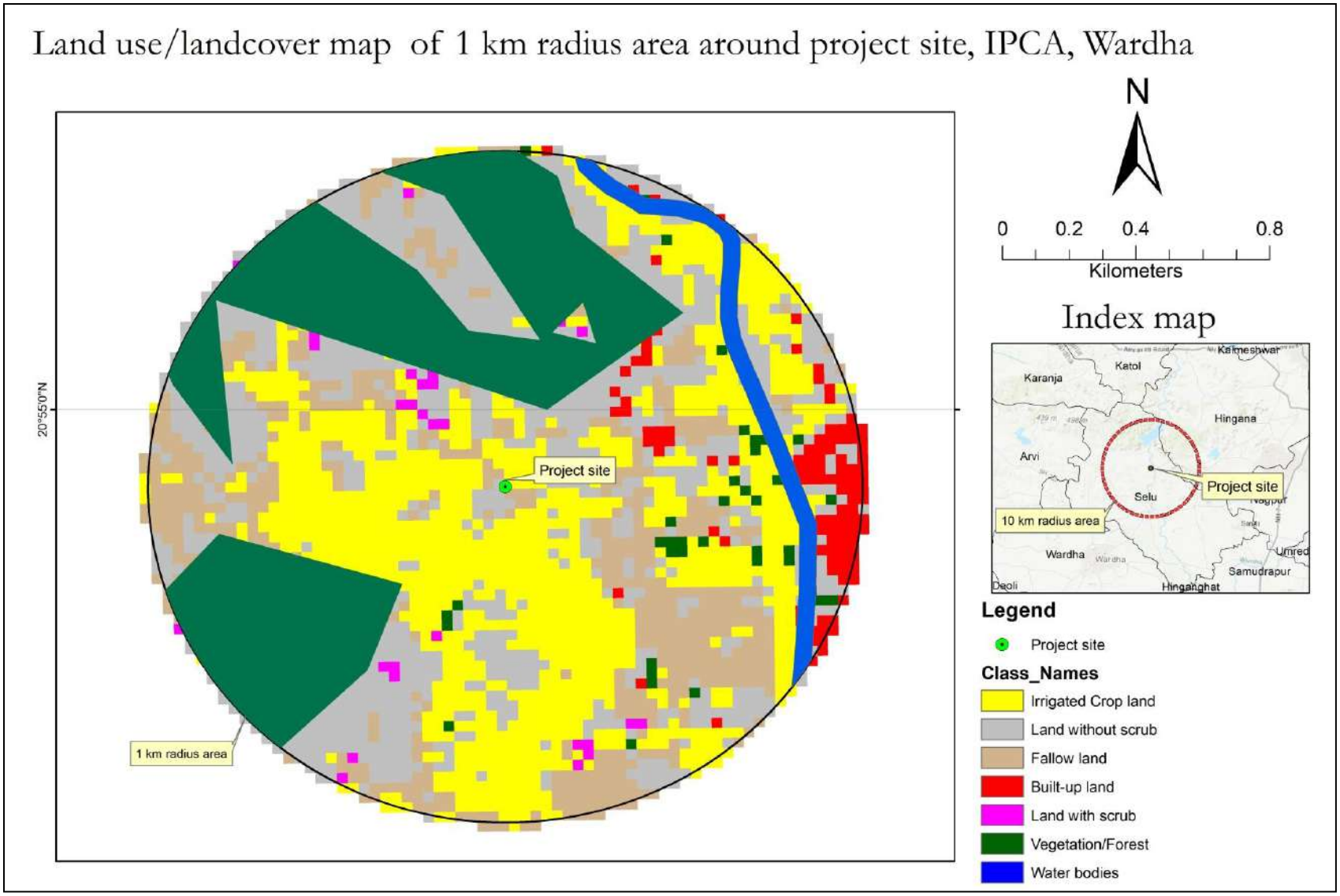


Fig. 4: Land use/landcover map of 1km radius area around project site, IPCA, Wardha

Table 3: Landuse/ Landcover Statistics of the 1 km radius area around project site.

Sr. No.	LAND USE/LAND COVER	AREA (Hectare)	AREA (%)
1	**Built-Up Land**		
	Settlements, Road etc.	10.08	3.12
2	**Water Bodies**		
	River/tank	2.04	0.63
3	**Reserved Forest / Vegetation**		
	Vegetation	78.69	24.33
4	**Waste land**		
	Land with scrub	3.77	1.17
	Land without scrub	70.2	21.71
5	**Agriculture land**		
	Irrigated crop land	96.5	29.84
	Fallow Land	62.13	19.21
	Total	323.41	100

1.11.2 Air Quality Modelling

No	Parameter	Details
1	Model Name	AERMOD
2	Model Type	Steady state Gaussian Plume Air Dispersion model
3	Topography	Flat
4	Averaging Time	24 hours
5	Source Type	Point Source
6	Boundary Limits	10 km X 10 km
7	Co-ordinate System	Uniform Polar Grid
8	Receptor Height	0 m
9	Surface meteorological data	Purchased from Denvilabs Technologies
10	Upper air Data	Purchased from Denvilabs Technologies

11	Anemometer Height	10 m
12	Sources of Air Pollution	Sources of continuous air pollution
13	Air Pollution Control System	• **Coal fired boiler and Thermopack: Multicyclone followed by bag filter** • **Low NOx burners**

Impact on Air Environment and Mitigation measures

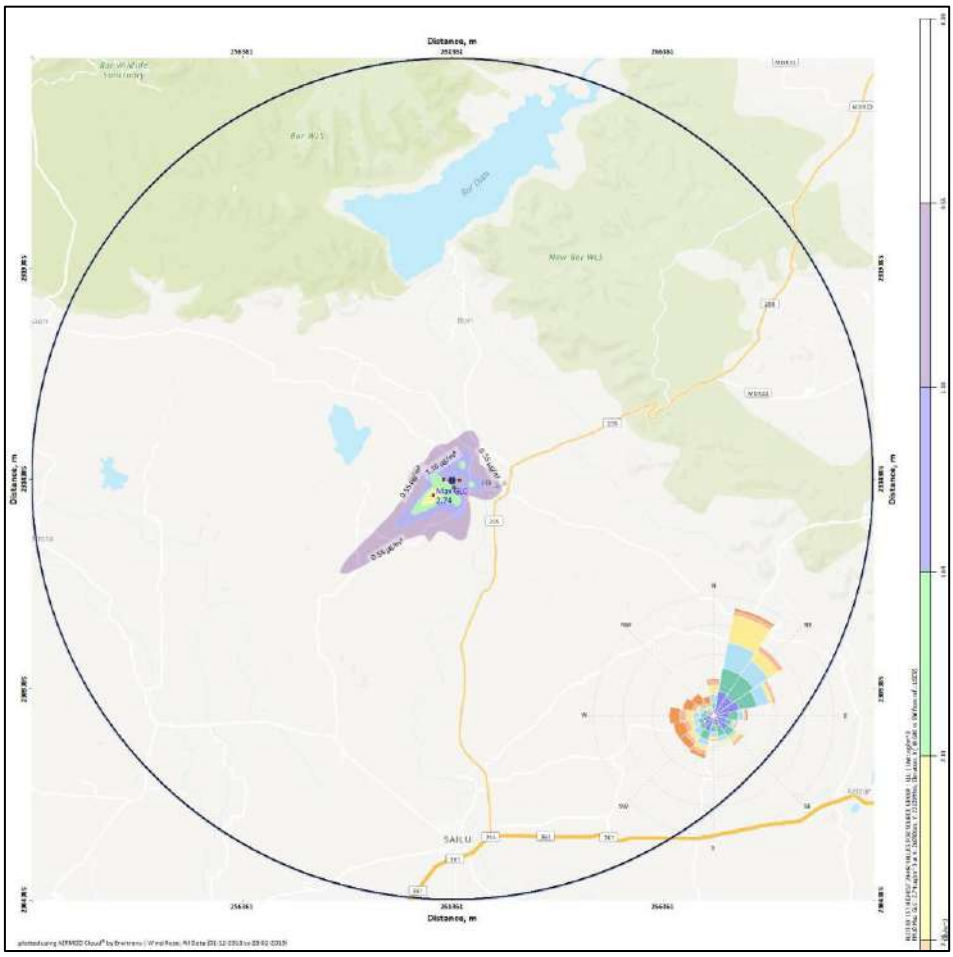
Aspect	**Impact**	**Mitigation Measures**
Increase in PM10 , SO2 and NO_x emissions	PM10 : Dust deposited on vegetation can inhibit the normal respiration and photosynthesis mechanisms within the leaf of the plants NOx : Contributes to eutrophication, killing fish Damages leaves of plants, retard the photosynthetic activity and causes chlorosis. NOx also reacts with other pollutants in the presence of sunlight to form ozone which can damage vegetation at high concentrations. SO2 essentially a potent phytotoxic gas and its toxicity to plant is manifested in typical chronic or acute foliar symptom injury	• Multicyclone followed by bagfilter to limit particulate emission and Low NO_x burners to limit NO_x emissions. • Adequate stack height as per CPCB norms • Scrubbers for the process vents • Regular analysis from MOEFCC recognized laboratory • Continuous online monitoring system will be installed & connected to MPCB,CPCB server
Increase in worker exposure to various emissions such as PM2.5, SO2 and NOx	PM2.5 : Respiratory and cardiovascular illness, Decreased lung function and symptomatic effects such as those associated with acute bronchitis, causes chronic bronchitis; SO2 : Wheezing, shortness of breath and chest Tightness and other problems, especially during exercise or physical activity Continued exposure at high levels increases Respiratory symptoms and reduces the ability of the lungs to function. NOx : Contributes to serious respiratory illness (e.g., asthma, chronic bronchitis) due to fine particles and ozone	Workers will be provided with proper PPE like mask, canister, face shields & goggles • Regular medical checkups will be undertaken to ascertain the health conditions of the workers

Fugitive emission, Odour	**Volatile organic compounds (VOCs) are one of them which are carcinogenic.** **With short-term exposure, the consequences can encompass eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reactions, nausea, and memory impairment.**	Fugitive emissions over reactors, formulation areas, centrifuges, chemical loading, transfer areas, chemical storage area etc., are to be controlled through proper exhaust systems wherever required.
		Emphasis should be given to solvent management/solvent loss prevention.
		Stripping of effluents reduces fugitive emissions
		All reactors shall be closed and provided with primary and secondary condensers for vapor recovery. Liquid raw materials will be charged by pumping & closed loops and dosing will be done by metering system.
		Flame arrestors, Breather valves, N2 blanketing will be provided for storage tanks in accordance with requirement of MSDS and applicable rules
		Closed handling systems will be provided for chemicals and solvent
		All open-ended intermediate vessels will be covered securely during period of operation and storage.
		Mechanical seals will be provided for pumps/agitators for reactors handling volatile chemicals for reduction of fugitive emissions.
		Separate storage areas for flammable and non-flammable chemicals
		Leak Detection and Repair (LDAR) program for quantification and control of fugitive emissions at critical areas, tanks and vessels will be provided.
Fugitive emission, Odour	**Long-term contact with VOCs can damage the liver, kidneys and central nervous system.**	Workplace monitoring Plan will be implemented for regular monitoring work place environment
		Provided process scrubber as per process emission requirement.
		Usage of seal less pumps for transferring of toxic/hazardous chemicals.
		Regular inspection and Preventive maintenance with reference to plant operations like pumps, valves, pipes.

		Online sensors / detectors with alarm provision for Hazardous gases.
		All pipelines and pipe fittings shall be well-maintained, and wear and tear shall be attended promptly
		Welded pipes to be used wherever feasible. Suitable gasket material to be used. Suitable gland packing to be used in valves.
		Green belt is already developed and maintained in and around the plot area.

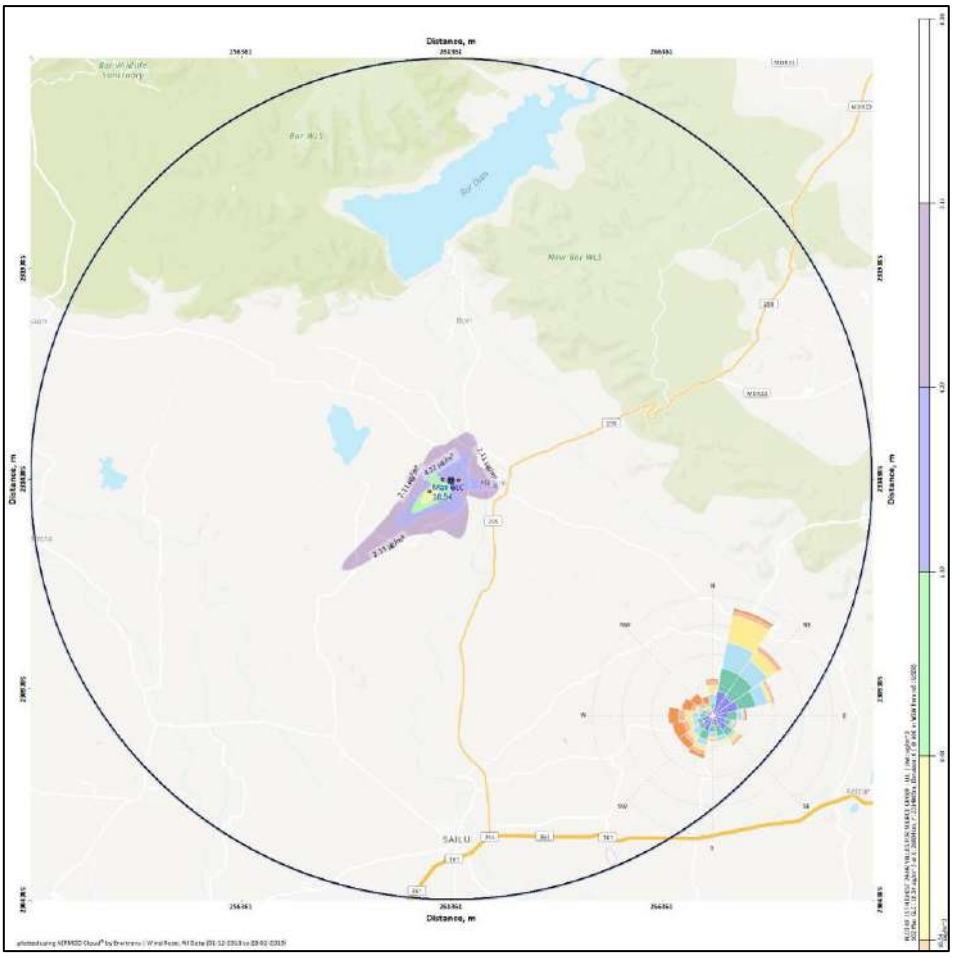
Isopleths for PM10

Based on the modeling results, the highest incremental concentration of PM10 occurs in SW direction at a distance of 600 meter and the incremental increase is 2.74 µg/m3.



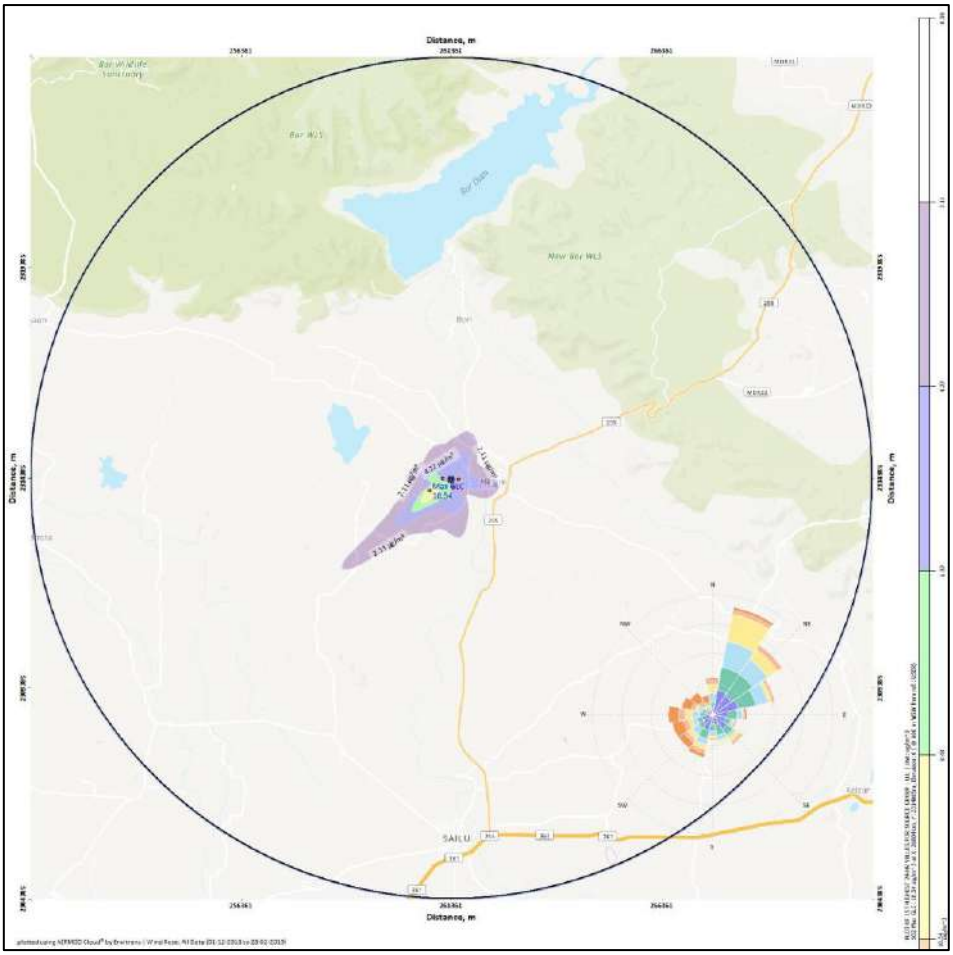
Isopleths for PM2.5

Based on the modeling results, the highest incremental concentration of PM2.5 occurs in SW direction at a distance of 600 meter and the incremental increase is 1.83 µg/m3.



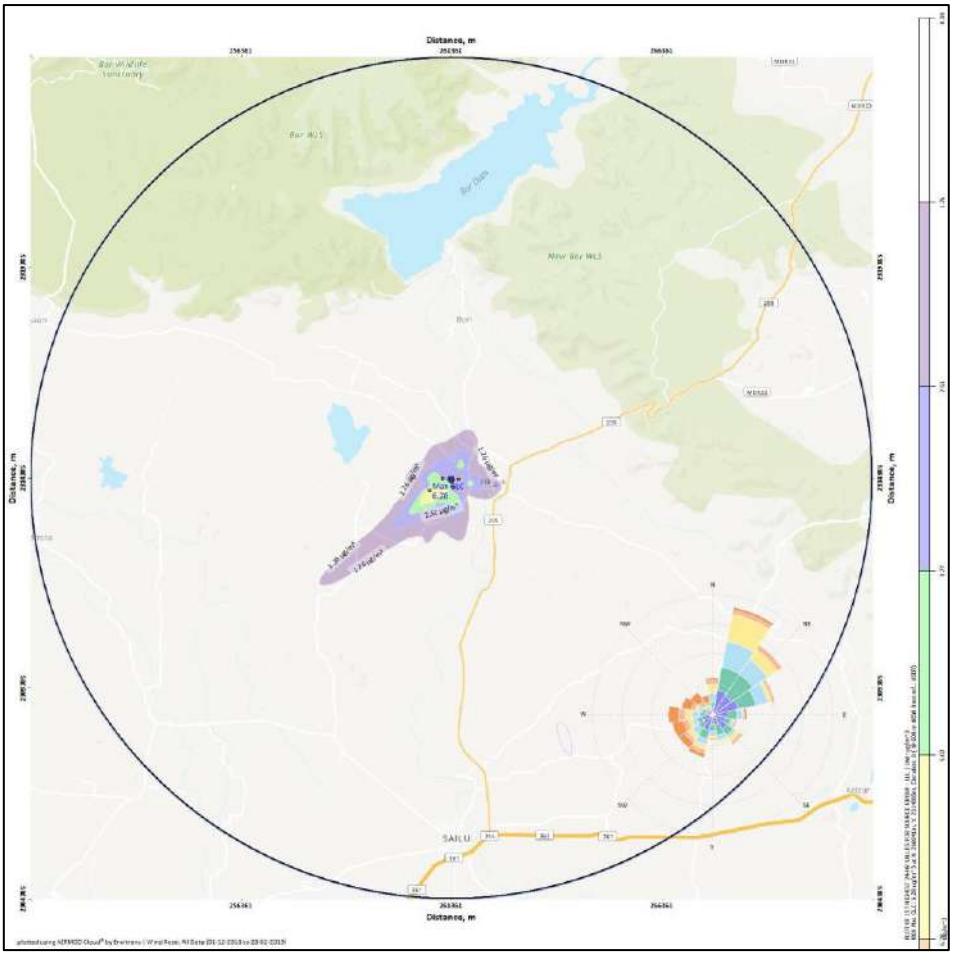
Isopleths for SO2

Based on the modeling results, the highest incremental concentration of SO2 occurs in WSW direction at a distance of 600 meter and the incremental increase is 10.54 µg/m3.



Isopleths for NOx

Based on the modeling results, the highest incremental concentration of NOx occurs in WSW direction at a distance of 600 meter and the incremental increase is 6.28 µg/m3.



1.11.3 Risk and Hazards

1.11.3.1 Relative Ranking

Dow Fire and Explosion and MOND Index

No	Storage Installation	DOW F&E Index	The Degree Of Hazard	Radius Of Exposure (m)	Damage Factor	Toxicity Index	Toxicity Category
1	Pet Ether	76.96	Moderate	19.70	0.51	16.35	Category III
2	Toluene	75.44	Moderate	19.32	0.51	10.70	Category III
3	Chloro Sulphonic Acid (CSA)	72.00	Moderate	18.43	0.68	11.25	Category I
4	Tetrahydrofuran (THF)	71.63	Moderate	18.34	0.45	9.22	Category II
5	Isopropyl Alcohol (IPA)	71.04	Moderate	18.19	0.45	5.25	Category I
6	MIBK	70.45	Moderate	18.04	0.45	9.15	Category II
7	Acetone	68.38	Moderate	17.51	0.46	5.16	Category I
8	Ethyl Acetate	68.38	Moderate	17.51	0.45	5.16	Category I
9	Methanol	65.42	Moderate	16.75	0.42	5.06	Category I
10	Cyclohexane	64.82	Moderate	16.60	0.45	5.04	Category I

Ref.: Dow 's Fire & Explosion Index Hazard Classification Guide , seventh edition & MOND INDEX Manual 1993.

Risk reduction measures: Rationalize the equipment's in the radius of exposure zone and manpower as loss prevention design.

Note: Above assessment depend mainly upon maintenance and plant upkeep and management procedures followed by PP

1.11.3.2 Applicability of MSIHC Rules 1989*

Group		Material	Maximum Storage Capacity MT	Threshold Qty. Mt.*
3	Highly reactive chemicals	Hydrogen	0.35	2
5.3	Very Highly Flammable Liquids.	Toluene	60	1500
5.3	Very Highly Flammable Liquids.	Iso Propyl Alcohol	90	1500
5.3	Very Highly Flammable Liquids.	Methanol	120	1500
5.3	Very Highly Flammable Liquids.	Ethanol	90	1500
5.3	Very Highly Flammable Liquids.	Cyclohexane	30	1500
5.3	Very Highly Flammable Liquids.	Acetone	60	1500
5.3	Very Highly Flammable Liquids.	Ethyl Acetate	60	1500
5.3	Very Highly Flammable Liquids.	Tetrahydrofuran	20	1500
5.4	Highly Flammable Liquids.	Methyl Isobutyl Ketone	20	1500
5.5	Flammable Liquids.	Aniline	20	5000
5.5	Flammable Liquids.	Dimethylformamide	20	5000

*Criteria used: “Manufacture Storage and Import of Hazardous Chemicals Rules, 1989” and amendments.

The site is not Major Accident Hazards (MAH) Installation.

1.11.3.3 Qualitative Risk Assessment:

Qualitative Risk Assessment has been carried out for the following areas:

1. Storage and Handling of Solvents and Liquid Chemicals
2. Storage and handling of solid chemicals at warehouse
3. Storage and handling of Corrosive and Toxic chemicals

Quantitative Risk Assessment:

Following scenarios considered for Quantitative Risk Assessment & Consequence Analysis and recommendations suggested: Accidental loss of containment of

- Toluene, Is Propyl Alcohol, Methanol, Ethanol, Methylene Dichloride, Cyclohexane, Acetone, Ethyl Acetate, Aniline, Tetrahydrofuran (THF), Methyl Isobutyl Ketone (MIBK), Dimethylformamide (DMF) .

Typical Scenarios considered:

Failure Scenarios	Accident Scenario	Effects
Catastrophic failure of tanker	vapor cloud formation and dispersion	Toxic area of vapor cloud
		Flammable area of vapor cloud
	Vapor cloud catching fire	Radiation Effects from pool fire
	Explosion of vapor cloud	Overpressure effects of VCE
Leakage from Pump discharge	vapor cloud formation and dispersion	Toxic area of vapor cloud

		Flammable area of vapor cloud
	Vapor cloud catching fire	Radiation Effects from pool fire
	Explosion of vapor cloud	Overpressure effects of VCE

Assumption and Worst case scenario

Worst Case Scenario/ MCA (Maximum Credible Accident)

Down Wind Affected Distance- Tanker failure

Chemical	Downward affected distance, meters															
	Tank Failure										Radiation effect from pool fire			Radiation effect from Fire ball		
	Toxic area of vapor cloud				Flammable area of vapor cloud			Overpressure Effects								
	AEGL 3 / PAC 3/ EPFG 3	AEGL 2 / PAC 2 / EPRG 2	AEGL 1 / PAC 1 / EPRG 1	IDLH	100 % LEL	60 % LEL	10 % LEL	8.5 psi	3.5 psi	1 psi	10 kw/m2	5 kw/m2	2 kw/m2	10 kw/m2	5 kw/m2	2 kw/m2
Toluene	15	53	204	-	-	<10	34	-	-	-	<10	<10	14	345	488	762
IPA	<10	32	86	-	-	<10	32	-	-	-	<10	<10	13	290	414	648
Methanol	21	53	161	-	<10	12	30	-	-	-	<10	<10	10	234	338	533
Ethanol	-	27	41	-	-	-	27	-	-	-	<10	<10	12	275	393	616
Methylene Dichloride	67	254	460	-	10	18	49	-	13	22	<10	<10	15	117	202	340
Cyclohexane	16	46	123	-	12	19	52	-	14	24	<10	<10	14	351	496	773
Acetone	31	43	217	-	11	18	48	-	13	22	<10	<10	12	283	404	634
Ethyl Acetate	15	44	53	-	<10	11	39	-	<10	13	<10	<10	12	265	381	599
Aniline	41	68	99	-	<10	<10	<10	-	-	-	<10	<10	14	305	434	678
THF	30	106	289	-	11	19	49	-	14	23	<10	<10	13	280	399	624
MIBK	12	48	160	-	-	-	27	-	-	-	<10	<10	13	282	401	627
DMF	17	54	-	-	<10	<10	11	-	-	-	<10	<10	12	248	355	559

Down Wind Affected Distance- Transfer pump discharge line rupture

Chemical	Downward affected distance, meters								
	Failure of pump 100 % of rated flow								
	Toxic area of vapor cloud			Flammable area of vapor cloud			Overpressure Effects		
	AEGL 3 / PAC 3/ EPFG 3	AEGL 2 / PAC 2 / EPRG 2	AEGL 1 / PAC 1 / EPRG 1	100 % LEL	60 % LEL	10 % LEL	8.5 psi	3.5 psi	1 psi
Toluene	63	176	628	36	48	121	-	40	63
IPA	41	105	269	30	41	105	-	30	51
Methanol	78	173	425	16	23	79	-	-	20
Ethanol	-	93	133	23	33	93	-	-	30
Methylene Dichloride	59	232	422	<10	11	42	-	<10	16
Cyclohexane	38	94	252	33	44	109	-	32	59
Acetone	60	83	422	26	35	92	-	27	46
Ethyl Acetate	41	99	120	26	34	87	-	26	47
Aniline	1400	1900	2400	36	48	120	-	40	63
THF	62	222	587	30	40	101	-	31	53
MIBK	65	171	529	33	43	105	-	31	56
DMF	221	640	-	28	36	96	-	29	49

Observations from study:

Based on modelling analysis,

a) Explosion overpressure remains within plant boundary.

b) Radiation effect from pool fire remains within plant boundary.

c) Toxicity effect slightly outside plant boundary.

d) Radiation effect from fireball is found slightly outside plant boundary

1.11.3.4 Individual Risk

Annual fatality risk level per year	Description
1 x 10-3	**Intolerable risk** and unacceptable (Immediate action shall be taken to reduce the hazard and risk)
1 x 10-4	**Maximum tolerable risk** for public *(Management should invest / take measures to control hazards, e.g. Fire detection and control system, traffic signages)*
1 x 10-5	**Tolerable risk** *(People still recognize. Safety slogans have precautionary rings. Such as never swim alone, never point a gun, avoid air travels*
1 x 10-6	**Negligible risk (acceptable risk)** *(Not of major concern i.e. e risk refers to the level of human and property loss that can be tolerated by an individual, group, organization, community)*

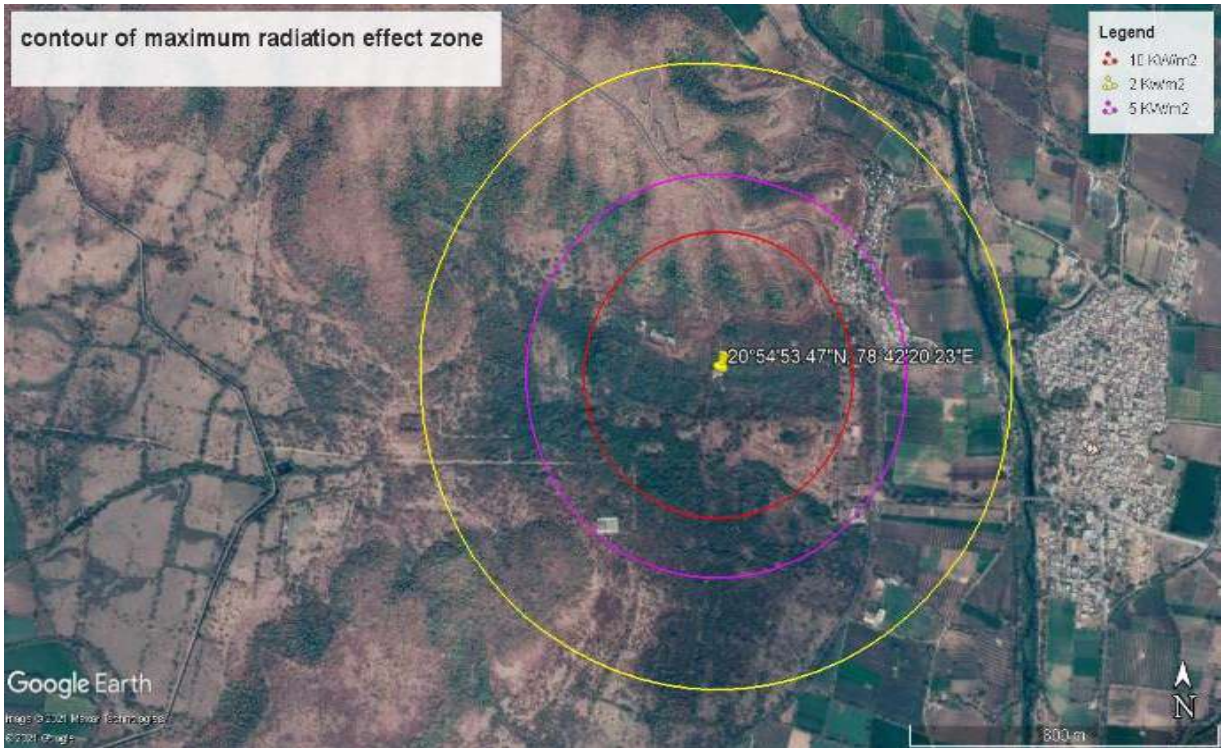
Sr No	Name of Chemical	Incident	Consequence Effect	Frequency of occurance per year	No of Probable Sources (Tanks)	Frequency of Occurance per year	Consequence Mitigation factor	Individual Risk	Cummulative Individual Risk
1	Paraffin	Tanker failure	Toxic release, pool fire	1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	2.21E-07
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	2.35E-07
2	Toluene	Tanker failure		1.6E-05	2	3.2E-05	1.38E-02	4.42E-07	6.76E-07
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	6.90E-07
3	Isopropyl Alcohol AC	Tanker failure		1.6E-05	3	4.8E-05	1.38E-02	6.62E-07	1.35E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	1.37E-06
4	Methanol	Tanker failure		1.6E-05	4	6.4E-05	1.38E-02	8.83E-07	2.25E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	2.26E-06
5	Ethyl Alcohol	Tanker failure		1.6E-05	3	4.8E-05	1.38E-02	6.62E-07	2.93E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	2.94E-06
6	Methylene Dichloride	Tanker failure		1.6E-05	2	3.2E-05	1.38E-02	4.42E-07	3.38E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	3.39E-06
7	Cyclohexane	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	3.62E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	3.63E-06
8	Acetone	Tanker failure		1.6E-05	2	3.2E-05	1.38E-02	4.42E-07	4.07E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	4.08E-06
9	Ethyl Acetate	Tanker failure		1.6E-05	2	3.2E-05	1.38E-02	4.42E-07	4.53E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	4.54E-06
10	Aniline	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	4.76E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	4.77E-06
11	THF	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	5.00E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	5.01E-06
12	Pet Ether	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	5.23E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	5.24E-06
13	MIBK	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	5.46E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	5.48E-06
14	DMF	Tanker failure		1.6E-05	1	1.6E-05	1.38E-02	2.21E-07	5.70E-06
		Pump discharge leak		1.00E-06	1	1.0E-06	1.38E-02	1.38E-08	5.71E-06

Cumulative Individual risk is estimated to be 5.71 E-06

The risk to the member of the public from the raw material storage system at site is well within 'Acceptable' region.

1.11.3.5 Societal Risk

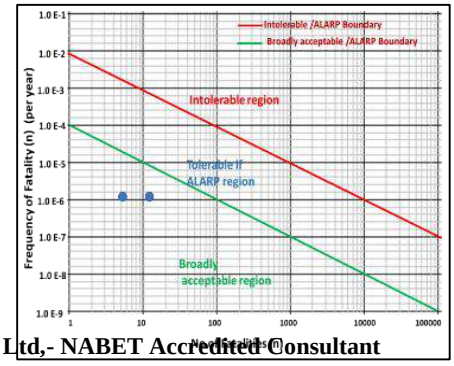
Iso contour of radiation effect



Cumulative societal risk

Direction	Base frequency (Per year)	Direction	Day/Night	Outcome frequency (per year)	Outcome fatalities *(based on 6 % fatality (radiation exposure)*	Cumulatiive Frequency (Societal risk)
South - day	4 x 10 -6	0.7	0.8	2.24 x 10 -6	5	2.24 x 10 -6
West - Day	4 x 10 -6	0.1	0.8	0.32 x 10 -6	5	2.56 x 10 -6
North - day	4 x 10 -6	0.1	0.8	0.32 x 10 -6	5	2.88 x 10 -6
East - day	4 x 10 -6	0.1	0.8	0.32 x 10 -6	5	3.20 x 10 -6
South - night	4 x 10 -6	0.7	0.2	0.56 x 10 -6	3	3.76 x 10 -6
West - Night	4 x 10 -6	0.1	0.2	0.08 x 10 -6	3	3.84 x 10 -6
North - night	4 x 10 -6	0.1	0.2	0.08 x 10 -6	3	3.92 x 10 -6
East - night	4 x 10 -6	0.1	0.2	0.08 x 10 -6	3	**4.00 x 10 -6**

F N Curve for the project



Cumulative societal risk estimated as 4.00 E-06

As per Health and safety commission guidelines **Societal risk is acceptable.**

Chemical compatibility:

Chemical compatibility chart is developed based on properties of chemicals for storage and handling

Chemical compatibility chart for warehouse chemicals

Y : Compatible
N : Incompatible
C : Caution
SR : Self-Reactive
* : Changed by user

NFPA Health	NFPA Flammability	NFPA Instability	NFPA Special	Ipca, Wardha. ware house Compatibility Chart	2-ETHYLANILINE	CHLOROACETIC ACID, SOLUTION	DIETHYLAMINE	DIMETHYL SULFATE	ETHYLAMINOETHANOL, [COMBUSTIBLE LIQUID LABEL]	ETHYLENE GLYCOL	FURFURYLAMINE	HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN 20% BUT	MORPHOLINE	PHOSPHORIC ACID	PHOSPHORUS OXYCHLORIDE	THIONYL CHLORIDE	TRIETHYLAMINE
1	2	0		2-ETHYLANILINE													
4	1	0		CHLOROACETIC ACID, SOLUTION	N												
3	3	0		DIETHYLAMINE	Y	N											
4	2	1		DIMETHYL SULFATE	Y	Y	C										
3	2	0		ETHYLAMINOETHANOL, [COMBUSTIBLE LIQUID LABEL]	Y	N	Y	C									
2	1	0		ETHYLENE GLYCOL	Y	N	Y	Y	Y								
2	3	0		FURFURYLAMINE	Y	N	Y	C	Y	Y							
3	0	1	Oxi	HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN	N	N	N	N	N	N	N						
3	3	1		MORPHOLINE	Y	N	Y	C	Y	Y	Y	N					
3	0	0		PHOSPHORIC ACID	C	Y	C	Y	C	Y	C	C	C				
4	0	2	W	PHOSPHORUS OXYCHLORIDE	N	N	N	N	N	N	N	N	N	N			
4	0	2	W	THIONYL CHLORIDE	N	N	N	N	N	N	N	N	N	N	Y		
3	3	0		TRIETHYLAMINE	Y	N	Y	C	Y	Y	Y	N	Y	C	N	N	
				VALERYL CHLORIDE	N	N	N	N	N	N	N	N	N	N	Y	Y	N

Handling & storage for warehouse chemicals

- All material will be suitably labelled with their properties
- Segregation of chemical based on its properties
- Chemicals will be stored according to chemical compatibility chart
- Chemical in warehouse will be stored in a secure store well protected from elements of nature
- Containers will be selected based on chemical characteristics
- Storage areas will be provided with appropriate spill containment measures with facilities for clean up commensurate.
- The MOC of the containment trays shall be compatible with the chemical
- Adequate ventilation facilities
- Liquid material will be stored at floor level Stability of the stack will be maintained.

Chemical compatibility:

Chemical compatibility chart is developed based on properties of chemicals for storage and handling

Chemical compatibility chart for bulk chemicals

Y : Compatible
N : Incompatible
C : Caution
SR : Self-Reactive
*: Changed by user

NFPA Health	NFPA Flammability	NFPA Instability	NFPA Special	Ipca, Wardha Solvent Compatibility Chart	ACETONE	ANILINE	CYCLOHEXANE	DICHLOROMETHANE	ETHANOL	ETHYL ACETATE	ISOPROPANOL	METHANOL	METHYL ISOBUTYL KETONE	MINERAL OIL	N,N-DIMETHYLFORMAMIDE	PETROLEUM NAPHTHA, [V. M. & P.]	TETRAHYDROFURAN
1	3	0		ACETONE													
3	2	0		ANILINE	C												
1	3	0		CYCLOHEXANE	Y	Y											
2	1	0		DICHLOROMETHANE	Y	N	Y										
2	3	0		ETHANOL	C	Y	Y	Y									
1	3	0		ETHYL ACETATE	Y	Y	Y	Y	Y								
1	3	0		ISOPROPANOL	C	Y	Y	Y	Y	Y							
1	3	0		METHANOL	C	Y	Y	Y	Y	Y	Y						
2	3	1		METHYL ISOBUTYL KETONE	Y	C	Y	Y	C	Y	C	C					
0	1	0		MINERAL OIL	Y	Y	Y	Y	Y	Y	Y	Y	Y				
2	2	0		N,N-DIMETHYLFORMAMIDE	Y	C	Y	C	Y	Y	Y	Y	Y	Y			
1	3	0		PETROLEUM NAPHTHA, [V.M. & P.]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
2	3	1		TETRAHYDROFURAN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2	3	0		TOLUENE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Handling & storage for bulk chemicals

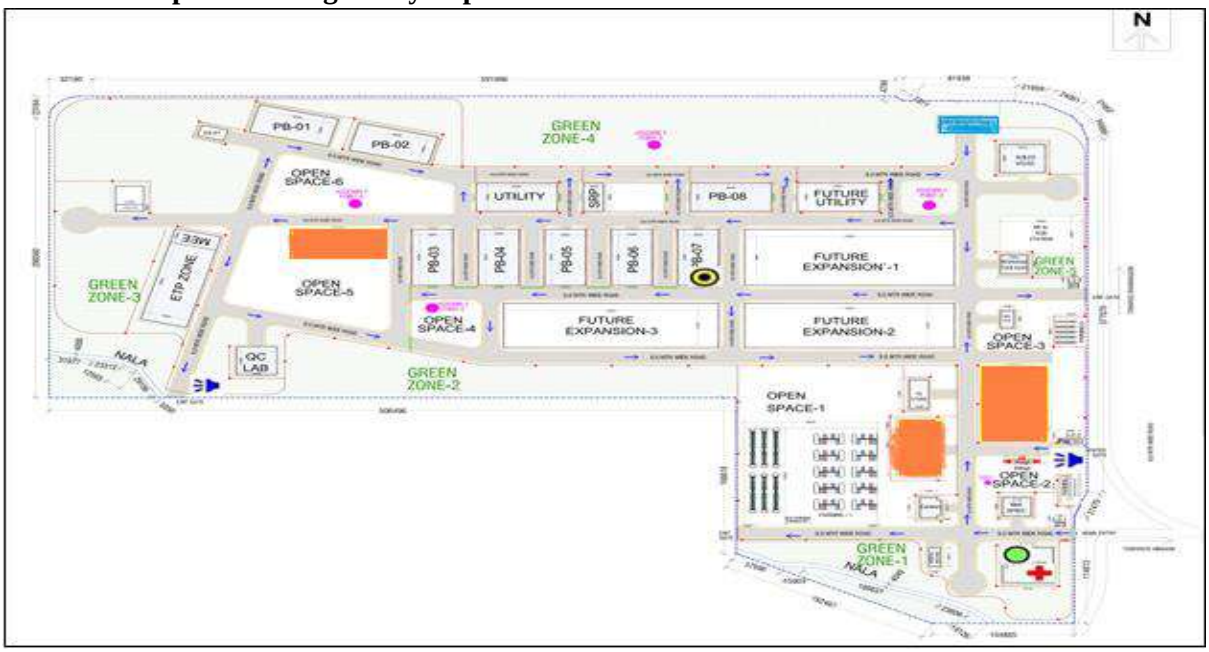
- Dyke volume of 110% of the total volume of liquid will be provided
- MOC of the tanks, dyked area walls & flooring will be selected based on chemical characteristics
- Operating equipment shall not be located within the dyked area
- The electrical fittings near dyked area shall conform to the electrical area classification
- Tanks shall be earthed
- Drain valve will be provided to dyked area.
- The drain from the dyked area shall be led to a hold tank
- Emergency equipment for firefighting and spill management will be provided near dyked area and shall be accessible at all times.
- All material transfer equipment shall be properly tagged showing direction of flow.
- Labelling with their storage capacities for individual tanks

1.11.3.6 Risk Mitigation measures

- Hydrogen Gas detectors to be placed near cylinder bank area and reactor area.
- Hydrogen cylinder bank should be placed at distance (min 15m) from reactor area. The bank should be covered with FW monitor and hydrants.
- Provision of separate Rupture Disc line to avoid further consequence.
- Storage of chemicals considering compatibility and reactivity hazards.
- Dyke for accidental spillage containment for above ground storage tanks.
- SOP/s and emergency instruction,
- Training and validation of all workmen.
- Fire detection and protection system
- Fire hydrant system.
- Availability of Spill control kit.
- LDAR (Leak detection and rectification.
- Provide scrubber and leak detector at site as well as at vent of the scrubber.
- Provide color code for transfer piping and display piping color code at site.
- Provide PPE, SCBA. Warning signages.
- Carry out Work area monitoring for air born concentration of chemicals.
- Development of Onsite emergency management plan.
- Occupational Health Center will be available at site as per Maharashtra Factories rule equipped all necessary equipment's, full time doctor and trained personnel.
- Transportation of Hazardous Materials
    - Spark arrestor at exhaust
    - Display of class labels , HAZCHEM code.
    - TREM card.
    - Availability of MSDS.
    - PPE, First aid box, toolbox, safety equipment's, antidotes as may be necessary to contain an accident.
    - Periodic training and validation of Tanker/Truck Drivers
    - Valid registration to carry the said goods.

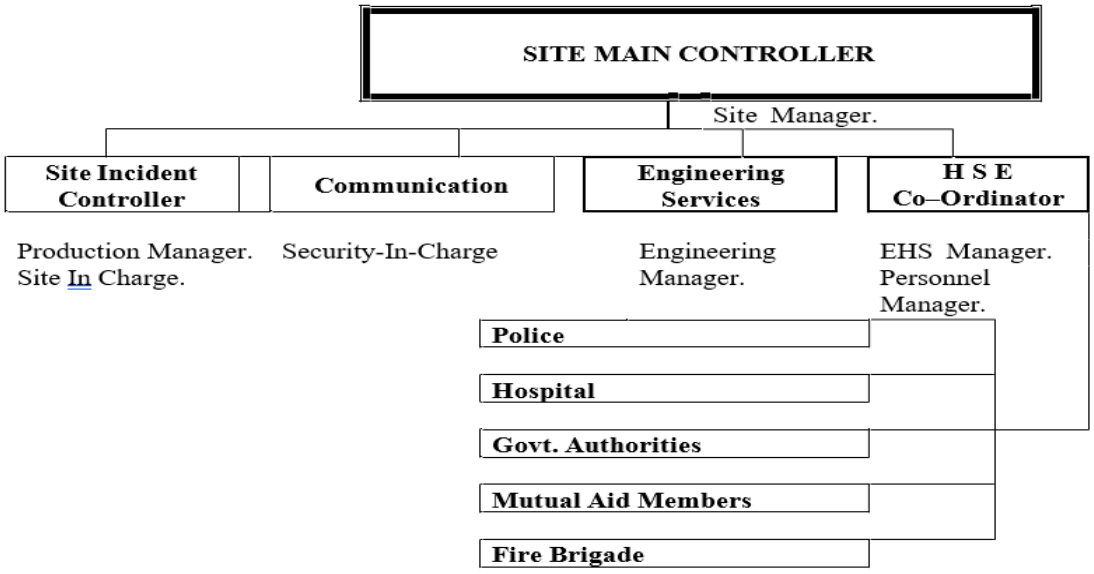
- Risk Reduction Measures suggested for Fugitive Emission Control
- Use of closed feed system for toxic materials.
- Equipment venting through scrubber system.
- Monitoring of air born concentration of chemicals in workplace.
- Preventive maintenance for pumps.

1.11.3.7 Site plan showing Safety Aspects



Siren		Assembly Point		First Aid		Water Storage	
Emergency Control Centre		Escape Route		Wind direction Sack		Hazardous Area Fire/ Explosion/ toxic gas release	

1.11.3.8 Emergency Preparedness Organization Chart



1.12 Overall Recommendation and Implementation Schedule

The mitigation measures suggested earlier are to be implemented so as to reduce the impact on the environment due to proposed project. The implementation of these recommendations could be done in phases so that, the most important mitigation measures would be implemented first and the mitigation measures, which are less important, could be implemented later.

Along with the implementation of these mitigation measures, monitoring schedule and Infrastructural requirements for environmental protection detailed in previous chapter are important for environmental control measures

1.13 Summary of the Environmental Management Plan

The summary of the Environmental Management Plan is presented Table below,

Table 1 : Summary of Environmental Management Plan

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
Air Environment				
1	Emission of PM10,NOx and SO2 from the proposed boiler (16 TPH x 2 Nos, 8 TPH x 1 No.) & Thermopack (10 LacKcal/Hr x 2 Nos)	500 to 1,500 meters in predominant wind direction.	• Provision of adequate stack height will be ensured. • Installation of the ESP, multi dust cyclone followed by bag filter and online monitoring system for the proposed boiler .	Process Head
2	Proposed HCl, SO2, Ammonia etc due to operation of plant.	250 to 500 meters in predominant wind direction.	• Provision of adequate stack height will be ensured with high efficient wet scrubbers. • Ensuring that the plants are operated 24 x 7 by providing necessary power backups (DG Sets) • Ensuring the provision of all safety features along with water spraying, • Ensure Onsite plans are made and followed, also strictly adhered to offsite plans too during emergency situations; • Ensure periodic monitoring of stacks for parameters prescribed by MPCB.	Process Head
3	Fugitive emissions plant operation and storage of raw material and finished goods.	Within 100 m from the source.	• Ensure periodic work place monitoring of for HCl and SO_2	Process Head
4	Dust generation due to Transportation activity.	Nearby villages & roads.	• Transportation of raw materials and finished goods will be carried out in covered trucks.	Process Head
Water Environment				
5	Generation of wastewater from boiler blow down	Within plant	Boiler blow-downs (48 CMD) will be treated in conventional effluent treatment plant having	EHS Manager

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
			Primary Secondary and tertiary treatment.	
6	Waste water generation from Cooling tower blow down	Within plant premise	Cooling tower blow-downs (99 CMD) will be treated in conventional effluent treatment plant having Primary Secondary and tertiary treatment.	EHS Manager /
7	Workforce requirement for proposed plants	Within plant premise	The waste water generated from domestic activity will be treated in proposed STP of 40 CMD capacity.	Head, Civil
8	Waste Water Generation from ETP	Surrounding Surface Water	High TDS stream (150 CMD) will be treated separately in MEE-1. Condensate from MEE- 1 (180 CMD= 150 CMD + 30 CMD live steam condensate from MEE) along with Low TDS stream from washings (260 CMD) and utility blow-downs (147 CMD) will be treated in conventional effluent treatment plant having Primary Secondary and tertiary treatment. Treated effluent (587 CMD) will be fed to RO, permeate (440 CMD) will be reused in utilities and reject (147 CMD) will be again treated in MEE-2, condensate from MEE-2 (177 CMD= 147 CMD + 30 CMD live steam condensate from MEE) will be reused in utilities, achieving Zero Liquid Discharge (ZLD).	Head ETP
9	Consumption of water (surface) for operation of plant	Fresh water from Bor Dam	The fresh water demand will be reduced by recycling and reuse of treated water through RO, Solvent	Head process in charge

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
			stripper, MEE, ATFD and Conventional Effluent treatment plant.	
10	Mixing of contamination form Process, chemical fuel storage and handling area, Effluent treatment plant with storm water	Surrounding surface water bodies	Separate drain for storm water and for effluent Management will be proposed to avoid run off contamination.	Top Management for CAPEX, Projects Team, Head, Civil
Land Environment				
1	Removal of top soil and Land clearance during site preparation	Within plant premise	The land is private land owned by Ipca and meant for Industrial activity. Top layer of soil will be used for Landscaping purpose.	Head, Civil
2	Generation of construction waste and scraps to accommodate the expansion capacity.	Within plant premise	Debris will be used in filling of low lying area as far as possible, Concrete bags, aggregates will be given for the authorized vendors for reuse	Head, Civil
3	Generation of scraps from Heavy fabrication work	Within plant premise	Scraps will be handled as per rules and sold to authorized vendors	Head, Civil
4	Generation of Process Residues, ETP sludge , MEE salts	Within plant premise	Process residue, ETP sludge and MEE salts will be sent to CHWTSDF/ Preprocessing /Coprocessing	Head process in charge
6	Generation of Waste Drums/Barrels/bags and containers	Within plant premise	Will be given to authorized vendors	Head, Civil
7	Generation of Sewage sludge due to influx of workers	Within plant premise	Proper sanitation and STP Sludge will be used as manure for gardening.	HRD and civil department
8	Generation of used oil and lubricants, scraps and used spares etc from Equipment maintenance	Within plant premise	Used oil and Lubricants will be given to authorized refineries as per HW rules and scraps and used spares etc will be given to authorized vendors	Head process in charge
Noise Environment				
1	Noise Generation due to vehicular movement for	Within plant premise	Maintenance and servicing of mechanized equipment	Security officer and Head, Civil department

S No.	Expected Aspect due to Proposed Activity	Impact Zones	Management Plan	Responsibility
	transportation of raw materials and finished goods		and vehicles, Project activities to be undertaken during regular working hours, Erection of temporary barriers	
2	Noise Generation from Heavy fabrication work	Within plant premise	Properly certified, tested and calibrated equipment's will be used. Ear plugs/Muffs will be provided / and use ensured	Contractor / Third Party
3	Noise Generation due to operation of Cooling towers, pumps, compressors, blowers, DG sets etc	Within plant premise	Acoustic enclosures will be built-in with equipment by technology provider. PPE like Ear Plugs & ear muffs will be provided and its use shall be ensured	Head Process In charge

1.14 Budget Allocation

The anticipated details of proposed capital expenditure and along with recurring expenditure are indicated in Table-9.

Table -9: Budget allocation for the EMP

a) During Construction Phase

Sr. No.	Attribute	Mitigation measures/Details	Capital Cost (Rs lakh)
1	**Air**	Water sprinkling through sprinkler for the dust suppression during the construction	**8**
2	**Water**	Provision of the onsite mobile portable toilets for the construction labors and the silt traps for prevention of soil erosion along with runoff	**12**
3	**Noise**	Noise damping pads, enclosure of the area by tin sheets	**6**
4	**Soil**	Preserving top soil for the later use in green belt by storing at a temporary place	**4**
5	**Solid waste**	Segregation of the solid waste in wet and dry waste and provision of the separate bins for the same	**11**
6	**Hazardous waste**	Storage areas for the hazardous waste such as empty paint cans etc and barrels for used oil , etc	**2**
7	**Fuel & Energy**	Use of cleaner fuel for construction machineries	**6**
8	**Safety & heath**	Provision of the PPE kit for the workers such as safety harness, safety goggles, safety helmets , gloves	**7**
Total			**56**

b) During Operational Phase

Sr. No.	Pollution Activity	Mitigation Measures/Details	Responsibility in Organization	Capital cost (In Rs. lacs)	Recurring cost (Rs. Lacs/yr)	Purchase/Implementation Schedule
1	**Air pollution**	Provision of Boiler stack, Scrubbers, Provision of Multicyclone, Bag filters etc. Online monitoring for process vents	EHS Team	400	100	During Commissioning and operation phase
2	**Water Pollution**	Effluent Treatment Plant & STP Online continuous monitoring for effluent as per CPCB guidelines	EHS Team	2135	1906	During Commissioning and operation phase
		RO System & Multiple Effect Evaporators				
3	**Noise pollution**	Acoustic encl./ Anti vibration pads	EHS Team	Included in capital cost	20	During Construction, Commissioning and operation phase
4	**Occupational health**	Medical check-up	HR/Admin/ EHS Team	50	36	During operation phase
		Health insurance policy				
		Medical staff charges				
		First aid facilities consumables				
		In-house first aid room				
		Other infrastructure and Equipment				
5	**Green belt**	Potholes digging, Saplings, labor cost, Fertilizers, Drip irrigation facility &maintenance	HR/ EHS Team	50	20	From Construction Phase

6	**Hazardous Waste**	Segregation & Storage of Waste, Disposal to CHWTSDF site	EHS Team	150	2500	During Construction and Operation phase
7	**Environmental monitoring and Management**	Regular monitoring of Ambient Environmental Conditions & Pollution Control Equipments	EHS Team	--	25.0	During Operation phase
8	**Carbon Footprint Monitoring**	Installation of solar Panels for reduction of consumption of electricity which indirectly reduce carbon footprint. Provision of bigger tank farm to reduce number of transportation resulting in reduction of CO2, Reduction of fuel consumption by using well efficient insulation to heating equipment.	Project Team/ EHS Team	1030	20	During Construction and Operation phase
9	**Water Footprint Monitoring**	Rain water harvesting & use of rain water in utilities & domestic, *Recycling & reuse of treated waste water in utilities Regular maintenance of equipment to reduce wastage of water due to leaks	Project Team/ EHS Team	50	20	During Operation phase
	Sub Total			3865.00	4647.0	
10	**Corporate Environmental Responsibility (CER)**			553.00	--	
	Final Total			4418.00	4647.0	

1.14.1 Regular Environmental Audits and Corrective Action

Environmental Auditing is the process of determining whether our operations and practices are in compliance with regulatory requirements, company policies and procedures and accepted standards. The audit program and procedures will cover both internal and external auditing requirements, including scope, frequency and methods, as well as the responsibilities and requirements for conducting audits and reporting results. The frequency of audits will reflect the level of significance of environmental impacts and the results of previous audits.

Environmental audit will cover following points:

- Defines sources, quantities and types of waste generation
- Collects information on unit operations, raw materials, products, water usage and wastes and increase Knowledge of the process.
- Highlights process and poor management
- Helps to set targets for waste reduction
- Helps to improve process efficiency
- Enable legislative compliance and avoids litigation
- Corrective Action

Ipca Ltd. will define procedures for dealing with non-compliance with environmental management controls, environmental incidents and emergencies. The procedures will also define who is responsible and has the authority for handling and investigating non-compliance, taking action and completing corrective and preventative action.

Schedules will be developed for recording environmental incidents, non-compliance and corrective and preventative actions.

1.14.2 Environmental Management Schedules and reporting

Environmental management schedules are copies of forms, reports or registers used during a projects day-to-day environmental management. Examples include:

- Site Inspection Checklist
- Non-compliance and Corrective Action Report
- Complaints Report
- Environmental Incident Report
- Environmental Training Register
- Monitoring Checklist.
- Waste Register, and

Relevant Schedules Included in The EMP are as Follows.

There will be three facets to design and follow the schedules viz.:

(A) for compliance of responsibilities,

(B) for day-to-day operation and management of ETP and ECE, and

(c) for routine environmental monitoring, to assess the impact and take timely warning.

- **The Schedule**

The schedule of compliances is presented in Table-10

Table -10: Schedule of compliances

Daily compliance	**Monthly compliance**	**Quarterly compliance**
Take the meter readings - initial and final, for checking the water consumption	Monitor the emissions sources through the competent authority and submit the analysis reports to the board.	Monitor the ambient air quality at upwind and downwind locations of the factory.
Maintain the electricity consumption record for pollution control	Monitor ambient/work zone noise levels & ensure conformance to standards.	Review the Water Reuse performance
Monitor ambient air as per the Notification of November 2009.		

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1.14.3 Approval, Licensing and Legal Register

Syntheic Organic Chemical Industry is regulated by various legislations related to manufacturing and environment.

Environmental Legislations

- The Water (Prevention and Control of Pollution) Act, 1974 and Rules
- The Water (Prevention and Control of Pollution),Cess Act,1977 and Rules
- The Air (Prevention and Control of Pollution) Act, 1981 and Rules
- Relevant provisions under Environmental Protection Act and Rules, 1986
- The Environment Impact Assessment Notification 1994 & 2006

- The Noise Pollution (Regulation and Control) Rules, 2000
- The Municipal Solid Waste (Management & Handling Rules), 2000
- Hazardous waste (management and Handling) Rules 2016
- The manufacture, Storage and Import of Hazardous Chemical Rules, 1989
- The Rules for the Manufacture, use, Import, Export and storage of Hazardous Micro-organisms/Genetically Engineered Organisms or cells, 1989
- The Chemical accidents (Emergency planning, preparedness and Response) Rules, 1996

A projects regulatory framework has been identified by proponent. An EMP includes relevant requirements to ensure they are considered, including:

- Carryout "Environmental Audit Statement" of various environmental aspects, review

the environmental policies with the help of experts and make the upgradation.

- Submit the "Environmental Statement" to the State Pollution Control Board in Form-V under Rule 14 of the Environment (Protection) Second Amendment Rules 110102 of the Environment (Protection) Act, 1986.
    - Renew the Consent to Operate under the Water and Air Acts.
    - File the Cess returns to the State PCB under the Water (Prevention and Control of
    - Pollution) Cess Act, 1977.
    - Renew the Hazardous Waste Authorization under sub-rule 3 of the Hazardous Waste (Management Handling & Trans boundary) Rules, 2016.